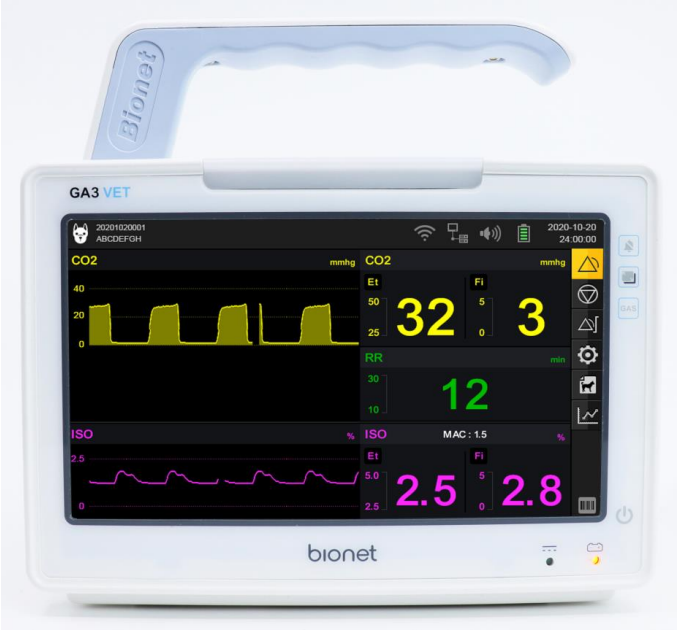
GA3VET

Instructions for use

Veterinary EtCO2 and Multi-Gas Monitor

Rev. 1.0

2021.07.12



GA3VET

Warning

To ensure proper use of this veterinary equipment, you must read and comply with this user manual

Before using Bionet devices, read all the manuals that are provided with your device carefully. Animal monitoring equipment, however sophisticated, should never be used as a substitute for the human care, attention, and critical judgement that only trained health care professionals can provide.

Table of Contents

GA3VET User Manual

Intended Use

GA3VET is an efficient anesthetic gas monitor for use with canine, feline, and equine patients. For patient monitoring, concentrations of carbon dioxide and volatile anesthetic gases in the respiratory gas mixture are measured and displayed.

The carbon dioxide concentration and the volatile anesthetic gas concentration are displayed as real-time curves. Additionally, inspiratory and expiratory concentrations are displayed for all measured gas concentrations. The respiratory rate is determined from the carbon dioxide concentration curve and then displayed.

The monitor offers visual and audible monitoring alarms when it indicates outside of the value ranges from high alarm limit to low alarm limit of the measured parameters.

NOTE
All hardware and screenshots in this user guide are for illustration purposes only. Actual products or screens may vary slightly.

General Description

The GA3VET monitor can monitor the following parameters:

- Inspiratory and expiratory concentrations of carbon dioxide
- Respiration rate
- Inspiratory and expiratory concentrations of volatile anesthetic gases (Isoflurane, Sevoflurane, Enflurane, Halothane, Desflurane)

This monitor is designed to be used in an environment where a health care professional can

determine when to use the equipment for its intended purpose, based on an expert assessment of the animal's medical condition, including veterinarians.

Animal Classification

GA3VET monitors are designed for use with canine, feline, and equine.

Functional Safety

The essential performance of the monitor is to provide the veterinarian with meaningful parameter values and to sound an alarm when the established parameter value is exceeded or the function that provides the value is not working properly. We assessed the risks associated with the use of the monitor in light of these essential performance features and mitigated the risk of lowering the residual risk to a level that could be used without compromise as long as the monitor is maintained by its regular lifecycle maintenance and service recommendations.

Warning, Caution, Note

The following terms are defined in the user guide to emphasize the agreement as follows: The user must follow all warnings and precautions.

The specifications and functions shown in this manual are subject to change without prior notice.

WARNING
"Warning" A warning contains important information regarding possible danger to you or the animal that is present during normal operation of the equipment.

CAUTION
"Caution" A caution provides information or instructions that must be followed to ensure proper operation and performance of the equipment.

NOTE
"Note" A note presents information that helps you operate the equipment or connected devices.

Define Groups

The defined groups for this product are users, service personnel, and experts.
Defined groups should read the user manual before using the product and be trained in the use, installation, reprocessing, maintenance and repair of the product.
This product can only be used, installed, reprocessed, maintained and repaired by a defined group.

User

Users use the product for their intended use.

Service Personnel

Service personnel are responsible for the maintenance of the product.

They must be trained in the maintenance of the medical device, install, reprocess and maintain the product.

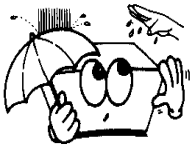
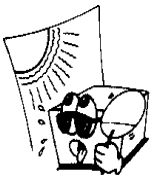
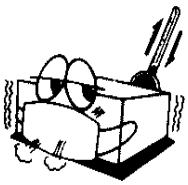
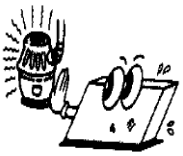
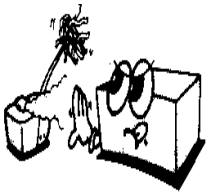
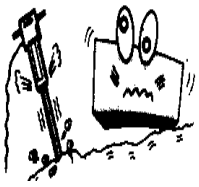
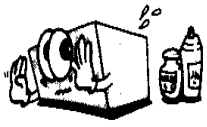
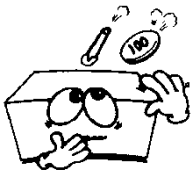
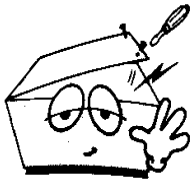
Expert

The expert repairs the product or performs complex maintenance tasks.

The expert has the knowledge and experience to perform complex maintenance tasks on the product.

General Precaution on Environment

Do not keep or operate the equipment in the environment listed below.

	Avoid placing in an area exposed to moisture. Do not touch the equipment with wet hands.		Avoid exposure to direct sunlight.
	Avoid placing in an area where there is a high variation of temperature.		Avoid placing in the vicinity of Electric heaters.
	Avoid placing in an area where there is an excessive humidity rise or ventilation problem.		Avoid placing in an area where there is an excessive shock or vibration.
	Avoid placing in an area where chemicals are stored or where there is danger of gas leakage.		Avoid inserting dust and especially metal material into the equipment.
	Do not disassemble the equipment. We take no responsibility for unauthorized repairs.		Power off when the equipment is not fully installed. Otherwise, equipment could be damaged.

Electromagnetic Compatibility

The monitor has been designed and tested for compliance with current regulatory standards as to its capacity to limit electromagnetic emissions(EMI), and also as to its ability to block the effects of EMI from external sources.

The monitor complies with the following standards pertaining to EMI emissions and susceptibility : EN60601-1-2, CISPR 11 Class A.

To reduce possible problems caused by electromagnetic interference, we recommend the following.

- Use only Bionet approved accessories.
- Ensure that other products used in areas where Animal monitoring and life support is used comply to accepted emissions standards (CISPR 11, Class A).
- Try to maximize the distance between electro medical devices. High-power equipment related to electrical simulators, electrosurgical instruments and radiators (X-ray machines) as well as evoked potential devices may cause monitor interference.
- Strictly limit exposure and access to portable radio frequency sources (e.g. cellular phones and radio transmitters). Be aware that portable phones may periodically transmit even when in standby mode.
- Maintain good cable management. Do not route cables over electrical equipment. Do not intertwine cables.
- Ensure all electrical maintenance is performed by qualified personnel.

CAUTION
Infectious devices and parts must be sanitized and cleaned before disposal.

1. Basic

Basic Overview

GA3VET is an efficient anesthetic gas monitor for use with canine, feline, and equine. For patient monitoring, concentrations of carbon dioxide and volatile anesthetic gases in the respiratory gas mixture are measured and displayed. The use of the monitor is limited to one animal at a time.

The carbon dioxide concentration and the volatile anesthetic gas concentration are displayed as real-time curves. Additionally, inspiratory and expiratory concentrations are displayed for all measured gas concentrations. The respiratory rate is determined from the carbon dioxide concentration curve and then displayed.

The monitor offers visual and audible monitoring alarms when it indicates outside of the value ranges from high alarm limit to low alarm limit of the measured parameters.

The monitor can be connected with BT-Link or BT-Link Mobile via LAN or WiFi.

Electric Safety Precautions

CAUTION

Please check the following before using the product.

1. Be sure that AC power supply line is appropriate to use. (AC100 - 240V)
2. Be sure that the power source is the one supplied from Bionet.

   (Manufacturer : BridgePower, Model: JMW128KA1503F51, Rated Voltage: DC15V/2.0A)
3. Be sure that the entire connection cable of the system is properly and firmly fixed.
4. Be sure that the equipment is completely grounded.

   (If not, there might be the problems occur in the product.)
5. The equipment should not be placed in the vicinity of electric generators, X-ray, broadcasting apparatus to eliminate the electric noise during operation. Otherwise, it may cause incorrect results.

NOTE

GA3VET is classified as follows :

- GA3VET classifies as Class II, BF concerning electric shock. It is not proper to operate this equipment around combustible anesthetic or dissolvent.
- Noise level is A class regarding IEC/EN 60601-1 and the subject of noise is A level concerning IEC/EN60601-1-2.

WARNING

Do not touch the animal while using the defibrillator. The user may be at risk.

When using the defibrillator, be careful about safety and use only the supplied cable.

WARNING
In case the equipment does not operate as usual or is damaged, do not use on animal, and contact the medical equipment technician of the hospital or the equipment supply division.

Equipment Connection

CAUTION
Veterinarians and animals in hospitals are exposed to the risk of uncontrollable currents. This current is caused by a potential difference between the equipment and a conductive object that can be contacted. Use auxiliary equipment to meet this requirement in accordance with EN60601-1; 2011.

Biocompatibility

When used as intended, the parts of the product described in this operation manual, including accessories that come in contact with the animal during the intended use, fulfill the biocompatibility requirements of the applicable standards. If you have questions about this matter, please contact Bionet or its representatives.

Product Configuration

1. Main body of GA3VET monitor 1 EA
2. DC adaptor 1 EA
3. User manual 1 EA
4. Rechargeable battery 1 EA
5. Power cord 1 EA
6. IV pole mounting kit 1 SET

Optional Products

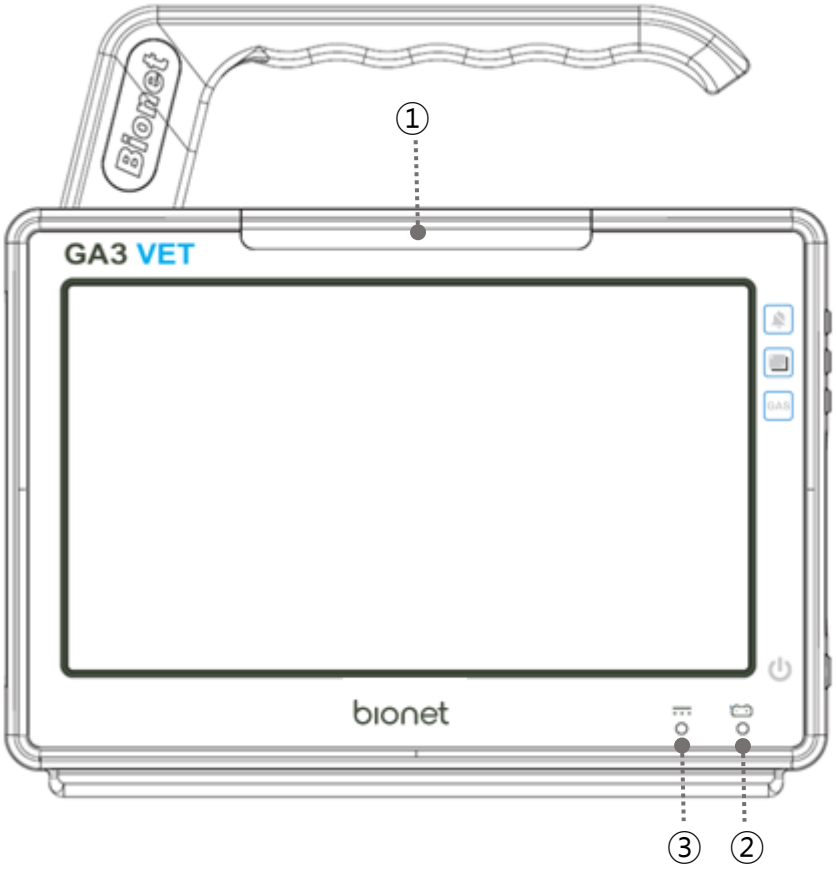
1. Sidestream EtCO2 sensor
2. Mainstream EtCO2 sensor
3. Sidestream EtCO2 airway adapter sampling kit
4. Mainstream EtCO2 airway adapter
5. Sidestream Dual Gas module
6. Sidestream Dual Gas airway adapter sampling kit
7. Dual Gas module holding kit
8. Mainstream EtCO2 sensor holding kit

WARNING
In order to avoid electrical shock, do not open the cover. Disassembling the equipment should be done only by the service personnel authorized by Bionet.

WARNING
Users must pay attention to connecting any auxiliary device via LAN port. Always consider about summation of leakage current, please check if the auxiliary device is qualified by IEC 60601-1, or consult your hospital biomedical engineer.

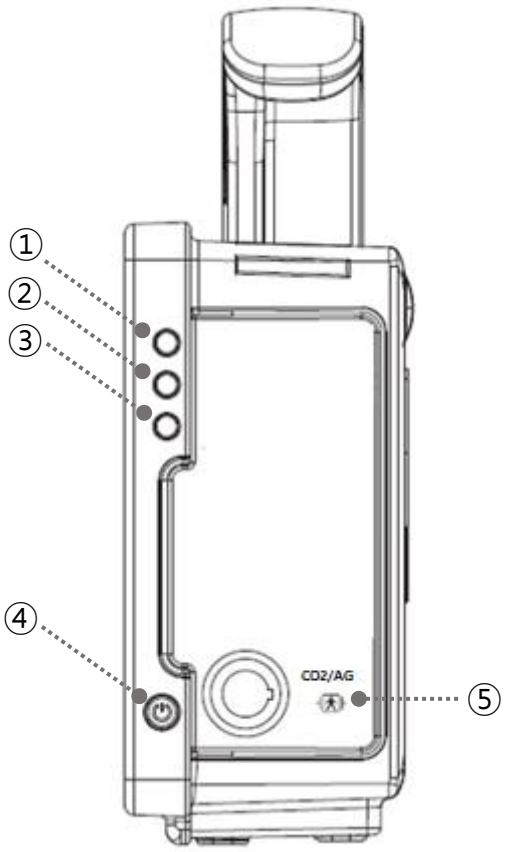
Basic Unit

Front View



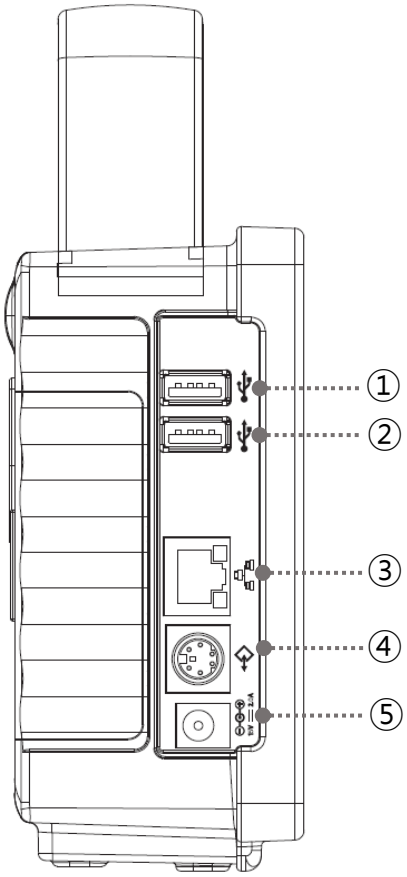
①	Alarm lamp
②	Battery operation indicator
③	AC status indicator

