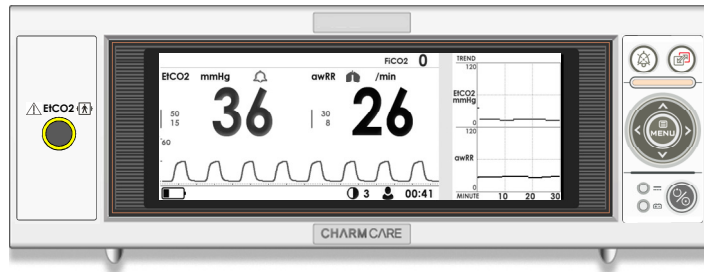



End-Tidal CO2 | **CAPNO3**
User Guide



Ver 2.00

Charmcare Co., Ltd.

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Part 0**Before You Begin...**

Thank you for purchasing the PRIZM3 Capnograph. For the safe operation of this device, it is recommended that you read this user's manual thoroughly before using.

Indications for use statement

The Capnograph is a product that measures the EtCO₂ levels of the patient to relay various biological information of the patient to the medical staff.

Warranty

- To obtain information about a warranty, if any, for this product, contact your local Charm-care representatives.
- This product has been manufactured and inspected following the strict quality assurance guidelines of charmcare.
- Refer to the Economic Planning Board's "Regulations Regarding Consumer Compensation" for more information on conditions for product repairs and exchanges.
- Product malfunctions occurring from regular use shall be repaired for free at the charmcare service center during the term of the warranty period.
- During the term of the warranty period, report all problems with the product to charmcare by including the model no., the device no., date of purchase and a detailed description of the error.
- Manufacturer and/or the store where the product was purchased do not assume any responsibility for any and/or all problems resulting from improper use or improper storage of the product.

Battery Replacement

- If the monitor has not been used for a long period of time, the batter will need charging. To charge the battery, contact your local Charmcare representatives.
- Charmcare recommends that the li-ion battery be replaced at 6-months intervals. Refer to the monitor service manual for batter replacement and general service instruction. Follow local governing ordinances and recycling plans regarding disposal or recycling of the battery and other device components.

Contact Us

Please contact us for better service and products.

Charmcare service is always open.

Need to purchase products or parts?	charmcare Co., Ltd. 714ho, Woolim Lions2-cha, Gasan-Dong Geumcheon-Gu, Seoul, Korea (ZIP 153-787) Tel : +82-2-862-5052 Fax : +82-2-862-5065
Need service or repairs?	Charmcare Co., Ltd. Tel : +82-2-862-5052 Fax : +82-2-862-5065
Need technical advice?	Charmcare Co., Ltd. Tel : +82-2-862-5052 Fax : +82-2-862-5065
Website	HTTP://www.charmcare.com

Definition of Terms

- Certain parts of this manual have been highlighted. Users are advised to pay close attention to warnings and cautions.
- Manufacturer and/or the store where the product was purchased do not assume any responsibility for any and/or all problems resulting from improper use or improper storage of the product.

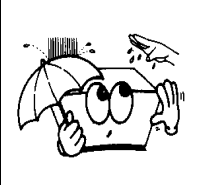
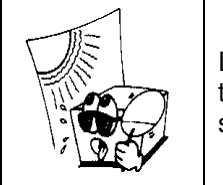
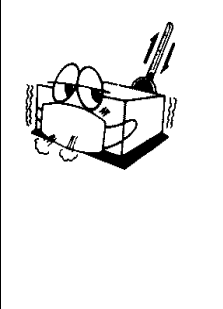
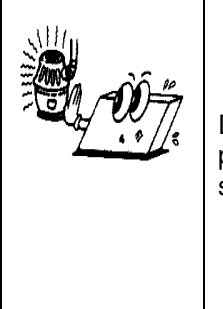
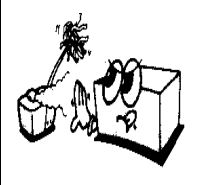
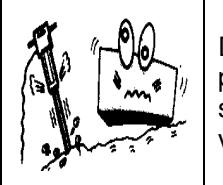
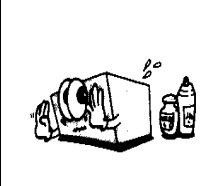
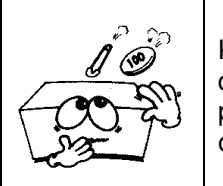
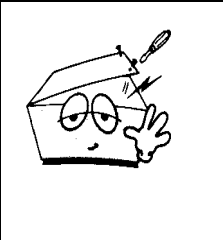
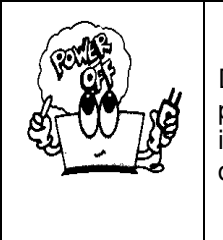
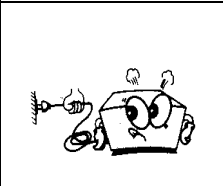
Warning
“Warning” is used to refer to factors, which, when ignored, may result in severe and/or fatal injuries and property damage.

Caution
“Caution” is used to refer to factors, which, when ignored, may result in moderate, but non-life-threatening, injuries.

Note
“Note” is used to highlight factors that are not dangerous, but should be paid close attention to during installation, use, and maintenance.

Proper Environments for the Product

- Do not use or store the product in the following conditions:

	Exposure to Humidity and/or Moisture Do not use the product with wet hands.		Do not store or place the product in direct sunlight.
	Do not store or place the product in areas where temperature changes are drastic. Use the product between temperatures of 10°C and 40°C and at a humidity between 30% and 85%.		Do not place the product near heat sources.
	Do not store or place the product in very humid areas or areas where air circulation is a problem.		Do not subject product to severe shock and or vibrations.
	Do not store or place the product in places where product is exposed to chemicals or flammable gas.		Keep product free of dust and debris, particularly metallic objects.
	Do not attempt to disassemble the product yourself. CharmCare is not liable for any problems that may occur should you attempt to do so.		Do not connect the power during installation. This may damage the product.
	Grip the plug when unplugging the product from a power source.		