Right Side View



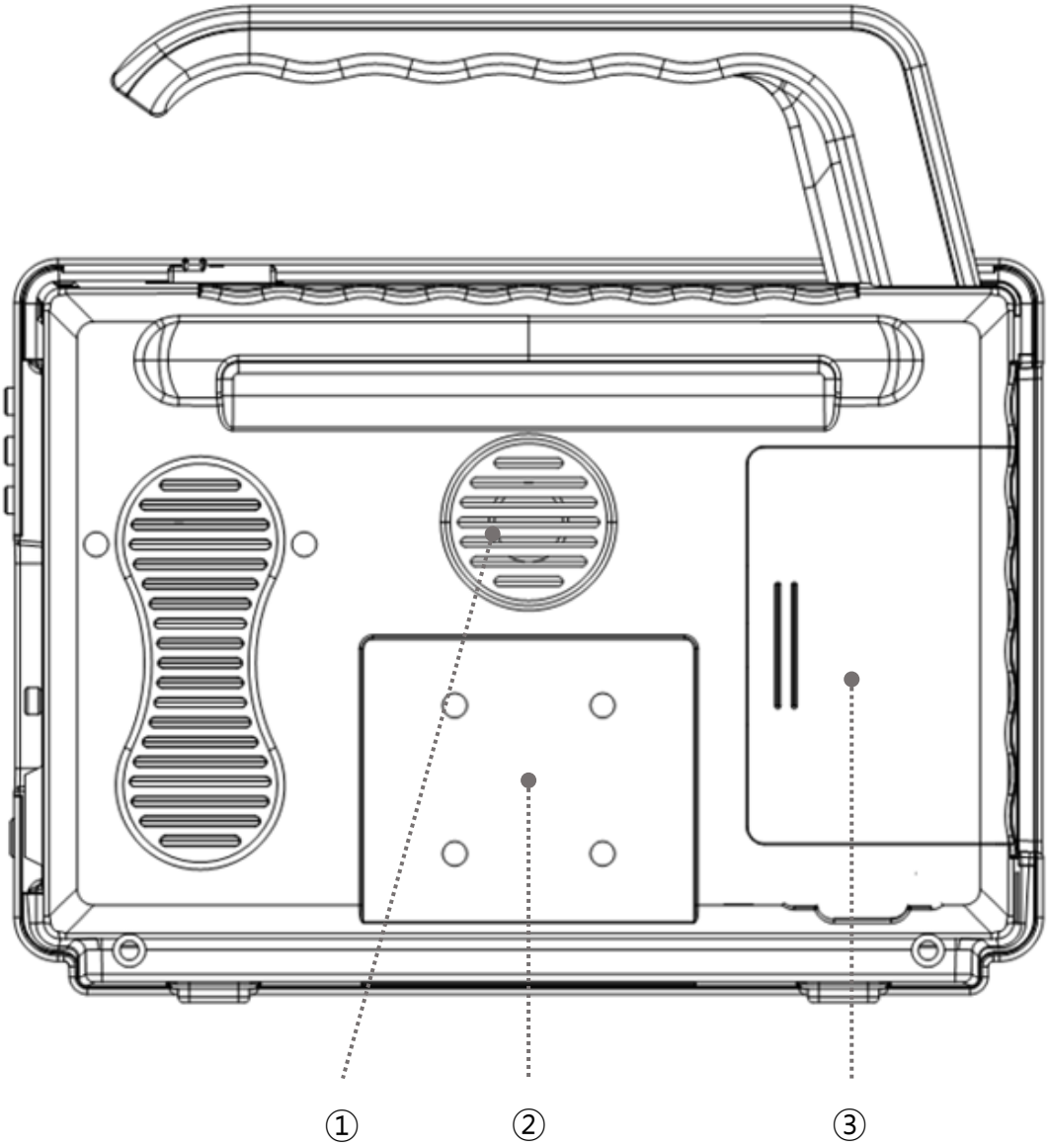
①	Alarm control key
②	Display mode selection key
③	Anesthetic gas setup key
④	Power ON/OFF key
⑤	Receptacle for sidestream/mainstream EtCO2 or sidestream Dual Gas module

Left Side View



①	USB port
②	USB port
③	Network connection port
④	Service port
⑤	DC adaptor connector

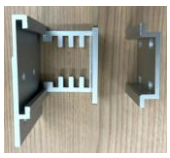
Back Side View



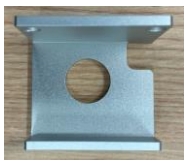
①	Speaker hole
②	4 screw holes for IV Pole mounting bracket or Dual Gas module mounting bracket
③	Battery Cover

NOTE
USB Compatible ● The GA3VET is compatible with external USB memory drives up to 64GB. ● We recommend branded products listed in this manual. (SanDisk, PNY, Transcend, Samsung) ● When using a product with high power consumption, such as an external flash drive, be sure to use the provided adapter for suitable power supply. (Cannot be used alone as a power supply) ● You should save the data of any connected device before connecting the additional device. ● It may not support some devices that require high power.

Sidestream Dual Gas module

	Dual Gas module set includes - Dual Gas Module 1ea - Water Trap 1ea, - Sample Line 1ea, - Airway Adapter (Straight) 1ea,
	Water Trap
	Sample line with luer lock (8′)
	Airway Adapter (Straight)
	Airway Adapter (L type)
	Dual Gas module mounting kit includes - DGM main clamp 1ea - DGM bracket hanger 1ea

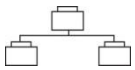
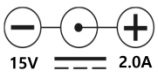
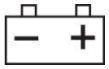
Mainstream EtCO2 module

	CAPNOSTAT 5 CO2 Mainstream Sensor
	Bionet CO2 Mainstream Sensor
	Single Patient Use - Adult Airway Adapter For CAPNOSTAT® 5 CO2 Mainstream Sensor ET Tubes > 4.0mm (1 per box)
	Single Patient Use - Infant/Neonatal Airway Adapter For CAPNOSTAT® 5 CO2 Mainstream Sensor ET Tubes <= 4.0mm (1 per box)
	Reusable Adult Airway Adapter For CAPNOSTAT® 5 CO2 Mainstream Sensor 7007-01 (1 per box)
	Reusable Infant/Neonatal Airway Adapter For CAPNOSTAT® 5 CO2 Mainstream Sensor 7053-01 (1 per box)
	EtCO2 sensor holding kit

Sidedtream EtCO2 module

	LoFlo Sidestream Module
	LoFlo Sidestream Module Bracket (This material is being provided free of charge for LoFlo Sidestream Module.)
	Adult CO2 Airway Adapter For Intubated Patients 3473ADU-00 (10 per box)
	Infant CO2 Airway Adapter For Intubated Patients 3473INF-00 (10 per box)
	Disposable Sampling Line Kit with Dehumidification Tubing 3475-00 (10 per box)

Device Markings

	Caution : Consult Accompanying Documents		Consult instructions for use. This symbol advises the reader to consult the operating instructions for information needed for the proper use of the device.
	TYPE CF Applied Part		TYPE BF Applied Part
	Drip proof protection to IPX1		Auxiliary Port
CO2/AG	Sidestream/Mainstream EtCO2 module or Sidestream Dual Gas module receptacle		Alarm Control Key
	Display Mode Selection Key		Anesthetic Gas Selection Key
	USB port		DC Input Indicator
	LAN port		Address of Manufacturer
	DC Input Port		Power ON /OFF
	Battery Operation indicator		European Medical Device Directive 93/42/EEC
	Safety Sign : To signify that the instruction manual must be read. Reading the instruction manual before starting work or before operating equipment.		WEEE(Waste Electrical and Electronic Equipment)

Power

The GA3VET monitor uses a DC adapter (100-240 VAC / 15VDC 2.0A). In the event of a power outage or cable shortage, the monitor automatically switches to battery power to continue monitoring without data loss.

The built-in battery is intended for back-up use only during power-off.

DC Adaptor information

- Manufacture: BridgePower Corp.
- Model name: JMW128KA1503F51
- Input Power: 100V~240V 1.0A
- Output Power: 15V, 2.0A

DC Power LED is lighted on when the DC Power is plugged into the inlet at the back of the product. A press of the power key makes the machine ready for use.

CAUTION
This equipment must be connected to a protective earth grounded power supply. Using non-standard products other than the adapters supplied by us may cause signal distortion or noise. Be sure to use a genuine adapter that is supplied by our company and is insulated.

Battery Power

This unit uses battery power during power failure and portable use.

The battery is attached to the bottom of the equipment.

Operation

1. Battery Power LED is lit when the equipment is in use.
2. Battery is automatically charged when the equipment is connected to DC adaptor. (Charging is displayed at the top right of the screen.)
3. The charging status of the battery is displayed on the screen in a green box with 5 levels. (5% -> 25% -> 50% -> 75% -> 100%)
4. When all batteries are discharged, the battery image is displayed in red.
5. When the battery is disconnected from the device and the battery is faulty, an 'X' appears inside the shape of the battery.
6. The monitor automatically turns off when the battery is depleted.

The table below describes the function of the battery charging bar graph at the top of the screen.

Battery charge/discharge display		
Display	**Charging remain time**	**Description**
	Your battery is fully charged	Not applicable
	Your battery is fully charged	Not applicable
	Your battery is 75% charged	Not applicable
	Your battery is 50% charged	If possible, connect it to the AC adapter.
	Your battery is 25% charged	Immediately connect the monitor to the AC adapter.

	The internal battery is very low. (The power will turn off about 2min)	Immediately connect the monitor to the AC adapter.
	There is no built-in battery.	Connect the battery.

CAUTION
The battery charge display is accurate only when the battery is operating normally.

NOTE
If no AC power is applied, the battery charge display will take up to 15 seconds to reflect the actual capacity of the internal battery.

Battery Information:

- 031PpTC(3ICR19/65) (10.8V / 2150mAh, Li-ion)
- Battery charging time: More than 6 hours
- Battery usage time: Max 4 hours

NOTE
Lithium-ion batteries are rechargeable batteries that contain lithium-ion cells. Each battery contains an electrical level measurement circuit and a safety protection circuit.

WARNING
Older or defective batteries will have significantly reduced capacity or operating time.

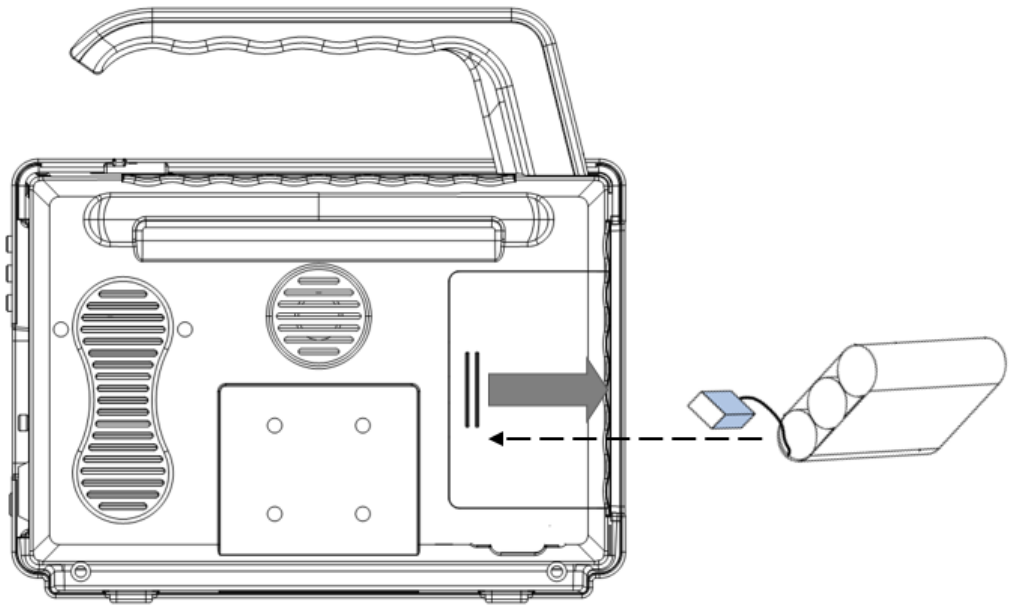
NOTE
To maximize battery performance for transport, keep the monitor connected until you are ready to transport the animal. Reconnect the monitor immediately after transport. Bionet recommends replacing the lithium ion battery after 24 months of use. Battery life depends on usage. If battery life continues, battery life will decrease and frequency of replacement will increase. To prevent pre-discharge, recharge after the battery is discharged.

WARNING
Be careful of the polarity when replacing the battery. We strongly recommend that you use the battery supplied by Bionet. Using unauthorized batteries may damage the equipment.

NOTE
Charging is not possible at low power. (below 12V) When replacing the battery, be sure to remove the DC adapter and replace it.

How to Replace the Battery

Please assemble and replace as shown below.



The Impact of Lithium-Ion Battery Technology on the Battery

The following are the key points you should know about Lithium-Ion battery technology :

The battery will discharge on its own, even when it is not installed in a monitor. This discharge is the result of the Lithium-Ion cells and the bias current required for the integrated electronics.

By the nature of Lithium-Ion cells, the battery will self-discharge. The self-discharge rate doubles for every 10°C (18°F) rise in temperature. The capacity loss of the battery degrades significantly at higher temperatures.

As the battery ages, the full-charge capacity of the battery will degrade and be permanently lost. As a result, the amount of charge that is stored and available for use is reduced.

Conditioning Guideline

Leave the battery in the monitor fully charged and discharge it every six months. Condition it using the battery charger.

Storage Guideline

Store the battery outside of the monitor at a temperature between 20°C to 25°C (68°F to 77°F).

When the battery is stored inside a monitor that is powered by an AC power source, the battery cell temperature increases by 15°C to 20°C (59°F to 68°F) above the room's ambient temperature. This reduces the life of the battery.

When the battery is stored inside a monitor that is continuously powered by an AC power source and is not powered by battery on a regular basis, the life of the battery may be less than 12 months. Bionet recommends that you remove the battery and store it near the monitor until it is needed for transport.

How to Recycle the Battery

When the battery no longer holds a charge, it should be replaced. The battery is recyclable. Remove the old battery from the monitor and follow your local recycling guidelines.

WARNING
EXPLOSION HAZARD DO NOT incinerate the battery or store at high temperatures. Serious injury or death could result.

Getting Started

Starting the Monitor

Press the power key at the bottom right side of the monitor front panel. The power light on the monitor lights up, the alarm bar lights up, the power is turned off, the screen lights up, the main screen is displayed after running the self-test.