Warning

Do not use the product in high ambient light conditions (direct sunlight).
--

Electrical Safety

Please check the following conditions before attempting to use the product.

- Are you using the proper power source line? (100-240VAC)
- Are you using the power source supplied by the manufacturer? (DC 12V, 3.5A)
- Are all parts (power cord and optional parts) connected properly to the product?
- Is the product properly grounded? (An improperly grounded product may result in noise.)

Warning

Read and check the conditions under "Electrical Safety" before using the product. Failure to do so may result in severe injuries and damage to the product.

Warning

The CAPNO3 patient monitor is a prescription device and is to be operated by qualified personnel only

Caution

To prevent noise, install the product away from generators, X-ray machines, speakers and power cords. Proximity of the product to such equipment may result in improper functioning of the product and lead to undesirable results. A separate power circuit and secure grounding of the product are very important. Sharing of a power source with other equipment(s) may lead to undesirable results.

Maintenance and Cleaning

Using various methods can clean patient monitor(CAPNO3) and its accessories. Please follow the methods mentioned below to avoid unnecessary damage or contamination to the Equipment.

- In the event that harmful (unauthorized) materials are used for cleaning, the damaged or contaminated Equipment shall not be serviced without charges regardless of warranty period.

Caution

Please check carefully both frame and sensor, after cleaning the Equipment, Do not use the Equipment that is worn out or damaged.

- At least once a month, clean and wipe off the frame by using the soft cloth after wetting it with lukewarm water and alcohol. Do not use lacquer, thinner, ethylene, or oxides, which could be harmful to the Equipment.
- Make sure both cables and accessories are free of dust or contaminants, and wipe them off with soft cloth wetted with lukewarm water(40°C / 104°F), and at least once a week, clean them by using the clinical alcohol
- Do not submerge the accessories under any liquid or detergent. Also, make sure any liquid not to penetrate into the Equipment or probe

Post-Use Storage and Management

- After use, store the product in an area that does not exceed 85% humidity, and maintain the temperature in the range of 0°C~ 40°C.
- Do not store the product together with chemical products and/or in an area subject to gas exposure.
- Avoid exposing the product directly or indirectly to heat.
- Make sure to review the product usage instructions prior to use.
- Store the product in an area where it will not come in contact with water.
- Store the product in an area free of dust and/or other foreign substances.
- Store the product away from direct sunlight.
- Maintain the product in a safe and stable condition away from vibration and/or other sources of shock.
- If the product and/or sensor area becomes dirty, wipe it clean with rubbing alcohol and cotton swabs, and then allow it to dry at room temperature for 30 minutes.

Classifications

The CAPNO3 capnograph is classified, according to IEC 60601-1 as:

Type of protection against electric shock :	Class II
Degree of protection against electric shock :	BF-Type applied part
Degree of protection against harmful ingress of water	Ordinary equipment

Part 1**Product Summary**

CAPNO3 is designed to measure EtCO2(End-Tidal CO2). It enables the user to monitor the patient's status also while on the move in battery mode.

The user can change settings such as the alarm by using the buttons on the front of the product. The TREND menu allows the user to store and view data.

Parts**■ Basic Accessories**

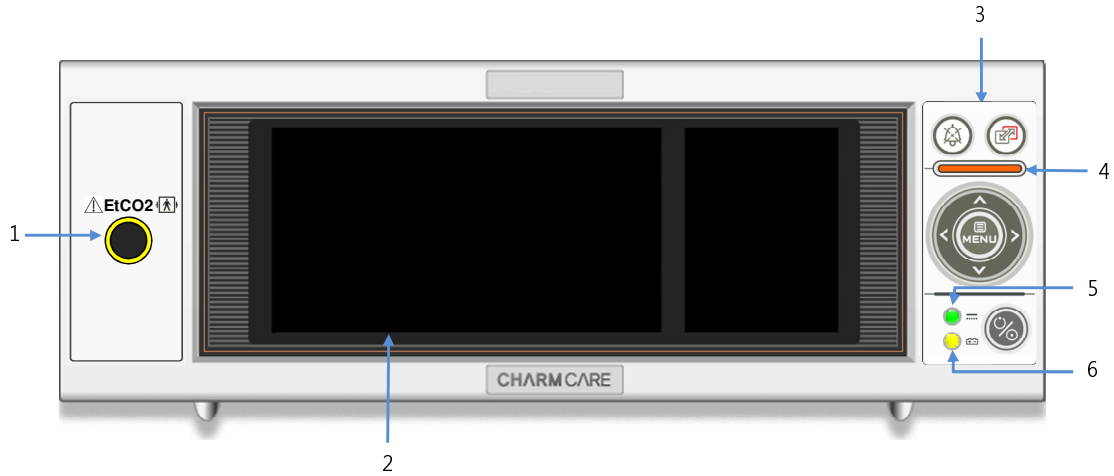
Type	Quantity
DC Power Unit	1
Power Cord	1
User's Manual	1

■ Optional Parts

1. Pole bracket
2. EtCO2 Sidestream (External)
3. EtCO2 Mainstream

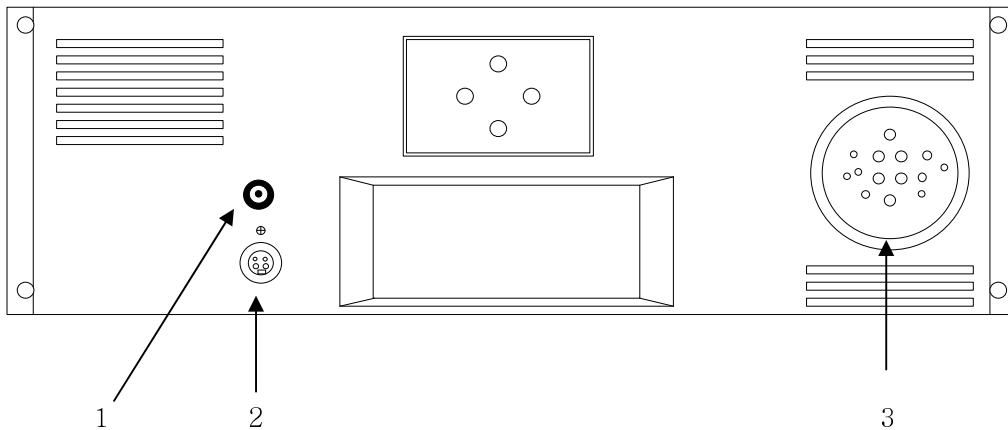
Main Units

■ Front view



- 1. EtCO2 Sensor Port
- 2. Display Screen
- 3. Buttons
- 4. Alarm Lamp
- 5. Using DC Power
- 6. Using Battery power

■ Rear view











- 1. DC Adapter Port
- 2. Serial Port
- 3. Speaker

Warning

To prevent electric shock, keep the top cover closed and do not attempt to disassemble the product on your own. Product should only be disabled by authorized service personnel.

Symbols

	Power ON/OFF indicator
	Battery Operated
	DC operated
	Type BF
	Caution
EtCO2	EtCO2 module connector
	Alarm sound pause
	SCREEN Change
MENU	MENU button
	Connect DC power

Part 2**Product Installation**

First-time users: Read the installation instructions thoroughly and install the product in a safe place to ensure product longevity.

Caution When Installing

- Use the product in a place where the temperature is between 0~40°C and the humidity is 85%.
- The product is very sensitive to shock. Caution is advised.
- Keep the product dust-free and install away from flammable materials.
- Make sure that the power cord is plugged in properly.
- Do not plug in more than one device into one outlet.
- Do not use a power cord that causes noise.
- Ground the product if noise develops.

Connecting the Power

- Connecting the Power – Connect the power to the power port in the back of the product.

Warning

Use the power supply device supplied by the manufacturer. Failure to do so may result in electric shock and damage to the product.

Warning

edge or points of the Product can hurt to patient and user.

Installing the Stand

The product may also be mounted on a stand, which can then be attached to an IV stand. This makes the product more portable. (*Stand is optional.)

Step 1) The product may be used horizontally or vertically. First, decide how you want the product to be mounted. Then, insert two bolts into the holes on the stand and tighten.

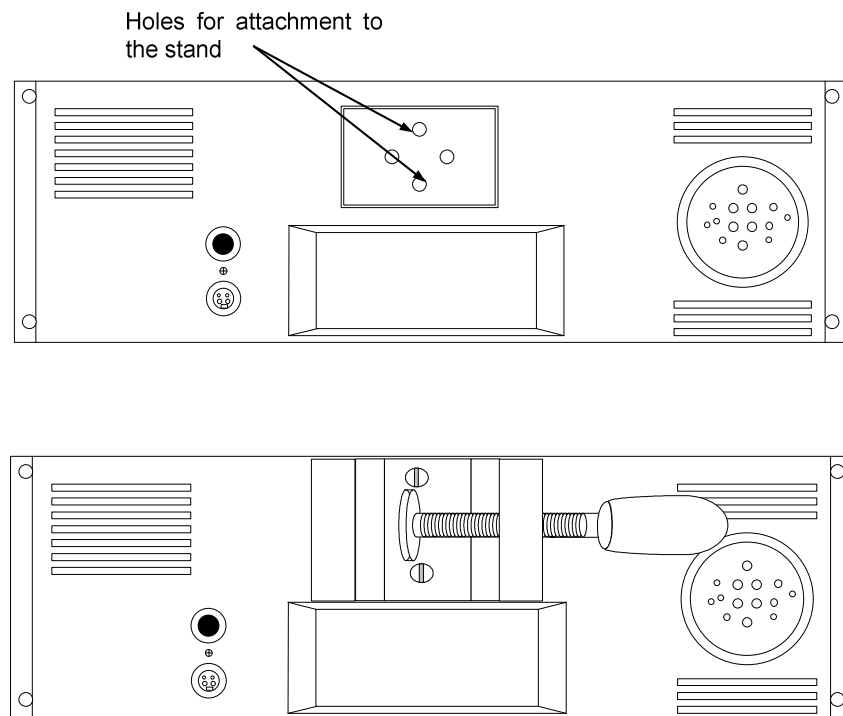
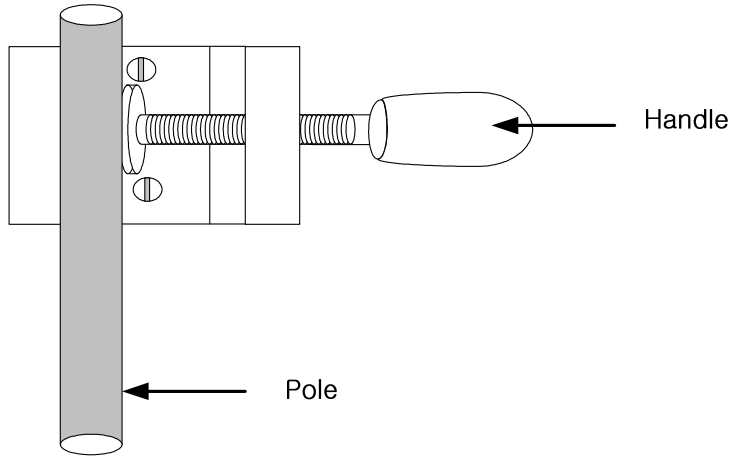
REAR

Fig. Attaching the stand

Step2) Mount the stand to the pole by sliding the stand onto the pole and then, turn the handle to tighten.



L

Caution

The pole on which the stand is mounted should be less than 30mm in diameter. Do not use poles that are any thicker than this.