Stopping the Monitor

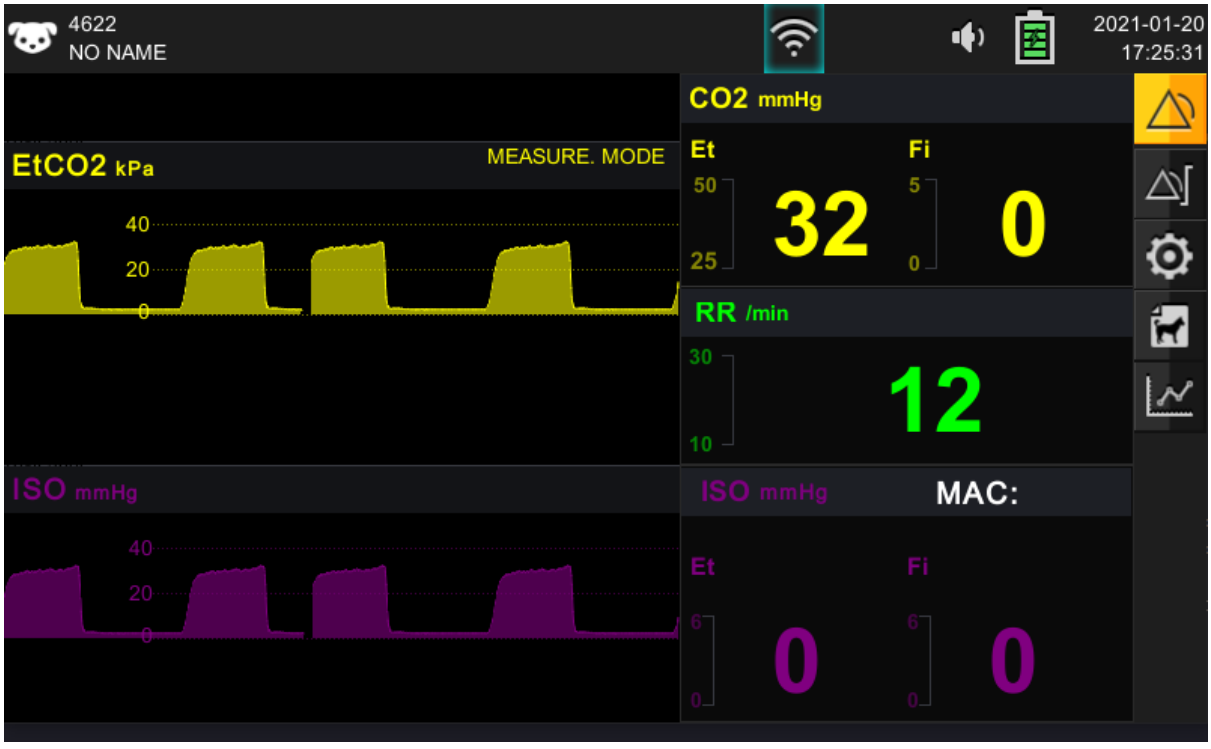
Press and hold the power key for 3 seconds. The screen goes off.

Main Screen Setup

After the monitor is turned on, the main screen is displayed.

①	Operating Mode window
②	Animal window
③	Device status information
④	Alarm status window
⑤	Parameter box displays (Waveform & Numeric window)
⑥	Keys window

Press the screen adjustment key on the right to display the screens for EtCO2 and FiCO2.



Animal Window

The Animal information is displayed in the upper corner of the screen.

There is a save button to save the study data in the spot and triage modes.

Indicator Icons

Displays the time, network and device management status.

Alarm Status Window

The message appears at the top of the screen except for technical alarms.

Parameter Box Displays (Waveform & Numeric Window)

The parameter box displays values, alarm limits and icons for the selected parameter. You can set the parameters and their associated waveforms so that they are easy to distinguish.

The colors differ according to the measurement time of EtCO2 or FiCO2.

- The measured value is displayed in the set color.

Function Key

On the right side of the monitor's front panel, the touch screen icon allows you to perform frequently-used functions.

Button	Description
	This is an alarm mode key, so it enables the current alarm mode one of Normal / Audio Paused/ Alarm Paused modes.
	Displays the alarm setting menu.
	Displays the setup menu.
	Sets the animal information.
	Displays trend menu.

Fixed Key

The fixed keys on the front panel of the monitor allow you to perform commonly performed functions.

Fixed key	Description
	Short press : Pauses all alarms or cancels the pause at a preset time. Long press : It enables the current alarm mode one of 'Alarm off' or 'Audio off' modes.
	Return to the main screen or switch the operating mode.
	Set parameters. Set the screen in Display Option and set the module in Module Setup.

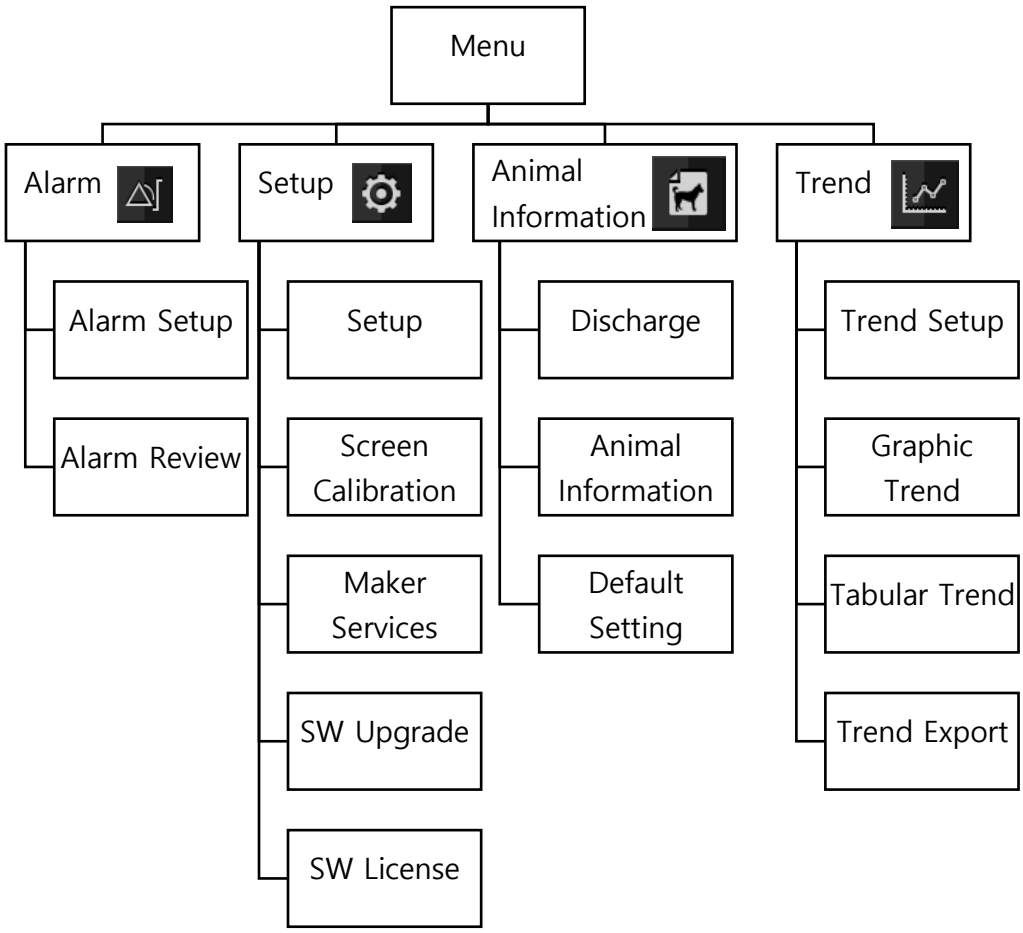
2. Setup

Setup Overview

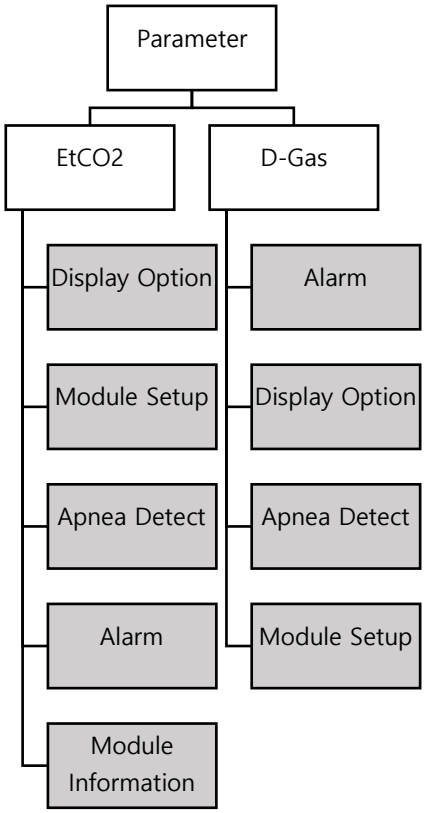
This chapter describes how to configure your monitor.

Monitor Configuration

Setup Menu tree



Parameter Menu Tree



Main Menu Settings

The Setup menu allows the user to access submenus, display screens, and perform specific monitor setup functions.

1. To display the Settings menu, click the Setup icon to open the submenu.
2. Click the desired setting to access the submenu that performs the desired function or goes one step further down.
3. Click x button at the bottom of the submenu list to return to the previous menu or screen.

Main Menu

	Main menu	Sub menu
	**A. SETUP**	**A-1.** Configuration Setup
		A-2. Units
		A-3. User Services
		A-4. NETWORK INFORMATION
		A-5. Export
		A-6. Hospital Information
	B. SCREEN CALIBRATION	
	C. MAKER SERVICE	
	D. SW UPGRADE	
	E. SW LICENSE	

Menu	Description	Available settings
A. SETUP		
A-1. Configuration Setup		
A-1-1. Module Type	measurement on the monitor Parameter selection menu:D-GAS, ETCO2	Select Module Type (EtCO2 , D-GAS)
A-1-2. Sweep Speed	EtCO2 and AG1-ISO waveform sweep speed	6.25 mm/s 12.5 mm/s 25.0 mm/s
A-1-3. Alarm Sound	Set alarm sound	IEC-60601 Bionet
A-1-4. System Information		
A-1-4-1. S/W Version	Display main S/W version	
A-1-4-2. License	Main software license display	
A-2. UNITS	Unit setting menu used for monitor measurement	
A-2-1. Weight Unit	Weight unit	Kg

		Lbs
A-2-2. CO2 Unit	Set Co2 Unit	mmHg kPa vol.%
A-2-3. Agent Unit	Set Agent Unit	mmHg kPa vol.%
A-3. User Services	User configuration menu	
A-3-1. KEY Sound	Set Key sound	ON / OFF
A-3-2. KEY Volume	Set Key volume	0 ~ 100%
A-3-3. Screen Brightness	Set screen brightness	0 ~ 100%
A-3-4. Date Display	Set date format	YYYY-MM-DD MM/DD/YYYY DD/MM/YYYY
A-3-5. Demo	Set Demo	ON / OFF
A-4. Network Information	Network information and setup	
A-4-1-1. Wireless	Wireless setup	ON/OFF
A-4-1-2. AP Search	Wireless Connectivity Device Selection Menu	
A-4-2. Network	Display the connected SSID	
A-4-4. DHCP	Auto IP allocation setting menu	ON/OFF
A-4-5. Device IP	Auto IP allocation setting menu	XXX.XXX.XXX.XXX
A-4-6. Subnet Mask	SUBNET MASK setting menu	XXX.XXX.XXX.XXX
A-4-7. Gateway IP	SUBNET MASK setting menu	XXX.XXX.XXX.XXX
A-4-8. Network Interface	Mac address information	
A-5. Export	BM Vet CENTRAL NETWORK setting menu	
A-5-1. BT-Link		
A-5-1-1. Protocol Version	Display network protocol version	x.x.x
A-5-1-2. Transmission	BT-LINK remote communication Function Activation Menu	On/Off
A-5-1-3. Host IP	BT-LINKIP set address Menu	XXX.XXX.XXX.XXX
A-6. Hospital Information	Set Hospital information	
A-6-1. Hospital Name	Hospital Name	

A-6-2. Address 1	Address information 1	
A-6-3. Address 2	Address information 2	
A-6-4. Postal Code	Set postal Code	
A-6-5. Doctor Name	Set doctor name	
B. Screen Calibration	Perform touch screen calibration point input.	
C. Maker Services	Manufacturer menu, not user menu.	
D. SW Upgrade	Manufacturer menu, not user menu.	
E. SW License	Manufacturer menu, not user menu.	

3. Network

Network Overview

When you connect the monitor to your network, you can access patient information from an EMR server.

BT-Link connects the monitors to the central station and each device to provide various monitoring functions. For more information on BT-Link Station, please refer to the BT-Link Station User Guide.

With the Remote Control feature in BT-Link, you can perform the following tasks on the monitor that can be remotely controlled from a central station.

- Start recording
- Modify alarm limit
- Alarm mute
- Enter, edit and view patient data

Network Connection

On a network, data can be exchanged over wired or wireless technology. All data interfaces (e.g. RS-232, LAN, USB interface) described in the standard and convention can be networked. This device can exchange information with other devices through the network during operation and supports the following functions.

- Display waveform and parameter data
- Alarm signal
- Device setup and transmission of Animal data

Connecting this device to an integrated network with other devices, or subsequent changes to that network, can be a new risk to Animals, users, and third parties. These risks must be identified, analyzed and evaluated before the device is connected to the network or the network is changed, and appropriate action must be taken.

Subsequent changes to the network examples:

- Network configuration change
- Removing a device from the network
- Adding new devices to the network
- Upgrading or updating devices connected to the network

WARNING
Recommendations for wireless connections • GA3VET has a change in the number of equipment connections depending on wireless AP (Access Point) performance. • When using a general AP, it is recommended to connect no more than 8 units to the same network. • It is recommended to use the AP exclusively for monitoring equipment. • Due to the nature of wireless, connectivity may not be good depending on the environment.

NOTE

Supported USB Wifi Dongle

GA3VET supports the following USB Wifi dongle.

TP-Link

Model	USB VID:PID	Chipset
TP-LINK T2U plus	2357:0120	Realtek 8821a
TP-LINK T2U nano	2357:011e, 2357:0122	Realtek 8821a
TP-LINK T2U v3	2357:011f	Realtek 8821a
Other 8821A-enabled products	0bda:0811, 0bda:0821, 0bda:8822, 0bda:a811	Realtek 8821a
TP-LINK T2UHP	2357:010b	MediaTek 7650u
TP-LINK T2U	148f:761a	Ralink 7610u
TP-LINK T2UH	148f:761a	Ralink 7610u
TP-LINK T2U v2	0e8d:7650	MediaTek 7650u

ipTime

Model	USB VID:PID	Chipset
Other products using 7650u / 7610u such as ipTime A1000	148f:7610, 0e8d:7610	MediaTek 7650u / 7610u
ipTime N150UA TP-Link TL-WN727N v4	148f:7601	Ralink 7601U
ipTime N150UA / N150U	148f:3070	Realtek 3070
ipTime N150UA	148f:5370	Realtek 5370
ipTime N100mini (N300U / Ncubic)	0bda:8176	Realtek 8188CU/8192CU
TP-Link TL725N v2	0bda:8179	Realtek 8188EUS

In addition to this, USB Wifi dongle using chipset below can be used.

Chipset
MediaTek 7650u / 7610u
Ralink 7601U
Realtek 3070
Realtek 5370
Realtek 8188CU/8192CU
Realtek 8188EUS
Realtek 8821a
MediaTek 7650u
Ralink 7610u

IT Network Connection

No one other than service personnel can connect this device to the network. Please consult with the hospital IT staff in advance.

Please refer to the following document to proceed with the installation.

- Documents attached to this device
- Network interface manual
- BT-Link User Documentation

It is recommended to comply with IEC 80001-1(Risk management of IT networks connected to medical devices).

LAN Network

LAN networks are usually configured through star topology. Individual devices can be combined

into groups via a layer –n-switch. Other data traffic is separated by separate VLAN networks. Configure your device's network settings according to this user manual and network specifications.

LAN connection specifications are described in the following standard specifications.

- Wired network: IEEE 802.3
- Wireless network: IEEE 802.11 (a, b, g, n)

If the device is used as a layer-2-switch or layer-3-switch, the port settings must be configured on the network switch. The Bionet equipment must be configured to make network settings compatible with the operating organization's.

The device exchanges data with other medical devices over the LAN network. The network supports the following transport and protocols:

- TCP/IP
- BROADCAST

VLAN Network

If data is exchanged within a single network, an independent VLAN network for clinical information systems must be established. At least one of the following independent VLAN networks must be established.

- Network for medical devices in hospitals
- Network for portable Animal monitors

In addition, a network system that detects and defends against denial-of-service attacks must be established through the installation of equipment dedicated to DDos defense.

When Using an Inappropriate Network

If your network does not meet the requirements, the following dangerous situations can occur.

The following situations may occur with this unit.

- If the distributed alarm system is not safe:
  - The alarm will not be delivered.
  - The alarm or data is delayed.
  - An error alarm appears.
- If the network connection is interrupted:
  - The alarm will not be delivered.
  - Reactivates with the alarm off or the alarm sound off.
- If you do not have firewall and antivirus software:
  - Your data is not protected.
  - The device settings are changed.
  - The device raises an error alarm or does not generate an alarm.
  - Data is sent incomplete, to the wrong device, or not at all.
  - Animal data is blocked, falsified, or corrupted.
- The time stamp of the data is inaccurate.
- Overloading this unit due to very high network loading (e.g. denial of service attacks) can cause interface deactivation. The interface can only be used again after the device is restarted. Rarely, booting may be slow or repeated reboots may occur.