Part 3

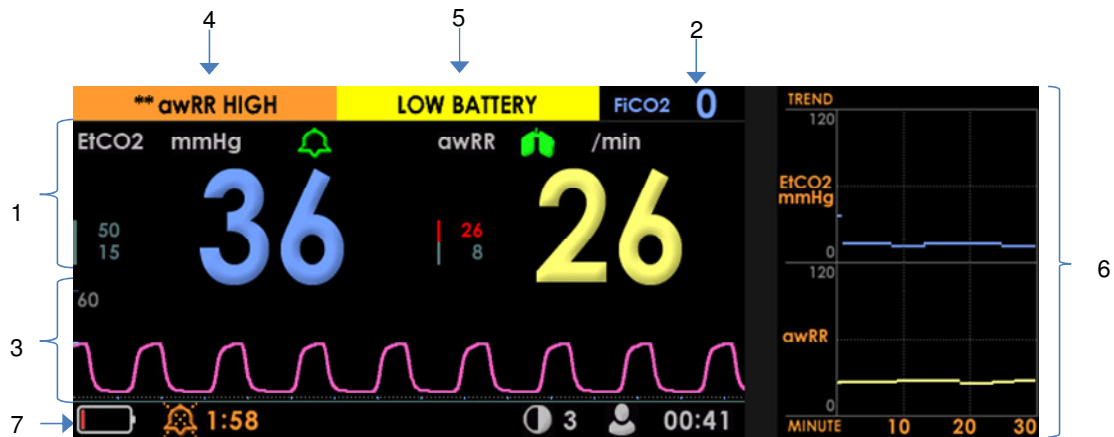
Using the Product

This section contains information on the basic nomenclature and directions for using the product.

Operation

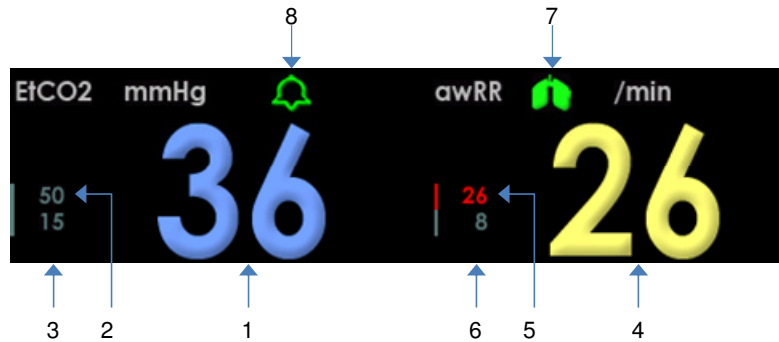
- (1) Connect the adapter to the adapter jack located on the back of the product
- (2) Connect the EtCO2 module to the terminal located on the front
- (3) When using mainstream connect the sensor to the airway adapter.
- (4) When using sidestream, connect the sampling line to the module and the patient.
- (5) Press the power button.
- (6) All of the indicators on the LCD flash on indicating the device is ready to measure.

The SCREEN



No	Name	Description
1	EtCO2/awRR	Displays the measured EtCO2, awPR and related values.
2	FiCO2	Display the measured FiCO2.
3	wave	Displays EtCO2 waveform.
4	Patient alarm message	Displays the alarm message from the measured value. When multiple alarms occur, it shows according to higher priority.
5	Technical alarm message	Displays the alarm message related to the system.
6	Short Trend area	Displays the EtCO2, awRR value saved during the previous 30 minutes on a graph.
7	System status area	Displays status setting data.












EtCO2/awRR Data area



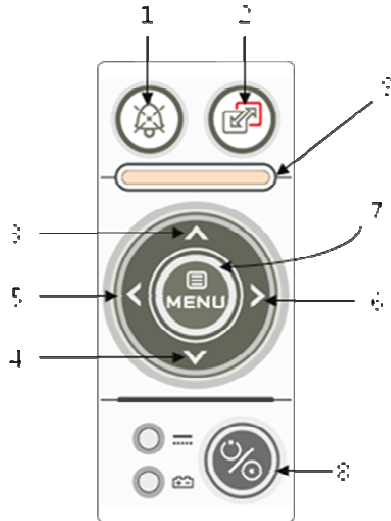
NO	Name	Description
1	EtCO2	Indicates the measured EtCO2. When the EtCO2 deviates from the alarm limit, the number flashes.
2	EtCO2 High alarm limit	Indicates the high limit for the EtCO2 alarm. If the EtCO2 value is higher than or equal to this value, the number becomes red.
3	EtCO2 Low alarm limit	Indicates the low limit for the EtCO2 alarm. If the EtCO2 value is lower than or equal to this value, the number becomes red.
4	awRR	Indicates the measured respiration rate. If the awRR deviates from the alarm limit, the number flashes.
5	awRR High alarm limit	Indicates the high limit for the awRR alarm. If the awRR value is higher than or equal to this value, the number becomes red.
6	awRR Low alarm limit	Indicates the low limit for the awRR alarm. If the awRR value is lower than or equal to this value, the number becomes red.
7	Respiration Status Indicator	Flashes when respiration is detected.
8	Alarm monitoring status	Displays the alarm monitoring status

System Status area



No	Name	Description
1	Battery Status	<p>Displays the battery status.</p> <ul style="list-style-type: none">  Uses DC power and battery is in charge  Uses a battery and capacity is FULL  Uses a battery and capacity is 3/4  Uses a battery and capacity is 1/2  Uses a battery and capacity is 1/4  Uses a battery and capacity is low
2	Alarm sound mode	<p>Displays the alarm sound off state.</p> <ul style="list-style-type: none">  Displays the alarm sound paused state and left time  Displays the Alarm sound off state
3	Screen Brightness	Displays the screen brightness state
4	Patient mode	<p>Displays the patient mode state.</p> <ul style="list-style-type: none">  ADULT  PEDIATRIC  NEONATE
5	Real-time clock	Displays the current time(hour: minute)

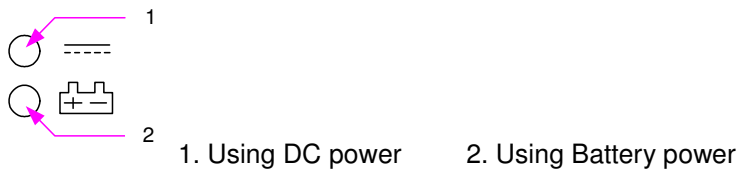
Using the Buttons and alarm lamp



No	Name	Description
1	Alarm sound pause	The alarm sound pauses for the setup duration when the alarm occurs.
2	SCREEN	Changes the SCREEN mode (Refer to modules composition) (OrderSCREEN1->SCREEN2->SCREEN3)
3	▲ button	Moves the selected item up.
4	▼ button	Moves the selected item down.
5	◀ button	Decreases the selected value in the menu screen
6	▶ button	Increases the selected value in the menu screen. Changes the screen brightness in the general screen.
7	MENU button	Moves to the SETUP menu when pressed in the general screen.
8	Power	Used when turning on/off the power of the product. Press the power for more than 2 seconds to turn the power off, when the power is on.
9	Alarm Lamp Display	When alarm occurs, the light displays as below. High Level Alarm : Red lamp blinks Medium Level Alarm : Yellow lamp blinks. Low Level Alarm : Yellow lamp stays on.

Using Powe

Attach the supplied DC power device to the DC power port in the rear of the product. The green "Power Operated" light will come on. If the DC power device is not connected, the product will operate on the internal battery. In this case, the red "Battery Operated" light will come on.

**Note**

When the battery gets low, the battery status display on the screen will start blinking and the alarm will sound. Depending on the parameters, the power may become disconnected right away. Therefore, it is advised that the DC power be connected immediately.

Note

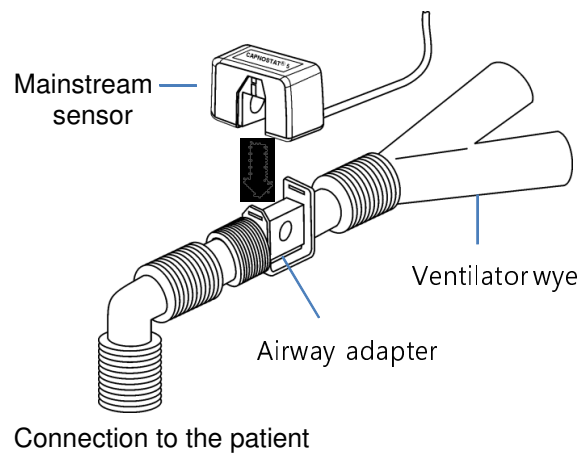
The battery guarantee is for 6 months. After this period, the battery life may drop drastically.

Note

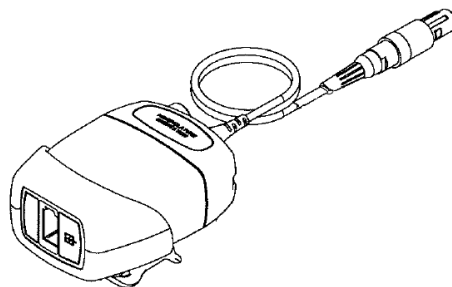
When the coin battery image (⊕) shows in the lower part of the screen, saved data can be damaged. Service request is necessary.

Part 4 EtCO₂ Measurement**Using Mainstream**

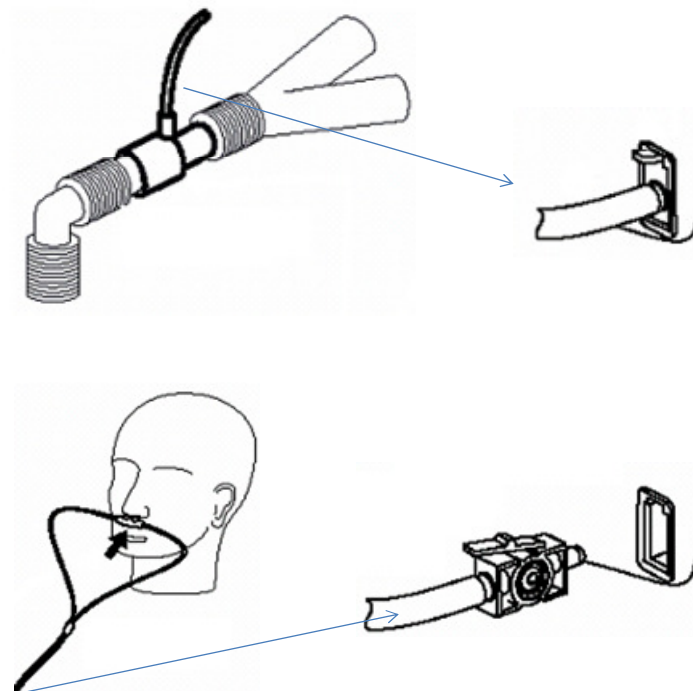
- Step1) Connect the Mainstream sensor cable to the product's EtCO₂ module connector.
- Step2) Select the airway adapter in accordance to patient type and usage
- Step3) Attach the airway adapter to the Mainstream sensor
- Step4) If the airway adapter type changes or usage between disposable or reusable changes, conduct the Zeroing process.
- Step5) Connect the airway adapter to the airway circuit.

**Using Sidestream**

- Step1) Connect the Sidestream module cable to the product's EtCO₂ module connector.



- Step2) When connecting to the ET tube, select the airway adapter kit corresponding to patient type and ET tube size.
- Step3) When connecting directly to the patient, select the CO₂ sampling canula corresponding to the patient type.
Nasal CO₂, Oral/Nasal CO₂,
Nasal CO₂ with O₂ delivery, Oral/Nasal CO₂ with O₂ delivery cannula
- Step4) Insert the Sampling cell into the module's socket.
- Step5) Begin WARM UP process of the CO₂ module.
- Step6) When necessary, conduct Zeroing. This step is necessary when using a new CO₂ module, or a different type of airway adapter kit or sampling line.
- Step8) When using the sampling cannula, connect it to the patient.
When using the ET tube, connect the sampling line kit to the airway adapter.