4. Hospitalization and discharge

Hospitalization and discharge Overview

The animal menu allows you to enter and edit an Animal's personal data (Type, ID, Animal and Protector Name, Weight, Gender).

Continuous Mode

In continuous mode, you can manage animal admission and discharge from hospital.
The admitted Animal is maintained even when the monitor is turned off and on. If the operating mode is switched, the admitted Animal is discharged. The admitted Animal is also discharged when using demo mode.

Animal Admission(Continuous Mode)

How to admit an animal

1. Press the Animal window.
2. Press the New button.
3. Enter the Animal Information.

   Please select a field. The data entry screen appears. Click the letter of the word you want to input. If you made a mistake, click Backspace and try again. ID is mandatory.
4. Click on Admit.

Animal Discharge(Continuous Mode)

The Animal should be discharged before the another Animal is admitted. Otherwise the monitor attaches the existing data to the new Animal being admitted.

How to discharge an Animal

1. Press the Animal window.
2. Press the Discharge button.
3. When the Animal is successfully discharged, a banner with the following message is displayed.
4. Press the YES button. The discharge procedure is in progress.
5. The monitor displays a Discharge message and a Discharge image in the upper left corner.

NOTE
• To change an animal's classification (Puppy, Cat, Dog, Horse), access the Animal settings menu. • If you change the Animal's classification, you will have to select again because the weight choices disappear. • Animal's height and weight related items and changes affect all other monitor menus and displays that use this information. • Animal data can be stored for up to 5000 patients.

Display images by PATIENT TYPE

TYPE	Puppy	Cat	Dog	Horse	Discharge
Male					
Female					

Animal Window By Operation Mode

Mode	Animal Window
Continuous	

Animal Settings

	Main Menu	Sub Menu
	**A. DISCHARGE**	
	B. Animal Information	**B-1.** Animal Information
	C. DEFAULT SETTING	

Menu	Description	Available Settings
B. ANIMAL WINDOW		
B -1. ANIMAL INFORMATION		
B -1 - 1. ANIMAL TYPE	Animal Type setting	Puppy/Cat/Dog/Horse
B – 1 -2. ID	Animal ID setting	
B - 1 -3. Pet NAME	Name setting	
B - 1 -4. WEIGHT	Weight setting	
B – 1 -3. Protector NAME	Name setting	
B – 1 -5. GENDER	Gender setup	MALE/ FEMALE

5.ALARM

ALARM Overview

In continuous mode the monitor displays the alarm limit (parameter threshold) and can be configured by the user to raise an alarm if exceeded. Limits are displayed both in the alarm limits table and in the parameter box. If this limit is exceeded, a visual or audible alarm will occur.

The bedside monitor is the primary alarm device, and there may be other secondary alarm devices depending on how you configured the device / network. Depending on the alarm condition, the monitor generates an alarm using one or more of the following devices:

- Sound reflecting alarm severity
- Change the color in the parameter box of the alarm parameter
- Alarm messages in the local message area
- Alarm banner indicating alarm status
- Activate alarm recording

The monitor generates an alarm when the parameter in the Alarm Limits table is ON. It is not a prerequisite that the parameter is displayed on the display or connected in the event of an alarm.

ALARM Priority

The alarm type is divided into an Animal status alarm and a product status alarm. The Animal status alarm status is not checked in Spot and Triage modes.

The Animal status alarm sounds when the alarm upper and lower limits are exceeded, and there are levels of HIGH, MEDIUM, LOW and MESSAGE, and there is a difference in the order and volume of the alarm.

The Animal status alarm provides the highest priority alarm.

The features of each alarm are described as follows. The alarm priority is HIGH> MEDIUM> LOW> MESSAGE.

Alarm priority	Alarm sound	Alarm status window	Number flashes	Alarm lamp
HIGH	-5	RED	250	R
MEDIUM	-3	YELLOW	1000	Y
LOW	-1	YELLOW	0	Y
MESSAGE		BLUE		

Product status alarm -The instrument is labeled 'Technical Alarm'.

Alarm priority	Alarm sound	Alarm status window	Number flashes	Alarm lamp
LOW	-1	BLUE	0	C
MESSAGE		BLUE		

R : Blinking red alarm lamp on the front panel.

Y : Blinking yellow alarm lamp on the front panel.

C : Blinking cyan alarm lamp on the front panel.

: 2 times blinking a second (0.25 seconds ON -> 0.25 seconds OFF)

: 1 times blinking a second (1 second ON -> 1 second OFF)

: Non-Blinking

Audible alarm		
Alarm priority	**BIONET**	**IEC**
HIGH	1 high sound per 5 seconds	10 consecutive beeps every 5 seconds.
MEDIUM	1 high sound per 15 seconds	3 consecutive beeps every 15 seconds
LOW	1 low sound per 30 seconds	2 consecutive beeps every 30 seconds

ALARM Management

Users can change to various alarm modes using the alarm mode change key on the top front of the monitor.

Change Alarm Mode:

To change alarm mode you can use the 'Alarm control key' on the side of the monitor.
Alarm mode changes from Normal → Audio Paused → Alarm Paused → Normal.
Press and hold the alarm control key for 3 seconds to switch from Normal to 'Audio Off' or 'Alarm Off mode'

Audio_Paused:

The alarm is temporarily silenced for 1 minute to hold the audible alarm. A banner with the message

Audio Paused and a countdown timer are displayed on the screen. However, the visual alarm, that is, the alarm status is still displayed on the screen. In this state, if a new alarm occurs during the silence period of an alarm, or if the alarm condition continues to occur even after 1 minute, which is the silence period of the alarm, the alarm silence is canceled and the alarm sound is generated again.

Audio_Off:

Stop an Audible Alarm. A banner with the message Audio Off is displayed on the screen. The monitor remains silent until the user switches to another alarm mode.

Alarm Control:

Various alarm functions, such as alarm hold, validity and alarm limit indicators, can only be configured in the alarm control menu, accessible only through the password protected unit manager menu.

NOTE
● Audio Paused and Audio Off mode stops only the Alarm sound, so a Touch or Key Sound may occur. ● To adjust Touch or Key Sound, please use the Key Sound menu in Setup.

ALARM Settings

	Main menu	Sub menu
	**A. ALARM SETUP**	**A-1.** PARAMETER ALARM LIMIT
		A-2. SYSTEM ALARM CONDITION
		A-3. ALARM PARAMETER

MENU	Description	Available Settings
A. ALARM SETUP		
A-1. PARAMETER ALARM LIMIT	All parameter alarm, level, activate Setup menu	
A-1-1. PARAMETER TYPE		DUALGS, ETCO2
A-1-2. PARAMETER ALARM LIMIT	ALARM	ON/OFF
	LEVEL	MESSAGE/LOW/MEDIUM/HIGH
	UPPER LIMIT	Alarm high limit for each parameter
	LOWER LIMIT	Low alarm value of each parameter
A-1-3. TECHNICAL ALARM CONDITION	ALARM	ON/OFF
	LEVEL	MESSAGE/LOW
A-2. SYSTEM ALARM CONDITION		
A-2-1. SYSTEM LOW BATTERY	ALARM	ON/OFF
	LEVEL	Low/Message
A-3. ALARM PARAMETER	ALARM VOLUME	10~ 100%
	Alarm Pause Time	1,2,3,5,10,15min
B. ALARM REVIEW		

Review Alarm

6. TREND

TREND Overview

The monitor can store trend data for connected signals. Users can request trend recording and can also export the screens of trends displayed.

Stores trends according to the characteristics of the operating mode.

TREND Setting

	Main menu	Sub menu
	**A.** Trend Setup	**A-1.** Popup Trend
	B. Graphic Trend	**B-1**. Graphic Trend
		B-2. Tabular Trend
	C. Tabular Trend	**C-1**. Graphic Trend
		C-2. Tabular Trend
	D. Trend Export	

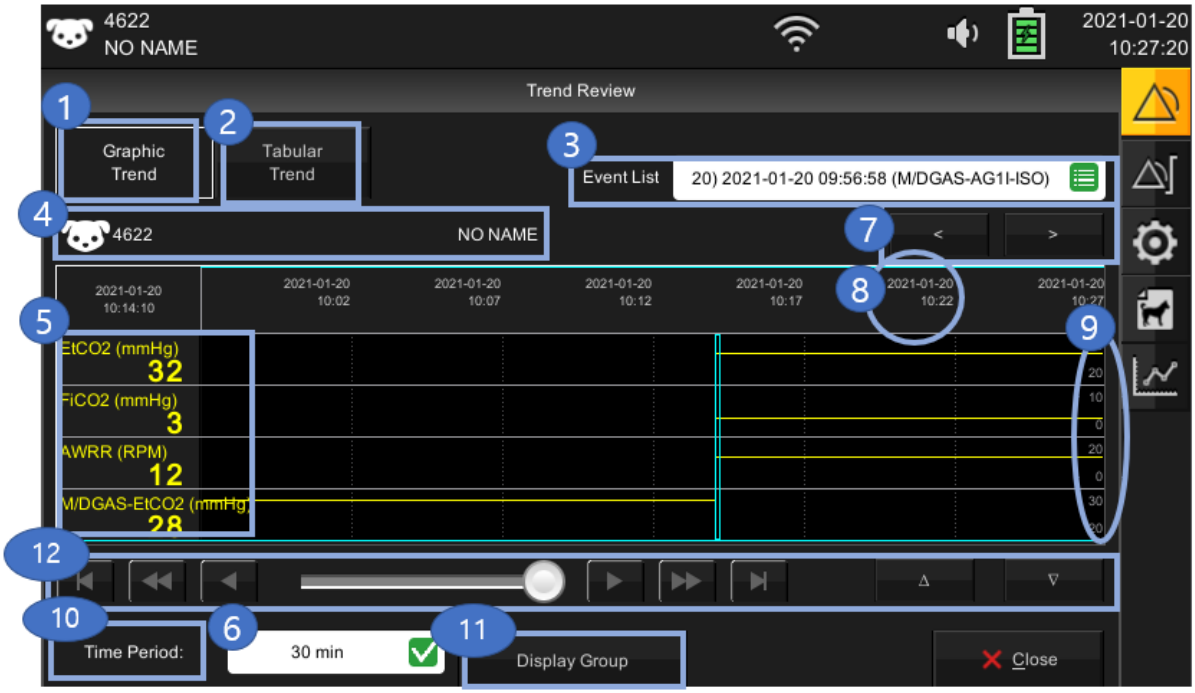
Menu	Description	Available settings
A. Trend Setup Menu		
A-1. Popup Trend		
A-1-1. Time Period	Time period setting	30min, 60min, 90min, 3hour, 6hour
A-1-2. Configure Parameters	Biometric configuration to show in popup trend window	
B. Graphic Trend Menu		
B-1. Graphic Trend	Saved data can be viewed graphically in sections.	
B-1-1. Event List		
B-1-2. Time Period	Time period setting	30min, 60min, 90min, 2hour, 3hour, 4hour,

		6hour, 8hour, 12hour
B-1-3. Display Group	Parameter settings menu to display on screen	
C. Tabular Trend Menu		
C-1. Tabular Trend		
C-1-1. Event List	Selectable by viewing the list of triggered alarms	
C-1-2. Time Period	Setting time cycle of Tabular Trend	1min, 5min, 10min, 15min, 30min, 1hour, 2hour
C-1-3. Display Group	Biometric configuration to show in table trend window	
D. Trend Export Menu		
D-1. Start Time	Set Start Time	
D-2. End Time	Set End Time	
D-3. Export Interval	Time cycle setting	1min, 5min, 10min, 15min, 30min, 1hour
D-4. Export Order	ascending order setting	Ascending/Descending
D-5. Export	Store data in USB	

Continuous Mode

Graphical Trend

Trend graph shows saved trend data as an individual graph type for each parameter. These graphs show that the displayed parameters are active over a significant period of time. Confirmation color, scale, Meter labels and numbers are displayed on the left side of the trend channel as vertical lines in each graph. This displays the time distribution. Trends keeps the most up-to-date data. It is automatically updated on the right side of the graph.



①	Graphic trend select button
②	Tabular trend select button
③	Event list menu & Event previous/next menu
④	Animal information : ID and name.
⑤	Parameter numeric window
⑥	Period setup menu
⑦	Parameter window selection menu
⑧	Event mark
⑨	Focus bar
⑩	Export button
⑪	Display group button
⑫	Navigator button

Tabular Trend

The Trends table displays the trend data in an easy-to-read table format. Up to five are displayed,

updated every minute. The time stamp above each column indicates the interval at which the data in that column was trended. The value displayed is the last one acquired during the interval, and the most recent data is displayed in the rightmost column.

①	Graphic trend select button
②	Tabular trend select button
③	Event List menu
④	Event previous/next menu
⑤	Animal information : ID
⑥	Parameter numeric window
⑦	Navigator button
⑧	Setting time period
⑨	Display group button
⑩	Parameter window selection menu

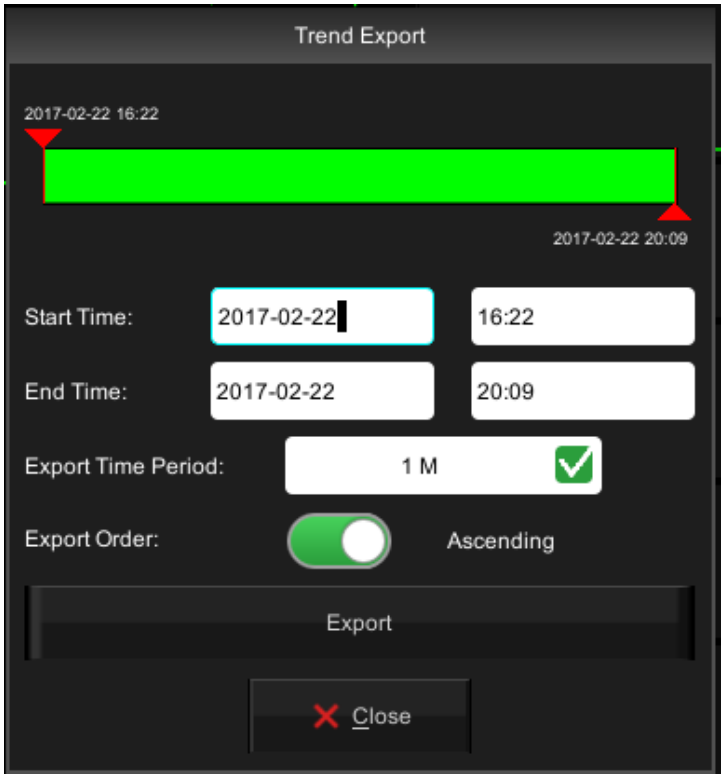
The monitor deletes all trend data when the Animal is discharged.