**Warning**

Don't hot plug EtCO₂ module, that is make sure that the CAPNO3 is powered off before insert the connector of CO₂ sensor into EtCO₂ socket. Otherwise the CO₂ module may be damaged by power supply from EtCO₂ socket of CAPNO3

Caution

- Check if the sampling line is tangled.
- Check if there is anything wrong with the CO2 module cable.
- Before connecting to patient, check the initial status of CO2 and the setup status.

Warning

- Disposable cannula kits may be used on the patient only once and cannot be recycled.

Warning

- DO NOT position the sensor cables of tubing in any manner that may cause entanglement or strangulation. Support the carbon dioxide monitoring system airway adapter to prevent stress on the ET tube.
- Reuse, disassembly, cleaning, disinfecting or sterilizing the single patient use cannula kits and on-airway adapters may compromise functionality and system performance leading to a user or patient hazard. Performance is not guaranteed if an item labeled as single patient use is reused.
- Inspect the sidestream on-airway adapters and sidestream sampling kits for damage prior to use. DO NOT use the sidestream on-airway adapters and sidestream sampling kits if they appear to be damaged or broken.
- Replace the sidestream on-airway adapters and sidestream sampling kits if excessive secretions are observed.
- Monitor the CO2 check waveform. If you see changes or abnormal appearance the patient and the sampling line. Replace line if needed.
- Do not apply excessive tension to any cable.
- DO NOT use device on patients that can not tolerate the withdrawal of 50 ml/min +/- 10ml/min from the airway or patients that can not tolerate the added dead space to the airway.
- Do not connect the exhaust tube to the ventilator circuit.
- DO NOT stick appendage into sample receptacle.
- Always insert sample cell before inserting the on-airway adapter into the ventilated circuit.
- always remove the on-airway adapter from the ventilated circuit before removing the sample cell.
- Nitrous oxide, elevated levels of oxygen, helium, Xenon, halogenated hydrocarbons

and barometric pressure can influence the CO2 measurement.

CO2 Sensor Zeroing

Sensor Zeroing is required in the following instances.

- Change of sensor module
- When changing the type of Airway adapter kit or sampling line
- When changing airway adapter from disposable to reusable or vice versa
- When the "ETCO2 ZERO REQUIRED" is displayed in the lower part of the screen


Conduct sensor Zeroing as follows.

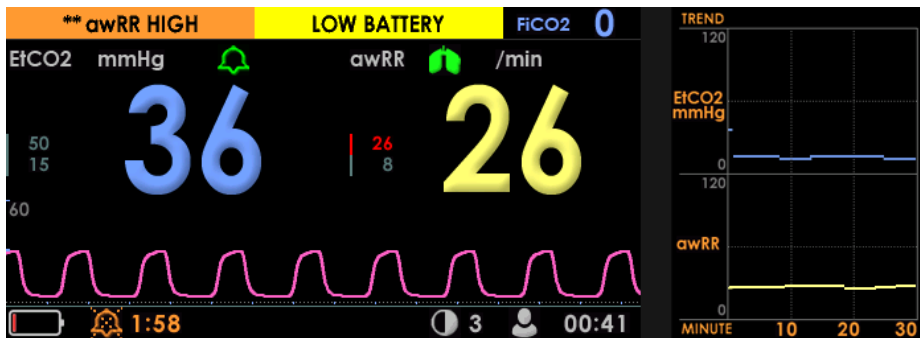
1. Make sure no CO2 passes through the Airway adapter and sampling line. Disconnect from the patient if it is connected.
2. Press the [MENU] button and advance to the SETUP>ETCO2>ZEROSSET menu. Set ZERO GAS and press the [MENU] button at the [START] menu to begin Zeroing.

Part 5 Switch Screen Mode

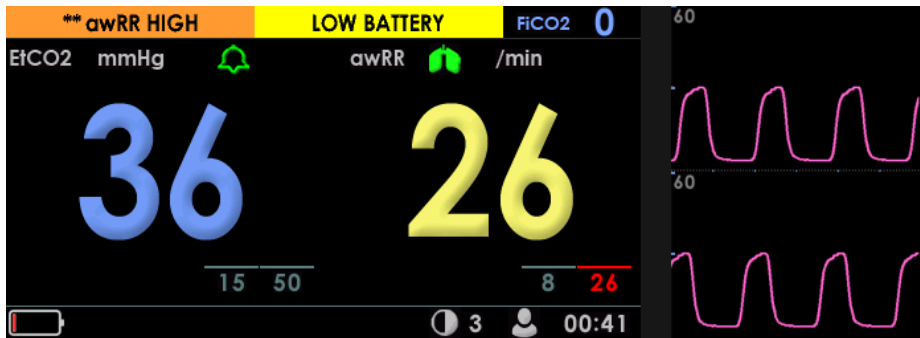
Switch Screen Mode

There are 3 types of screens which the user can choose from.

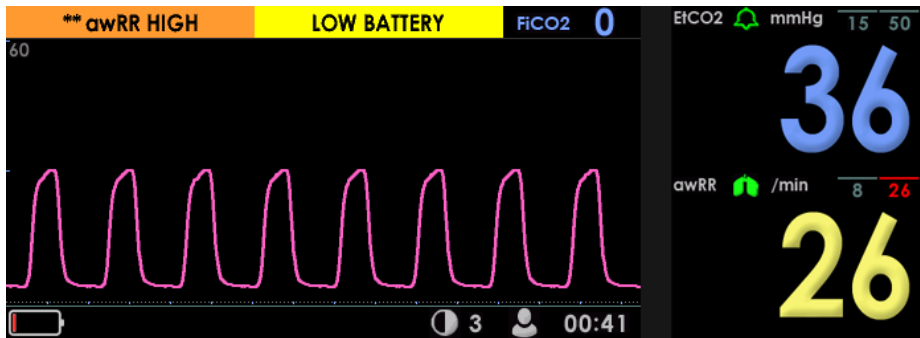
Press the  button once to switch the screen in the order of SCREEN1 → SCREEN2 → SCREEN3



<SCREEN 1>



<SCREEN 2>



<SCREEN 3>

Part 6

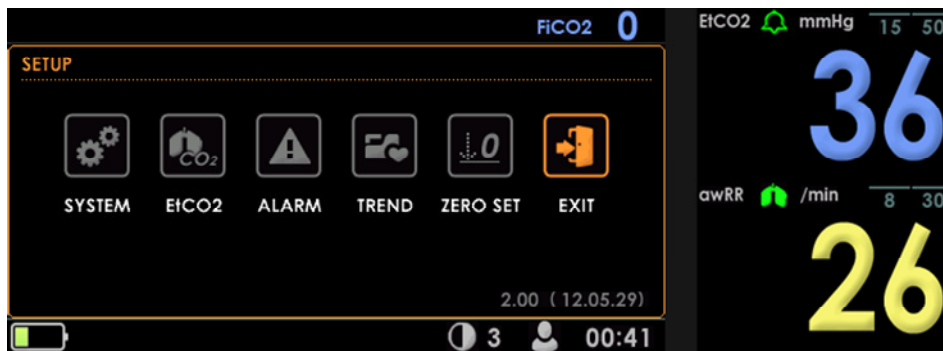
Using the SETUP Menu

Enter the SETUP Menu

Step 1) Press the MENU button to enter the SETUP screen. Switch to SCREEN3 so the parameter data is displayed in the right portion of the menu.

Step 2) Select the icon using the [\leftarrow , \rightarrow , \wedge , \vee] button to enter the lower menu after pressing the [MENU] button.

Step 3) Press the [MENU] menu button from 'EXIT' to move to the SETUP menu.



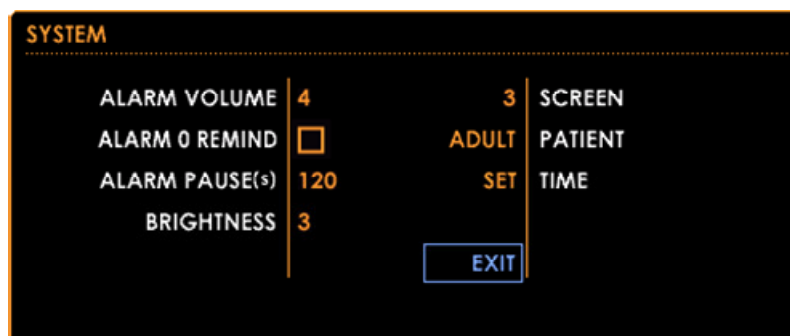
Setup SYSTEM

Step1) At the 'SETUP' menu go to 'SYSTEM' and press the [MENU] button to enter the SYSTEM settings screen.

Step2) Use the [^](up) and [v](down) buttons to move to the desired item.

Step3) Once at the item you wish to change, use the [<](left) and [>](right) buttons to adjust the settings.

Step4) Press the [MENU] button while on 'EXIT' to go to the SETUP menu.



Item	Description	Range
ALARM VOLUME	Set the degree of the alarm volume.	0~7
ALARM0 REMIND	When the alarm sound is 0 and the alarm occurs, sets if the alarm should beep in 3 minutes duration.	OFF, ON
ALARM PAUSE	Set the duration (second) when in alarm sound pause and alarm sound off.	30, 60, 90, 120 seconds
BRIGHTNESS	Set the brightness of the screen.	1~5
SCREEN	Set the main screen mode. (Part 5.Switch SCREEN mode)	1~3
PATIENT	Set patient mode.	Adult, Pediatric, Neonate
TIME	Move to the menu for setting the current time.	
EXIT	Move to previous menu.	

Setup Current Time

Step1) From the 'SYSTEM' menu, go to 'TIME' and press the [MENU] button to enter the TIME settings screen.

Step2) Use the [^](up) and [v](down) buttons to move to the item you wish to modify.

Step3) At the item you wish to modify, use the [<](left) and [>](right) buttons to adjust the settings.

Step4) Press the [MENU] button while on 'EXIT' to go to the SETUP menu.



Set	Year	Month	Day	Hour	Minute
Range	2000~2099	1~12	1~31	0~23	0~59

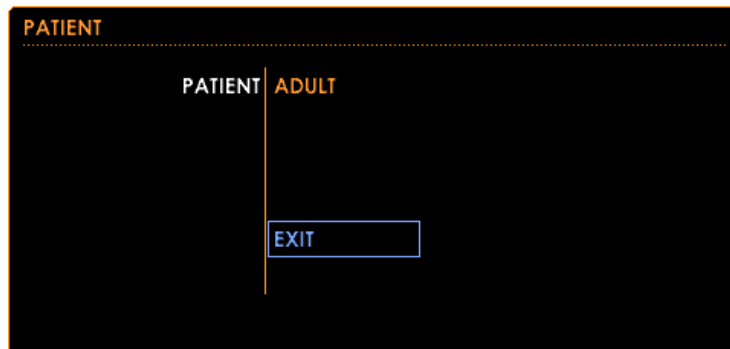
Setup PATIENT

Step1) Press the [MENU] button while on 'PATIENT' to go to the PATIENT settings menu.

Step2) Use the [^](up) and [v](down) buttons to move to the item you wish to modify.

Step3) At the item you wish to modify, use the [<](left) and [>](right) buttons to adjust the settings.

Step4) Press the [MENU] button while on 'EXIT' to go to the SETUP menu.



Item	Description	Range
PATIENT TYPE	Sets up the patient mode.	ADULT, PEDIATRIC, NEONATE
EXIT	Move to previous menu.	

** When changing the patient mode, the settings of each parameter will change to the default values of the patient mode.

(Refer to Appendix1. Factory defaults)

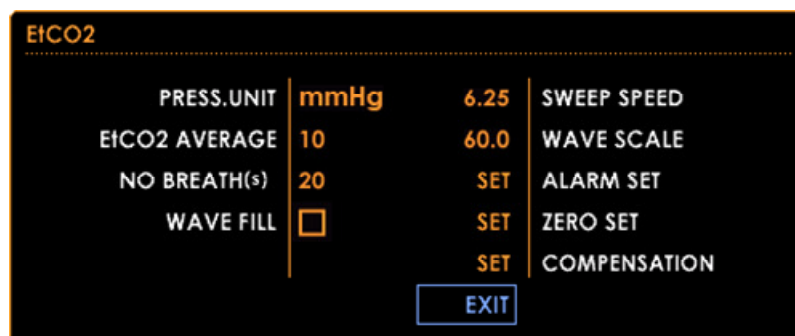
EtCO2 Settings

Step1) If the 'ETCO2' item is displayed in the 'SETUP' menu, press the [MENU] button to enter the ETCO2 settings screen.