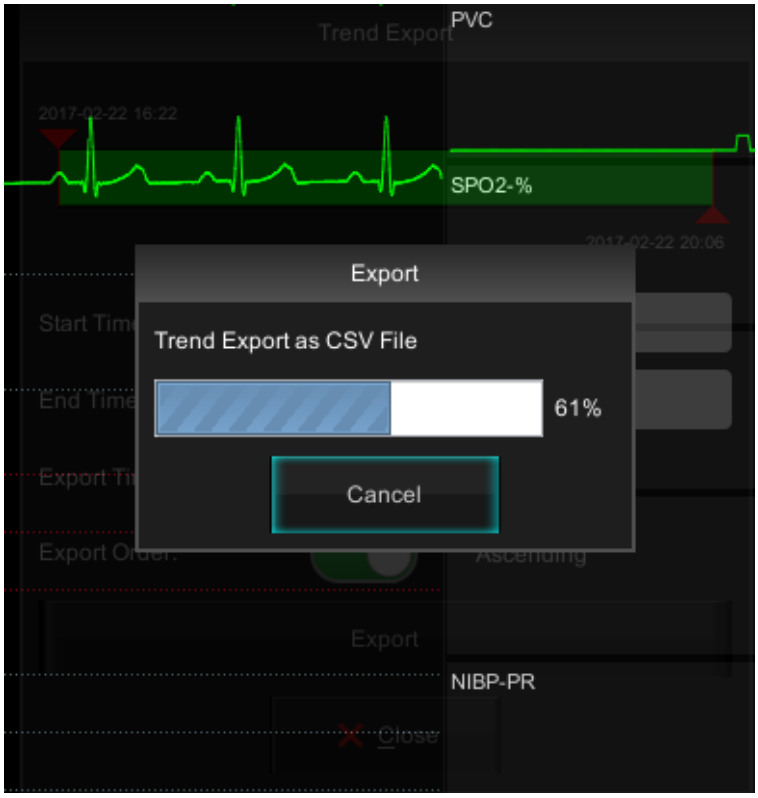
At the top of the trend screen, a summary of the auto-saved events (alarms) is displayed.

File Export

The file export function can transfer trend data to a file using USB memory.

1. Confirm USB memory connection.
2. Press TREND > Export button.
3. Set a start time, end time, export time period, and export order.
4. Press Export button.
5. The data is transferred to USB memory. A completion message is displayed when the transmission is completed.





NOTE
Saving Animal Data to a USB • Exported Animal data on a USB memory drive is not encrypted and therefore raises privacy concerns. So, only authorized personnel should be allowed to view, handle, store or transmit Animal data. • The file format of the USB memory drive used for the GA3VET Animal monitoring device is FAT32.

7. ETCO2

EtCO2 Overview

The GA3VET monitor measures concentrations of end-tidal CO2 (EtCO2) when this option is enabled and the EtCO2 module is connected to your monitor.

The EtCO2 module can perform mainstream measurements in all monitoring modes and sidestream measurements in the adult and pediatric monitoring modes.

EtCO2 only works in Continuous mode.

EtCO2 Precautions

WARNING
• The safety and efficacy of breath measurement methods for apnea detection have not yet been established. • Animal monitors that measure CO2, anesthetics, and / or respiratory mechanics cannot be used as apnea monitoring and / or recording equipment. While these products provide an apnea alarm, the alarm condition begins with the elapsed time from when the last breath was detected. However, there are a number of physiological indications for the clinical diagnosis of real apnea events. • The CO2 alarm is not activated until the first breath is detected after the monitor is turned on or the Animal is discharged. • Accuracy of the CO2 and breathing rate measurements may be impaired due to improper attachment of the sensor or due to certain Animal conditions and certain environmental conditions. • If the tube connection is faulty, loose or damaged, gas may leak and the accuracy of the measurement may be lowered, resulting in poor breathing. To prevent this,

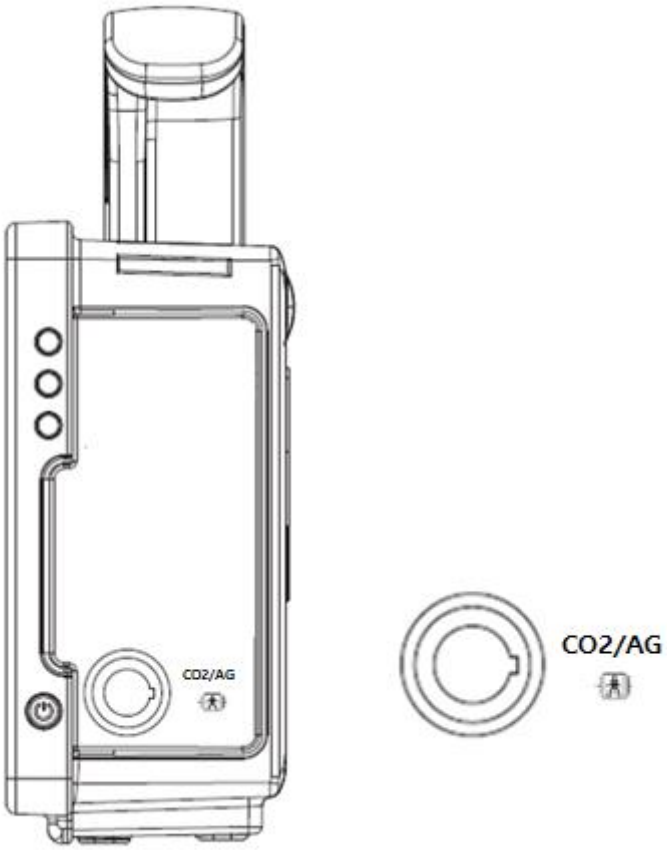
connect all components securely and check the connection according to standard clinical procedures to ensure that there are no leaks.

WARNING

- Industrial safety: Carefully dispose of used sampling tubes and T-connectors as they may cause infection. There is a risk of infection. Dispose of all equipment in accordance with local regulations.
- Optimize reaction time by minimizing dead space and keeping sample collection tubes as short as possible. Long sampling tubes can lead to poor accuracy and slow response times for sidestream measurement techniques.
- Do not place the airway adapter between the suction catheter and the endotracheal tube when using the sample collection line as a closed suction device for tuberous Animals. This is to ensure that the airway adapter does not interfere with the function of the suction catheter.

EtCO2 Connector And Accessories

EtCO2 Connector



LoFlo Sidestream CO2 Sensor and Connector

<Sidestream Sensor>

<Sidestream Sensor Connector>

Sidestream EtCO2 Accessories

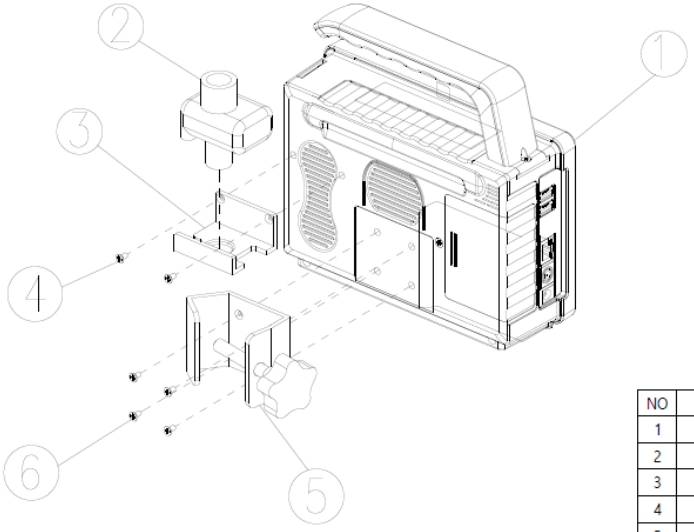
Intubation Accessories			
3473ADU-00		Airway Adapter Kit w/ Dehumidification Tubing	Adult /Child (ET Tube Size >4.0 mm)
3473INF-00		Airway Adapter Kit w/ Dehumidification Tubing	Child/Neonate (ET Tube Size <=4.0 mm)
3475-00		Disposable Sampling Line Kit with Dehumidification Tubing	

CAPNOSTAT 5 Mainstream CO2 Sensor and Connector

<Mainstream Sensor>

<Mainstream Sidestream Sensor Connector>

Mainstream EtCO2 sensor mounting



NO	PART NO.	PART NAME	QTY
1		SYSTEM GA3VET	1
2		ETCO2 SENSOR MODULE	1
3	451-P-BKT-3030A	ETCO2 HANGER BRACKET	1
4		SCREW FH M3.0X6	2
5		IV Pole Mounting Kit	1
6		SCREW FH M3.0X6	4

Mainstream EtCO2 Accessories

Intubation Animal Airway Adaptor Accessories		
Part	**Figure**	**Description**

6063-00		Adult/Neonate(disposable)
6312-00		Neonate(Disposable)
7007-00		Adult/Neonate (Reusable)
7053-00		Neonate(Reusable)

EtCO2 Connecting and Sampling Method

Connecting the CAPNOSTAT® 5 CO2 Sensor to the Host System

1. Insert the CAPNOSTAT 5 CO2 Sensor connector into the receptacle of the host monitor as shown in Figure 1.

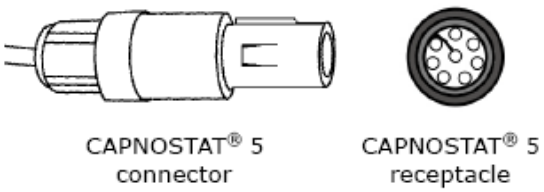
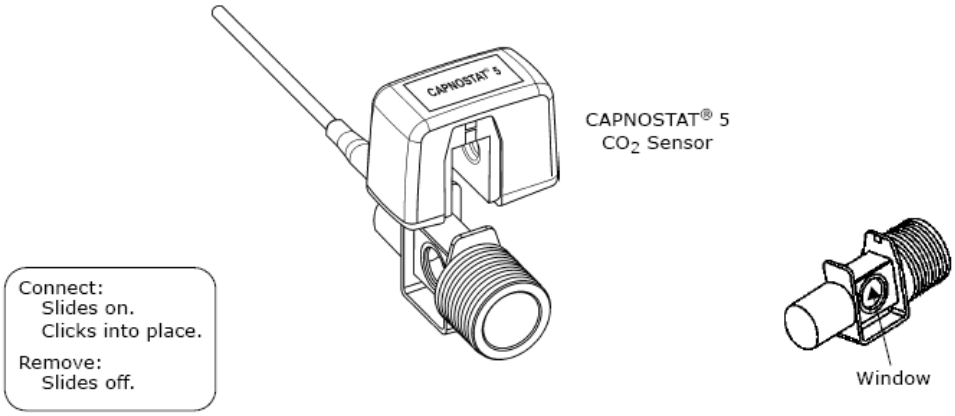


Figure 1

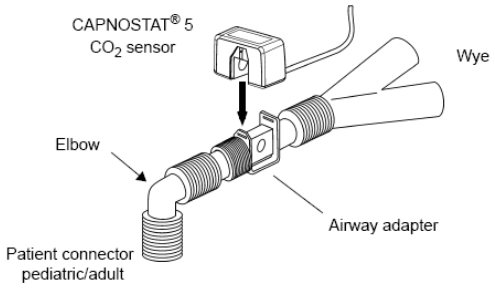
2. Make sure the arrows on the connector are at the top of the connector and line up the two keys of the connector with the receptacle and insert.

3. To remove the connector, grasp the body portion of the connector back and remove. Do not remove by pulling cable.

4. Shown below is the CAPNOSTAT 5 CO2 Sensor connection to a Respironics Novametrix CO2 adapter.



5. Shown below is the CAPNOSTAT 5 CO2 Sensor with an Animal circuit.



Connecting the LoFlo Sample Kit

1. The sample cell of the sampling kit must be inserted into the sample cell receptacle of the LoFlo CO_2 Module as shown in Figure 1. A "click" will be heard when the sample cell is properly inserted.

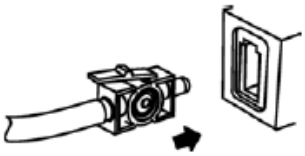


Figure 1

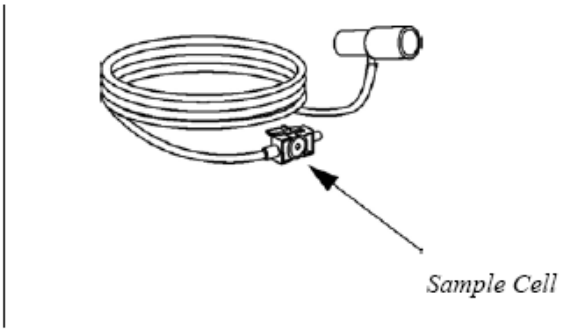


Figure 2

2. Inserting the sample cell into the receptacle automatically starts the sampling pump. Removal of the sample cell turns the sample pump off.

3. To remove the sampling kit sample cell from the sample cell receptacle, press down on the locking tab and pull the sample cell from the sample cell receptacle.

EtCO2 Display

①	EtCO2 wave window
②	EtCO2 CO2 concentration alarm upper and lower limit value display
③	EtCO2 value (Concentration value at exhalation)
④	FiCO2 value (Carbon dioxide concentration value at inhalation)
⑤	Apnea alarm set time in seconds
⑥	AwRR (Respiratory rate per minute)

EtCO2 Settings

A. EtCO2 Menu In Wave Window

Menu	Description	Available settings
A. EtCO2		
A-1. SWEEP SPEED	EtCO2 Waveform sweep speed setup	6.25mm/s, 12.5mm/s, 25mm/s

A-2. SCALE	Display waveform scale setup. The selectable value is the maximum pressure range shown in the waveform. When you select a range value, the selected pressure range value is displayed below the dotted line above the two dotted lines in the left middle of the WAVE window.	40mmHg (5.3vol%) 50mmHg (6.6vol%) 60mmHg (7.9vol%) 80mmHg (10.5vol%) 100mmHg (13.2vol%) 150mmHg (19.7vol%)
A-3. Fill	Fill in Graphs	ON/OFF

B. EtCO2 Menu In Text Window

Menu	Description	Available settings
B. EtCO2 Parameter		
B-1. Display Option	EtCO2 wave display Setup Menu	
B-1-1. Sweep Speed	EtCO2 Waveform sweep speed setup	6.25mm/s, 12.5mm/s, 25mm/s
B-1-2. Scale	Display waveform scale setup. The selectable value is the maximum pressure range shown in the waveform. When you select a range value, the selected pressure range value is displayed below the dotted line above the two dotted lines in the left middle of the WAVE window.	40mmHg (5.3vol%) 50mmHg (6.6vol%) 60mmHg (7.9vol%) 80mmHg (10.5vol%) 100mmHg (13.2vol%) 150mmHg (19.7vol%)
B-1-3. Fill	Fill the graph	ON/OFF
B-1-4. ETCO2 Unit	Select Unit of ETCO2 Measurements	mmHg/kPa/Vol.%
B-1-5. FiCO2 Unit	Select Unit of FiCO2 Measurements	mmHg/kPa/Vol.%
B-1-6. Use One Gas Unit	Choose whether to set pressure units for each type of gas. Unit setting menu by gas type appears when off	ON/OFF
B-1-7. Gas Pressure Unit	Gas Measurement Unit Selection	mmHg/kPa/Vol.%
B-2. Module Setup	Module setup	

B-2-1. Current Period	This setting is used to set the calculation period of the $ETCO_2$ value. The end-tidal CO_2 value is the highest peak CO_2 value of all end of expirations (end of breaths) over the selected time period. If less than two breaths exist in the selected time period, the value will be the maximum $ETCO_2$ value for the last two breaths.	1 BREATH, 10SEC, 20SEC
B-2-2. Balance Gas	This setup mode to setup the type of gas that is mixed with the breathing gas being measured.	ROOM AIR N2O HELIUM
B-2-3. Sleep Mode	Sleep mode is used to save power when the host monitor is in standby mode. There are two sleep modes available for the Capnostat. Using Sleep Mode 1 maintains the heaters so the Capnostat is able to run immediately after exiting the sleep mode. Mode 2 will require the Capnostat to go through its warm up sequence when exiting this mode and a delay will be introduced until the system has stabilized.	NORMAL MODE TURNOFF MODE POWER SAVING
B-2-4. Baro. Pressure	This setting is used to set current Barometric Pressure.	400~850mmHg (default 760mmHg)
B-2-5. GAS Temperature	This setting is used to set temperature of the gas mixture. This setting is useful when bench testing using static gasses where the temperature is often room temperature or below.	0~50°C (default 35.0°C)
B-2-6. O2 Compensation	Use this setting to correct for the compensation of the gas mixture administered to the Animal.	0~100

B-2-7. Anesthetic Agent	Anesthetic agent is ignored when the balance gas is set to helium.	0.0~20.0
B-2-8. Zero Type	When performing a zero on room air, this setting should be set to room air (the default). Only change to nitrogen (N_2) when performing a zero on 100% N_2 gas; this is provided for use in a laboratory environment.	ROOM AIR / N2
B-3. Apnea Detect	APNEA detection menu	ON/OFF
B-4. Alarm	EtCO2 Alarm Setup Menu	
B-4-1. Parameter Alarm Limit	ETCO2, FICO2, AWRR, APNEA parameter alarm, level, action setup menu	
B-4-1-1. ETCO2-ETCO2	Alarm Level Upper/Lower	On/Off Message/Low/Medium /High 0~100(mmHg)
B-4-1-2. ETCO2-FICO2	Alarm Level Upper/Lower	On/Off Message/Low/Medium /High 0~20(mmHg)
B-4-1-3. ETCO2-AWRR	Alarm Level Upper/Lower	On/Off Message/Low/Medium /High 0~150(RPM)
B-4-1-4. ETCO2-APNEA	Alarm Level Upper/Lower	On/Off Message/Low/Medium /High 10~60(s)
B-4-2. Technical Alarm Condition	ETCO2-MODULE OFF ETCO2-CHECK ADAPTOR ETCO2-CHECK LINE ETCO2-CHECK LINE DISCONNECT ETCO2-CO2 INVALID ETCO2-OVER RANGE ETCO2-ZERO REQUIRED ETCO2-SYSTEM FAULT	Alarm: On/Off Level: Message/Low/Medium /High

	ETCO2-TEMP UNSTABLE	
B-4-1. Sensor PN	The sensor part number	PNXXXXXX
B-4-2. OEM ID	The id is a 7bit identifier which is set at the factory to a unique value for each OEM.	0X01
B-4-3. SensorSN	The serial number of the module.	
B-4-4. H/W Version	The hardware version number of the module.	
B-4-5. Total Usage Time	Total use time of the module.	Min
B-4-6. Last Zero Time	This is the total time that has elapsed with the sensor in service the last zero.	Min
B-4-7. Pump Total Time	This is the total time the pump has been on.(LoFlo only)	Min
B-4-8. Pump Max Time	This value indicates the maximum rated lifetime of the sampling pump. (LoFlo only)	Min

NOTE
For best result, connect the CAPNOSTAT 5 CO2 Sensor to an adapter and wait 2minutes before performing the Adapter Zero procedure.

EtCO2 Status Messages

Following is a list of some of the message that may appear on the monitor when monitoring CO2.

The message should clear when normal operating criteria are met or a solution is found.

Message	Cause	Solution
SENSOR OVER TEMP	The sensor temperature is greater than 40'C.	Make sure sensor is not exposed to extreme heat(heat lamp,etc.).
SENSOR FAULTY	One of the following conditions	Check that the sensor is properly

	exist : Capnostat Source Current Failure EEPROM Checksum Faulty Hardware Error	plugged in. Reinsert or reset the sensor if necessary.
SENSOR WARM UP	Sensor under temperature , Temperature not stable, Source Current unstable	This error condition is normal at startup. This error should clear when the warm up is complete.
CHECK SAMPLING LINE	This error occurs whenever the pneumatic pressure is outside the expected range.	Check that the sampling line is not occluded or kinked. Replace the sample line.
ZERO REQUIRED	Zero Required , Zero Error	To clear, check airway adapter and clean if necessary. If this does not correct the error, perform an adapter zero. If you must adapter zero more than once, a possible hardware error may exist.
CO2 OUT OF RANGE	The value being calculated is greater than the upper CO2 limit(150mmHg)	If error persists, perform a zero.
CHECK AIRWAY ADAPTER	Usually caused when the airway adapter is removed from the Capnostat or when there is an optical blockage on the windows of the airway adapter. May also be caused by failure to perform Capnostat zero when adapter type is changed.	To clear, clean airway adapter if mucus or moisture is seen. If the adapter is clean, perform a Capnostat zero.
MODULE OFF	It occurs when the equipment and module are separated. Message output	Verify module connections , Service request

EtCO2 Measurement Failure

CO2 value is not output, or numerical error. Troubleshoot procedure

1. Check the connection between the main unit and the module
2. Check the module line connection with the filter line or airway

3. Replace filter line or airway
4. Service Request

NOTE
In the following monitoring conditions, the measured values may be inaccurate. Read the measured values carefully. 1. When using this in an environment of using Nitrous Oxide gas of high concentration 2. When using this in an environment where abrupt temperature change takes place 3. When using this in an environment with severely high humidity

CAUTION
● The measured values may be inaccurate when using this equipment for Animals who have very fast or irregular respiration. ● When measuring CO2 from an Animal under the anesthesia, check it when gas mixture comes in. Otherwise, the measured result values may be inaccurate. ● When using an anesthesia machine that uses a volatile anesthetic, CO2 values may be inaccurate.

8. Dual Gas Monitoring

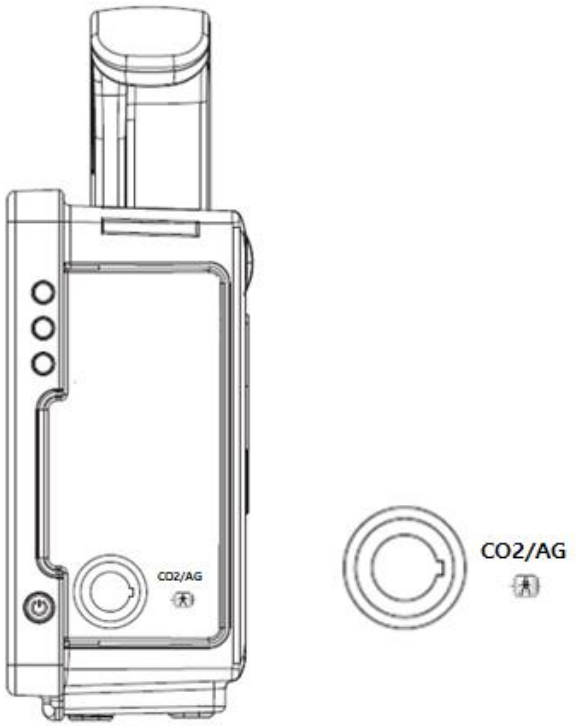
Overview

The D-GAS module extracts gas samples from animal breathing gases. It continuously measures CO2 and one of five anesthetic agents (isoflurane, sevoflurane, enflurane, halothane and desflurane) with manual selection of the specific agent type. All measured values as well as derived values are passed to the Veterinary patient monitor.

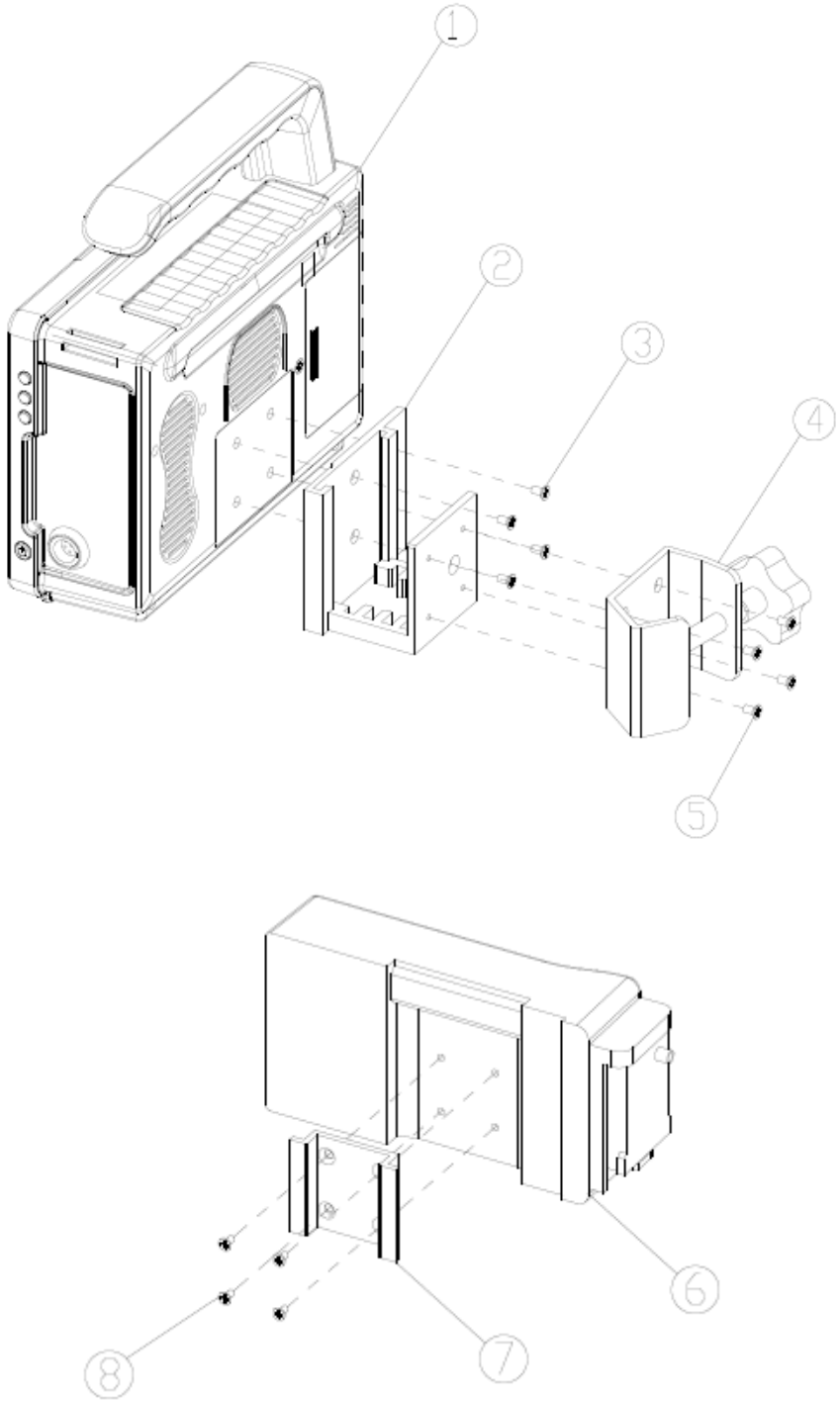
BIONET offers the following D-GAS modules. BDGA Sidestream Analyzer (Bionet).

Dual gas connector position and accessory

connector position



Dual Gas module mounting



NO	PART NO.	PART NAME	QTY
1		MAIN SET GA3VET	1
2	451-L-BKT-3010A	DGM MAIN CLAMP	1
3		SCREW FH M3.0 X L6	4
4		REAR CLAMP BASE-IV BM1	1
5		SCREW FH M3.0 X L6	4
6		DUAL GAS MODULE	1
7	451-L-BKT-3020A	DGM BRACKET HANGER	1
8		SCREW FH M3.0 X L6	4

Analyzers

Product	Description
Sidestream Dual Gas Module	Measures concentration of CO_2 and one of Halothane, Enflurane, Sevoflurane, Isoflurane, and Desflurane in the breath.

Consumables

Product	Description
Water trap	special designed container to trap moisture or water.
Sample line with luer lock (8')	Sampling line with male luer lock connector. Connects between Water trap and Airway adapter. Single patient use.
Airway adapter (Straight)	Straight airway adapter with female luer lock connector. Adult/Pediatric. Single patient use. Connects to Sample line.
Airway Adapter (L type)	Elbow airway adapter with female luer lock connector. Adult/Pediatric. Single patient use. Connects to Sample line.

Accessories

Product	Description
Dual Gas module mounting kit	Mounting kit for mounting Dual Gas module to GA3VET main body

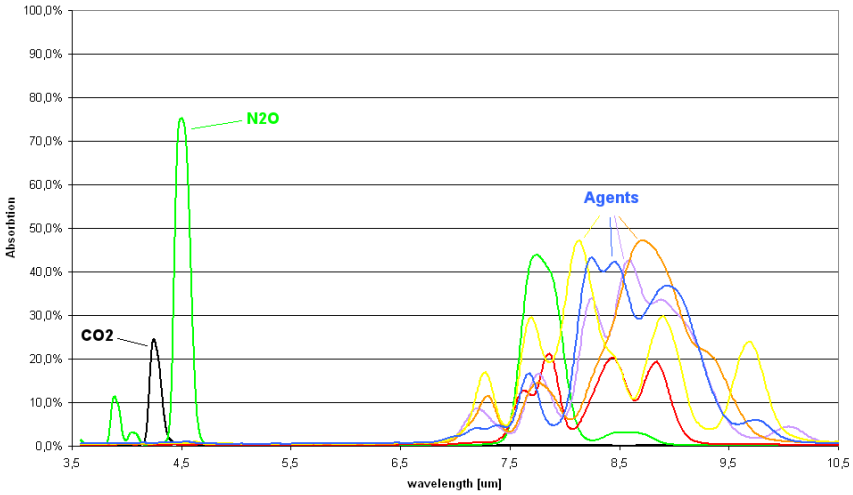
DG sidestream gas analyzers

Dual Gas sidestream module is intended for monitoring of intubated and ventilated or non-ventilated breathing small and large patients under anesthesia. The Dual Gas module is a multi-gas analyzer measuring carbon dioxide (CO2) and one of five anesthetic agents with **manual selection of the specific agent type**. The Dual Gas module has been specially designed to be extremely easy to integrate with any host device in order to display derived breathing gas data in real time.

Theory and design

Gas measurement

The measurement of CO_2 and anesthetic agents is based on the fact that different gases absorb infrared light at specific wavelengths. The analysis of respiratory gases by the DG gas analyzers are therefore performed by continuously measuring the infrared light absorption in the gas flow through an infrared spectrometer.



Gas absorption spectra.

Sampling

A sidestream gas analyzer continuously removes a gas sample flow from the respiratory circuit, for example a nasal cannula, a respiratory mask or the Y-piece of an intubated patient. The gas sample is fed through a sampling line to the gas analyzer. The sampled gas is usually warm and humid, and cools down in contact with the wall of the sampling line. Water therefore condenses in form of droplets on the inner wall of the sampling line. These droplets could potentially occlude the sampling line and interfere with the gas measurement.

Water trap

The water trap the of Dual Gas Module uses specially designed water filter disks. This disk can never be saturated by condensed water from the sample line until the water trap is full. Therefore, no moisture can come through beyond the sample line which can seriously jeopardize the gas sensor inside. In addition, another non-saturate water disk filter is installed in the sample line between the water trap and the gas sensor. This double protection design protects the module from moisture damage almost perfectly.

MAC (Minimum Alveolar Concentration) Calculation

The MAC value may be calculated and displayed by using end-tidal (ET) gas concentrations according to the following formula:

MAC = %ET(AA_1)/X(AA_1)

X(AA): HAL=0.75%, ENF=1.7%, ISO=1.15%, SEV=2.05%, DES=6.0%

Note: The altitude and the patient age as well as other individual factors are not taken into account in the above described formula.

Display

①	EtCO2 alarm high / low limit display
②	EtCO2 Exhales CO2 values.
③	FiCO2 Inhalation CO2 value display
④	Display respiratory rate value
⑤	Apnea alarm Set time in seconds
⑥	Use One Gas Unit is ON, All-gas unit display Use One Gas Unit is OFF, Agent-gas unit display
⑦	Alveolar concentration indicator
⑧	Display anesthesia gas concentration value

Settings

A. Setup menu

Menu	Description	Available Settings
D-1. Alarm	Dual-gas Alarm setting menu	
D-1-1. PARAMETER ALARM LIMIT	EtCO2, FiCO2, AWRR, APNEA, Parameter Alarm, Level, Operation Setting Menu	
D-1-2. TECHNICAL ALARM CONDITION	M/DGAS-MODULEOFF MGAS-CHECKADAPTER MGAS-ZERODISABLE MGAS-LASTSPANCAL MGAS-REPLACEO2SENS MGAS-UNSPECIFIEDACCESSORY MGAS-SENSORERROR MGAS-ROOMAIRO2CALREQUIRED MGAS-SWERROR MGAS-HWERROR MGAS-MOTORERROR MGAS-FACTORYCALLOST MGAS-O2SENSORERROR MGAS-REPLACEADAPTOR MGAS-O2PORTFAIL MGAS-WATRTRAPFULL	
D-2. DISPLAY OPTION	D-gas waveform display Setting menu	
D-2-1. SWEEP SPEED	Sweep speed setup	6.25mm/s, 12.5mm/s, 25mm/s
D-2-2. SCALE	Waveform display scale setup. The selectable value is the maximum pressure range shown in the waveform. When you select a range value, the selected pressure range value is displayed below the dotted line above	40.0 mmHg (5.3 vol%), 50.0 mmHg (6.6 vol%), 60.0 mmHg (7.9 vol%), 80.0 mmHg (10.5 vol%), 100.0 mmHg

	the two dotted lines in the left middle of the WAVE window.	(13.2vol%), 150.0 mmHg (19.7 vol%), 300.0 mmHg (39.5 vol%), 500.0 mmHg (65.8 vol%), 800.0 mmHg (105.3 vol%), 1000.0 mmHg (131.6 vol%)
D-2-3. FILL	Fill graph	ON/OFF
D-2-4. Waveform	Waveform select menu	EtCO2, AG1
D-2-5. USE ONE GAS UNIT	Choose whether to set pressure unit by gas type. When OFF, each unit setting menu for each gas type is shown as below.	ON/OFF
D-2-6. GAS PRESSURE UNIT	Displayed when USE ONE GAS UNIT is ON. Select all gas units.	mmHg/kPa/vol%
D-2-7. ETCO2 Unit	Displayed when USE ONE GAS UNIT is OFF. ETCO2 gas measurement unit selection	mmHg/kPa/vol%
D-2-8. FICO2 Unit	Displayed when USE ONE GAS UNIT is OFF. FiCO2 gas measurement unit selection	mmHg/kPa/vol%
D-2-9. AG1 Unit	Displayed when USE ONE GAS UNIT is OFF. ETCO2 gas measurement unit selection	mmHg/kPa/vol%
D-3. APNEA DETECT	In APNEA situation, the menu that determines whether detections and alarms are enabled or not.	ON/OFF
D-4. MODULE SETUP	Module Setup Menu	
D-4-1. AGENT ID1	Primary Agent ID setup	ISO, ENF, SEV, DES,

		HAL
D-4-2. GAS MODE	Gas status setup	Sleep, Measurement
D-4-3. ANESTHETIC GAS	Anesthetic Gas setup	ISO, ENF, SEV, DES, HAL
D-4-4. PUMP	Pump setup menu	ON/OFF
E-1. ZEROING	Primary Agent ID setup	
F-1. MODULE RESET	Secondary Agent ID setup	

10. Maintenance and Troubleshooting

Inspection Equipment

You should perform a visual inspection before every use, and in accordance with your hospital's policy. With the monitor switched off:

- Examine unit exteriors for cleanliness and general physical condition. Make sure that the housings are not cracked or broken, that everything is present, that there are no spilled liquids and that there are no signs of abuse.
- If the EtCO2 module is mounted on the monitor, make sure that it is locked into place and does not slide out without releasing the locking mechanism.
- Inspect all accessories (cables, transducers, sensors and so forth). If any show signs of damage, do not use.

Switch the monitor on and make sure the backlight is bright enough. Check that screen is at its full brightness. If the brightness is not adequate, contact your service personnel or your supplier.

Inspection Cables

- Examine all system cables and the power plug for damage. Make sure that the prongs of the plug do not move in the adaptor. If damaged, replace it with an appropriate Bionet power cord and adaptor.
- Inspect the parameter cable and ensure that it makes a good connection with the Monitor. Make sure that there are no breaks in the insulation.
- Apply the transducer or electrodes to the Animal, and with the monitor switched on, flex the Animal cables near each end to make sure that there are no intermittent faults

WARNIING
To avoid contaminating or infecting personnel, the environment or other equipment, make sure you disinfect and decontaminate the monitor appropriately before disposing of it in accordance with your country's laws for equipment containing electrical and electronic parts. For disposal of parts and accessories such as thermometers, where not otherwise specified, follow local regulations regarding disposal of hospital waste.

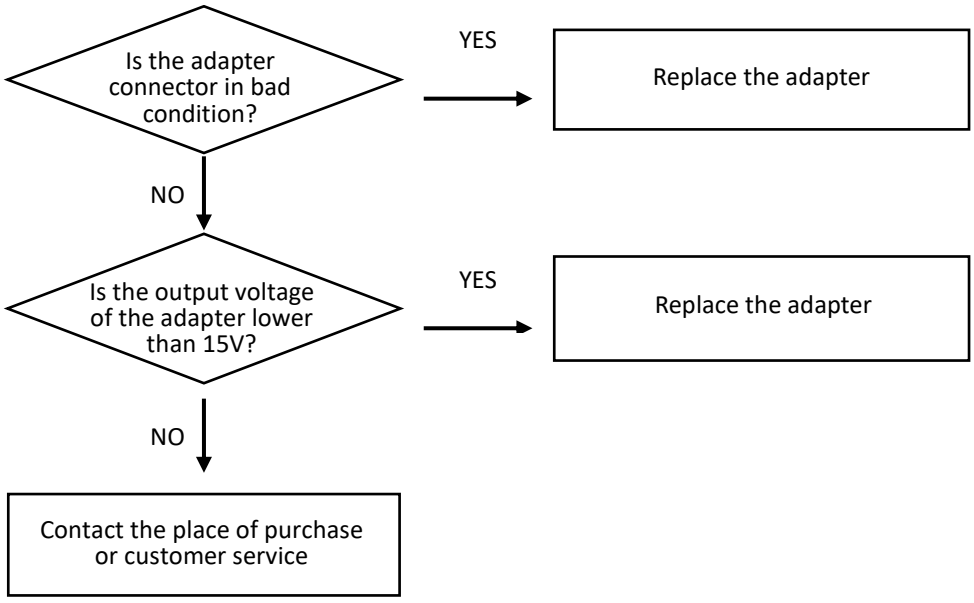
Maintenance Task and Test Schedule

All maintenance tasks and performance tests are documented in detail in the service documentation.

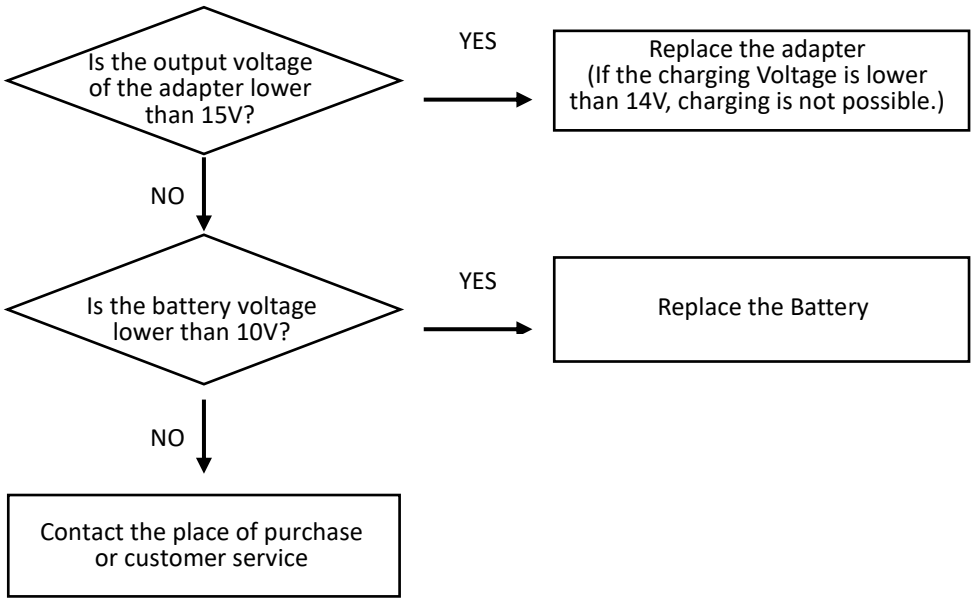
Maintenance and Test Schedule	Frequency
Monitor Tests	
Safety checks. Selected tests on the basis of IEC 60601-1	At least once every two years, or as needed, after any repairs where the power supply is removed or replaced, or if the monitor has been dropped
Monitor Maintenance	
Replace backlight (integrated displays only)	35,000 - 40,000 hours (about four years) of continuous usage, or as needed.
Parameter Module Tests	
Performance assurance for all measurements not listed below	At least once every two years, or if you suspect the measurement values are incorrect.
Parameter Module Maintenance	
NBP calibration	At least once every two years, or as specified by local laws.
Mainstream and sidestream CO2 calibration check	At least once a year, or if you suspect the measurement values are incorrect.
Battery Maintenance	
Battery	See the section on Maintaining Batteries in chapter 1.

Troubleshooting

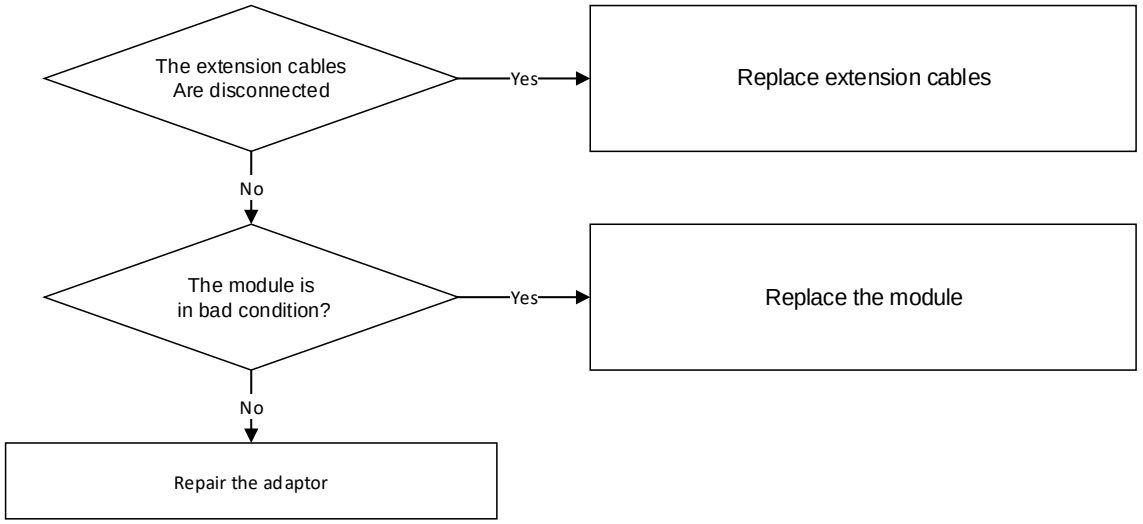
Power Failure



Failure in Battery Recharge (the battery does not fully recharge in 6 hours or more)



EtCO2 Malfunction



Cyber security issues

1) If equipment is stolen or lost, immediately report it to the hospital staff or manufacturer. Upon receipt of a report, the hospital network administrator must take measures to prevent the device from accessing the hospital network.

2) If a cyber security threat is detected while using the device, immediately disconnect the device from the network and contact the hospital staff or manufacturer.

※ For manufacturer contact information, please refer to the table of contents of how to contact us.

Storage lifetime issues

If the storage is nearing the end of its life, the following warning message appears when booting the device or hospitalizing the patient.

If the warning message appears, contact the customer center or the purchasing agent to check the equipment.

Contact the customer center or the store where you purchased the product and inspect the equipment

11. Clean and Care

Clean and Care Overview

Clean the monitor and all accessories after each Animal or daily according to your hospital's standard protocol. We recommend the following cleaning solution and procedures. To avoid contamination and unnecessary damage to the equipment, follow the instructions below.

Bionet does not claim the right to the following chemical efficacy, disinfectant method, the ability of the drug to inhibit bacterial infection, environmental impact, safe handling or precautions related to use. For more information on these topics, see the information provided by the detergent manufacturer.

Monitor and Peripherals

Moisture can damage the monitor and peripherals. (For example, around connectors, EtCO2 modules).

Please read the following instructions carefully before cleaning the basic unit or peripherals.

The following pages contain precautions for cleaning certain equipment and peripherals.

- Do not spray detergent on the monitor or peripheral devices. Wipe it off with a damp cloth.

- Disinfect the surface with gauze with diluted alcohol.
- Dry thoroughly with a lint-free cloth.

CAUTION
Do not wet or rinse the monitor and accessories. Disconnect the unit from the power source if you accidentally spilled liquid on the equipment. Contact your technician for stability before operating the equipment. To prevent damage to the equipment, do not use sharp tools or abrasives. Never immerse the electrical connector in water or other liquids. When cleaning, be careful not to let the liquid stick to the edge of the screen.

Animal's Cable

- Clean the Animal cables with a gauze pad moistened with a soap solution.
- To disinfect Animal cables, wipe the cables with a gauze moistened with diluted alcohol or a glutaraldehyde-based disinfectant.
- Ethylene oxide is suitable for intensive disinfection (almost sterilization), but it can reduce the service life of cables and lead wires.
- Dry thoroughly with a lint-free cloth.

CAUTION
Do not use disinfectants that contain phenol as they can spot plastics. Do not autoclave or clean accessories with strong aromatic, chlorinated, ketone, ether, or ester solvents. Never immerse electrical connectors. When cleaning, do not apply excessive pressure or bend the cable unnecessarily. Excessive pressure can damage the cable.

Capnostat Sensor

Wipe the sensor surface and sensor window with a damp cloth. Do not attempt to wet the sensor or disinfect it with hot water. Allow to dry completely with a lint-free cloth. Make sure the sensor window is clean and dry before use.

NOTE
The equipment should be inspected regularly once a year. For inspection items, refer to the user manual or service manual.

Cleaning and Inspection of Equipment

Carefully inspect the main unit and sensor after cleaning the equipment. Do not use damaged or old equipment.

Clean the exterior of the equipment at least once a month using a soft cloth moistened with lukewarm water or alcohol. Do not use lacquers, thinners, ethylene, or oxidizers that could damage the equipment.

Make sure that the cables and accessories are free from dust and dirt, then wipe them with a soft cloth moistened with 40 ° C water. Please wipe it with clinical alcohol at least once a week.

Do not immerse the accessory in liquid or detergent. Also, make sure that no liquid penetrates the instrument or probe.

CAUTION
Do not dispose of the disposable probe in a potentially hazardous area. Always be careful about environmental pollution.

CAUTION
There is a backup battery inside the system. When disposing of the battery, dispose of it in an appropriate place for environmental protection.

WARNING
When replacing the backup battery, check the battery electrode.

Installation and Storage of Equipment

If you suspect the installation or disposition of the external ground wire, operate the equipment by means of the internal power supply.

If the unit is not used for a certain period of time, remove the backup battery to prevent safety hazards from occurring.

12. Technical Specification

Technical Specification Overview

The monitor is not user installable. It must be installed by qualified service personnel.

The monitor is intended to be used for monitoring, recording, and alarming of multiple physiological parameters of adults, pediatrics, and neonates in health care facilities. The device is to be used by trained health care professionals.

The monitor is intended for use in health care facilities; the GA3VET Monitor is additionally intended for use in transport situations within the hospital setting.

EMC Compatibility (EMC)

Much of the information below has been borrowed from the requirements set forth in the Electromagnetic Compatibility Standard IEC 60601-1-2 for medical electrical equipment issued by the International Electro technical Commission and is available from a variety of sources. Although primarily aimed at equipment manufacturers, most of the information contained here is useful for users interested in medical equipment.

The information contained in this section (such as separation distance) is generally information about the Bionet Animal Monitor detailed above. The numbers provided here are not guaranteed, but are provided with reasonable assurance of error-free operation. This information may not apply to other medical and electrical systems, and older equipment may be particularly susceptible to interference.

NOTE
● Medical electrical equipment requires special precautions for electromagnetic compatibility and must be installed and serviced in accordance with the EMC information in this section and in the operating instructions supplied with the

monitor.

- Portable and mobile RF communication equipment can affect medical electrical equipment.
- Cables and accessories not specified in the user guide are not certified. Using other cables and / or accessories may adversely affect safety, performance, and electromagnetic compatibility (increased electromagnetic emissions and reduced immunity).
- This equipment should not be used near or on top of other equipment. If you need to use it on its side or stacked, you should observe the equipment to make sure it works properly within your configuration.
- This Animal monitoring device communicates over a 2.4 GHz 802.11b / g wireless network. Other equipment may interfere with data reception on this wireless network. This is also true if the equipment complies with the CISPR emission requirements. When using Animal monitoring equipment to communicate over a wireless network, be sure to check that it is compatible with existing or new wireless systems (eg, cell phones, pager systems, cordless phones, etc.). For example, a Bluetooth-compliant device using the 2.4 GHz frequency band may interfere with the wireless communication of the Animal monitor. For more information on wireless deployment, please contact your Bionet representative.
- Low amplitude signals such as EEG and ECG are particularly sensitive to interference from electromagnetic energy. This equipment complies with the tests listed at the bottom, but does not guarantee complete operation. The "quiet" electrical environment is better. In general, the greater the distance between electrical equipment, the lower the likelihood of interference.

Manufacturer's Declaration - Electromagnetic Emission

The GA3VET system is intended for use in the electromagnetic environment specified below. The customer or the user of GA3VET system should assure that it is used in such an environment.		
Emission test	**Compliance**	**Electromagnetic environment - guidance**
Mains terminal disturbance voltage CISPR 11	GROUP1, CLASS A	The EMISSIONS characteristics of GA 3VET make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) GA3VET might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.
RADIATED DISTURBANCE C ISPR 11	GROUP1, CLASS A	
Harmonic Current Emission IEC 61000-3-2	CLASS A	The GA3VET is suitable for use in all establishments other than domestic and may be used in domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage change, Voltage fluctuations and Flicker Emission IEC 61000-3-3	Pst : 1 Plt : 0.65 Tmax : 0.5 dmax : 4% DC : 3.3%	

Manufacturer's Declaration - Electromagnetic Immunity

The GA3VET system is intended for use in the electromagnetic environment specified below. The customer or the user of the GA3VET system should assure that it is used in such an environment			
Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic Environment -guidance
Electrostatic Discharge Immunity (ESD) IEC 61000-4-2	±8 kV/Contact ±2, ±4, ±8, ±15 kV/Air	±8 kV/Contact ±2, ±4, ±8, ±15 kV/Air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.

Radiated RF Electromagnetic Field Immunity IEC 61000-4-3	3 V/m 80 MHz - 2.7 GHz 80% AM at 1 kHz	3 V/m 80 MHz - 2.7 GHz 80% AM at 1 kHz	GA3VET is suitable to use in professional healthcare environment. RF communication equipment is used no closer than 30 cm to any part of the GA3VET, including cables specified by Bionet
Immunity to Proximity Fields from RF wireless Communication s Equipment IEC 61000-4-3	28 V/m Max. 3855785 MHz in according to table 9 in IEC 606011-2	28 V/m Max. 3855785 MHz in according to table 9 in IEC 606011-2	Mains power quality should be that of a typical commercial or hospital environment.
Electrical Fast Transient/Burst Immunity IEC 61000-4-4	±2 kV, 100 kHz repetition frequency	±2 kV, 100 kHz repetition frequency	The quality of supplied power should be suitable for general business site or hospital environment.
Surge Immunity IEC 61000-45	Line to Line ±0.5 kV, ±1 kV Line to Ground ±0.5 kV, ±1 kV, ±2 kV	Line to Line ±0.5 kV, ±1 kV Line to Ground ±0.5 kV, ±1 kV, ±2 kV	The quality of supplied power should be suitable for general business site or hospital environment.
Immunity to Conducted Disturbances Induced by RF fields IEC 61000-4-6	3 V 0.15 MHz - 80 MHz 6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz	3 V 0.15 MHz - 80 MHz 6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz	The strength of RF field in the frequency range higher than 150 kHz~80 MHz, the strength of the RF field is smaller than 3 V Power

Power Frequency Magnetic Field Immunity IEC 61000-4-8	30 A/m 60 Hz	30 A/m 60 Hz	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage dips IEC 61000-4-11	0% UT: 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT; 1 cycle and 70% UT; 30 cycles Single phase: at 0º	0% UT: 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT: 1 cycle and 70 % UT; 30 cycles Single phase: at 0º	Mains power quality should be that of a typical commercial or hospital environment. If the user of the GA3VET requires continued operation during power mains interruptions, it is recommended that the GA3VET be powered from an uninterruptible power supply or a battery be used with the system power source.
Voltage interruptions IEC 61000-4-11:	0% UT; 300 cycles	0% UT; 300 cycles	
NOTE UT is the a.c. mains voltage prior to application of the test level.			

System Specification

Hardware specifications	
Dimension, Weight	188 x 180 x 60 mm, Approx. 1.1kg (with battery) 990g (without battery)
Visual indicator	Categorized alarms (3 priority levels), Visual alarm lamp handle Battery status, External power LED, Touch screen
Display, Resolution	7" TFT-LCD, 800 x 480
Parameter	EtCO2, FiCO2, Airway Respiration Rate, Anesthetic gas
Trace	2 waveforms : AG1, EtCO2 Sweep speed : 6.25, 12.5, 25, 50 mm/sec
Indicators	Categorized alarms (3 priority levels), Visual alarm lamp handle , Battery status, External power LED
Interfaces	DC input connector : 15VDC, 2.0A LAN digital output for transferring data,
Battery	Rechargeable Li-ion battery (Max 4hours)
Data Storage	168hours trends, 5000 cases of Animal data
Environmental Requirements	
Temperature Range	Operating: 5 ~ +40 °C (41 ~ 104 °F) Storage: –20 ~ +60 °C (–4 ~ +140 °F)
Relative Humidity	Operating: 30% ~ 85%, Non-condensing Storage: 10% ~ 95% (Packing)
Atmospheric Pressure	Operating: 525 ~ 795 mmHg (70 ~ 106 kPa) Storage: 375 ~ 795 mmHg (50 ~ 106 kPa)

Sidestream CO2 (Option)	
Measurement range	0 to 150 mmHg, 0 to 19%
Accuracy	0-40mmHg ±2 mmHg, 41-70mmHg ±5% of reading 71-100mmHg ±8% of reading, 101-150mmHg ±10% of reading

Respiration rate	2 to 150 breath per minute
Respiration accuracy	±1breath per minute

Mainstream Respironics CO2 (Option)	
Measurement range	0 to 150 mmHg, 0 to 19%
Accuracy	0-40 mmHg ±2 mmHg, 41-70 mmHg ±5% of reading 71-100 mmHg ±8% of reading, 101-150 mmHg ±10% of reading
Respiration rate	0 to 150 breath per minute
Respiration accuracy	±1breath per minute

Mainstream Bionet CO2 (Option)	
Measurement range	0 to 114 mmHg, 0 to 15%
Accuracy	0-40 mmHg ±2 mmHg, 41-76 mmHg ±5% of reading 77-114 mmHg ±8% of reading, Above 80 BPM ±12% of reading
Respiration rate	2 to 150 breath per minute
Respiration accuracy	±1breath per minute

Dual Gas - Bionet (Option)	
Method	Infra-red absorption characteristic, sidestream
Gas	CO2, Iso, Sev, Enf, Hal, Des
Range, Accuracy	CO2: 0 – 10%, ±(0.2 vol% + 4% relative) Iso/Sev/Enf/Hal: 0-6%, ±(0.15 vol% + 4% relative)

	Des: 0-18%, ±(0.15 vol% + 4% relative)
Respiratory Rate	0 – 150 BPM ± 1 BPM

Default Biosignal Alarm Level

	High	Medium	Low	Message
EtCO2			●	
FiCO2			●	
AWRR			●	
APNEA			●	
EtAG		●		
FiAG		●		

Default Technical Alarm Level

Biosignal Class	Alarm Name	Alarm Level				Alarm On/Off	
		High	Medium	Low	Message	On	Off
ETCO2	MODULEOFF				●	●	
	CHECKADAPTER				●	●	
	CHECKLINE				●	●	
	CHECKLINEDISCONNECT				●	●	
	CO2INVALID				●	●	
	OVERRANGE				●	●	
	ZEROREQUIRED				●	●	
	SYSTEMFAULT				●	●	
	TEMPUNSTABLE				●	●	
DUAL GAS	MODULEOFF				●	●	
	CHECKADAPTER				●	●	
	ZERODISABLE				●	●	
	LASTSPANCAL				●	●	
	REPLACEO2SENS				●	●	
	UNSPECIFIEDACCESSORY				●	●	
	SENSORERROR				●	●	
	ROOMAIRO2CALREQUIRED				●	●	
	SWERROR				●	●	
	HWERROR				●	●	
	MOTORERROR				●	●	

	FACTORYCALLOST				●	●	
	O2SENSORERROR				●	●	
	REPLACEADAPTER				●	●	
	O2PORTFAIL				●	●	
	WATRTRAPFULL				●	●	
SYSTEM	LOWBATTERY				●	●	

Parameter Limit

Biosignal Class	Animal Type	Biosignal Alarm		Limits		Min./Max.	
		Position (IBP ONLY)	Alarm	Lower	Upper	Min.	Max.
ETCO2	PUPPY	ETCO2		25.0	50.0	0.0	100.0
		FICO2		0.0	5.0	0.0	20.0
		AWRR		10.0	30.0	0.0	150.0
		APNEA		0.0	40.0	10.0	60.0
	CAT	ETCO2		25.0	50.0	0.0	100.0
		FICO2		0.0	5.0	0.0	20.0
		AWRR		10.0	30.0	0.0	150.0
		APNEA		0.0	40.0	10.0	60.0
	DOG	ETCO2		25.0	50.0	0.0	100.0
		FICO2		0.0	5.0	0.0	20.0
		AWRR		10.0	30.0	0.0	150.0
		APNEA		0.0	40.0	10.0	60.0
	HORSE	ETCO2		25.0	50.0	0.0	100.0
		FICO2		0.0	5.0	0.0	20.0
		AWRR		10.0	30.0	0.0	150.0
		APNEA		10.0	20.0	10.0	60.0
DUAL GAS	PUPPY	ETCO2		25.0	50.0	0.0	244.0
		FICO2		0.0	5.0	0.0	244.0

		AWRR	10.0	30.0	0.0	150.0
		APNEA	20.0	40.0	20.0	60.0
		AG1E-DES	0.0	20.0	0.0	244.0
		AG1I-DES	0.0	20.0	0.0	244.0
		AG1E-ENF	0.0	6.0	0.0	244.0
		AG1I-ENF	0.0	6.0	0.0	244.0
		AG1E-HAL	0.0	6.0	0.0	244.0
		AG1I-HAL	0.0	6.0	0.0	244.0
		AG1E-ISO	0.0	6.0	0.0	244.0
		AG1I-ISO	0.0	6.0	0.0	244.0
		AG1E-SEV	0.0	5.0	0.0	244.0
		AG1I-SEV	0.0	5.0	0.0	244.0
	CAT	ETCO2	25.0	50.0	0.0	244.0
		FICO2	0.0	5.0	0.0	244.0
		AWRR	10.0	30.0	0.0	150.0
		APNEA	20.0	40.0	20.0	60.0
		AG1E-DES	0.0	20.0	0.0	244.0
		AG1I-DES	0.0	20.0	0.0	244.0
		AG1E-ENF	0.0	6.0	0.0	244.0
		AG1I-ENF	0.0	6.0	0.0	244.0
		AG1E-HAL	0.0	6.0	0.0	244.0
		AG1I-HAL	0.0	6.0	0.0	244.0
		AG1E-ISO	0.0	6.0	0.0	244.0
		AG1I-ISO	0.0	6.0	0.0	244.0
		AG1E-SEV	0.0	5.0	0.0	244.0
		AG1I-SEV	0.0	5.0	0.0	244.0
	DOG	ETCO2	25.0	50.0	0.0	244.0
		FICO2	0.0	5.0	0.0	244.0
		AWRR	10.0	30.0	0.0	150.0
		APNEA	20.0	40.0	20.0	60.0
		AG1E-DES	0.0	20.0	0.0	244.0
		AG1I-DES	0.0	20.0	0.0	244.0

		AG1E-ENF	0.0	6.0	0.0	244.0
		AG1I-ENF	0.0	6.0	0.0	244.0
		AG1E-HAL	0.0	6.0	0.0	244.0
		AG1I-HAL	0.0	6.0	0.0	244.0
		AG1E-ISO	0.0	6.0	0.0	244.0
		AG1I-ISO	0.0	6.0	0.0	244.0
		AG1E-SEV	0.0	5.0	0.0	244.0
		AG1I-SEV	0.0	5.0	0.0	244.0
		ETCO2	25.0	50.0	0.0	244.0
		FICO2	0.0	5.0	0.0	244.0
		AWRR	10.0	30.0	0.0	150.0
		APNEA	20.0	20.0	20.0	60.0
		AG1E-DES	0.0	20.0	0.0	244.0
		AG1I-DES	0.0	20.0	0.0	244.0
	HORSE	AG1E-ENF	0.0	6.0	0.0	244.0
		AG1I-ENF	0.0	6.0	0.0	244.0
		AG1E-HAL	0.0	6.0	0.0	244.0
		AG1I-HAL	0.0	6.0	0.0	244.0
		AG1E-ISO	0.0	6.0	0.0	244.0
		AG1I-ISO	0.0	6.0	0.0	244.0
		AG1E-SEV	0.0	5.0	0.0	244.0
		AG1I-SEV	0.0	5.0	0.0	244.0

Default Display

Item	Value
Alarm Volume	**50%**
Units for Weight	**Lbs**

Abbreviations

Abbreviations and symbols are alphabetized by reference, which can be read while reading the manual or using the equipment.

A

A	amps
AC	alternating current
Auto, AUTO	automatic
AUX	Auxiliary

B

BPM	beats per minute

C

C	Celsius
CAL	calibration
cm, CM	centimeter

D

DC	direct current

E

EMC	electromagnetic compatibility
EMI	electromagnetic interference
ESU	electrosurgical cautery unit

F

F	Fahrenheit

G

g	gram

H

HR	heart rate, hour
Hz	hertz

I

ICU	intensive care unit
Inc	incorporated

K

kg, KG	kilogram
kPa	kilopascal

L

L	liter, left
LBS	pounds
LCD	liquid crystal display
LED	light emitting diode

M

M mean,	minute
m	meter
MIN,	minminute
MM, mm	millimeters
MM/S	millimeters per second
MMHG, mmHg	millimeters of mercury
mV	millivolt

O

OR	operating room

R

RESP	respiration
RR	respiration rate

S

sec	second

T

Temp	temperature

V

V	precordial lead
V	volt

X

X	multiplier when used with a number (2X)

Symbols

&	and
°	degree(s)
>	greater than
<	less than
–	minus
#	number
%	percent
±	plus or minus

Product Name	**Veterinary Anesthetic Monitor**
Model Name	**GA3VET**
Approval Number	
Approval Date	
Serial Number	
Warranty Period	**3 year from date of purchase**
Date of Purchase	
Customer section	**Hospital Name :** **Address :** **Name :** **Phone :**
Sales Agency	
Manufacturer	**Bionet Co, Ltd.**

* * This product is Veterinary Use Only.

* Thank you for purchasing GA3VET.

* The product is manufactured and passed through strict quality control and through inspection.

* Compensation standard concerning repair, replacement, refund of the product complies with "Consumer's Protection Law" noticed by Korea Fair Trade Commission.

Contact Bionet

If you have any questions or comments relating to our products or purchasing, please contact the telephone numbers or E-mail below. You can talk to our sales people. Bionet always welcomes your enquiries. Please contact us.

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※ In the event of a malfunction or failure, contact Service Dept. Of Bionet Co., Ltd. along with the model name, serial number, date of purchase and explanation of failure.