Step2) Use the [^](up) and [v](down) buttons to move to the item you wish to modify.

Step3) At the item you wish to modify, use the [<](left) and [>](right) buttons to adjust the settings.

Step3) Press the [MENU] button while on 'EXIT' to go to the SETUP menu.



Item	Description	Range
PRESS.UNIT	Set EtCO2 measurement units.	mmHg, kPa, %
EtCO2 AVERAGE	Set EtCO2 calculation times.	1(a breath), 10, 20 seconds
NO BREATH	Set apnea detection times.	10~60 seconds
WAVE FILL	Select whether to display with filled in waves.	OFF, ON
SWEEP SPEED	Set the speed of the waves.	6.25, 12.5mm/s
WAVE SCALE	Set the scale of the EtCO2 waves.	30, 60, 90, 120mmHg
ALARM SET	Go back to the EtCO2 alarm settings screen.	
ZERO SET	Go to the EtCO2 ZEROSET screen.	
COMPENSATION	Go to the EtCO2 COMPENSATION screen.	
EXIT	Go to the previous menu.	

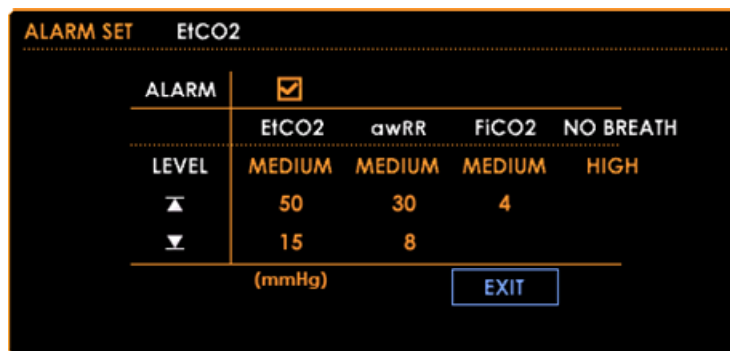
EtCO2 ALARM Setting

Step1) Press the [MENU] button while on 'ALARM SET' in the 'ETCO2' menu, or press 'ALARM' from the 'SETUP' menu to go to the ETCO2 ALARM settings screen.

Step2) Use the [^](up) and [v](down) buttons to move to the item you wish to modify.

Step3) At the item you wish to modify, use the [<](left) and [>](right) buttons to adjust the settings.

Step3) Press the [MENU] button while on 'EXIT' to go to the SETUP menu.



Item	Description	Range
ALARM	Set the EtCO2 limit and apnea (NO BREATH) alarm detection functions. When set to 'OFF', the alarm detection state will be displayed as ✗ .	OFF, ON
EtCO2 Level	Set the level of the EtCO2 limit alarm.	HIGH, MEDIUM, LOW
EtCO2 High Limit	Set the alarm upper limit for the EtCO2 value. When the value is larger or the same, the alarm beeps.	
EtCO2 Low Limit	Set the alarm lower limit for the EtCO2 value. When the value is smaller or the same, the alarm beeps.	
awRR Level	Set the level of the awRR limit alarm.	HIGH, MEDIUM, LOW
awRR High Limit	Set the alarm upper limit for the awRR value. When the value is larger of the same, the alarm beeps.	
awRR Low Limit	Set the alarm lower limit for the aRR value. When the	

	value is smaller or the same, the alarm beeps.	
FiCO2 Level	Set the level of the FiCO2 limit alarm	HIGH, MEDIUM, LOW
FiCO2 High Limit	Set the alarm upper limit for the FiCO2 value. When the value is larger of the same, the alarm beeps.	
NO BREATH level	Set alarm level when the 'NO BREATH' occurs.	
EXIT	Go to the previous menu.	HIGH, MEDIUM, LOW

Caution

Turning the alarm off will prevent you from being alerted to important changes in the patient's status. Therefore, you should be very careful when deciding to turn the alarm off. If the alarm is turned off, you must frequently check on the patient's status.

Warning

Make sure that nothing is covering the rear part of the product. Covering the rear of the product will block the speakers and prevent you from hearing the alarm. Make sure to place the product upright and away from walls or the floor.

Note

It is recommended that you listen the high alarms beforehand in order to be cognizant of the sounds when the alarms do go off.

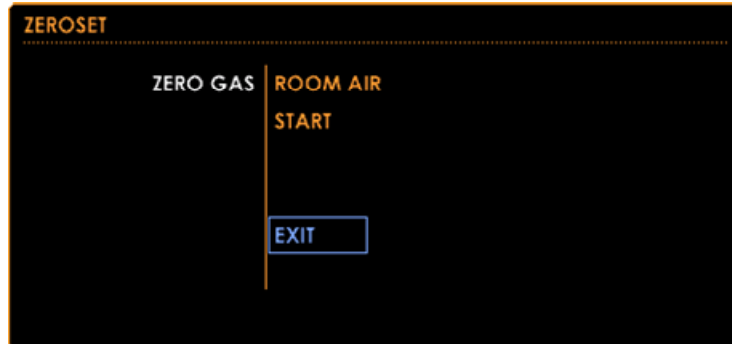
EtCO2 Zeroing Menu

Step1) Press the [MENU] button while on 'ZEROSSET' in the 'ETCO2' menu, or press 'ZEROSSET' from the 'SETUP' menu to go to the ZEROSSET screen.

Step2) Use the [^](up) and [v](down) buttons to move to the item you wish to modify.

Step3) At the item you wish to modify, use the [<](left) and [>](right) buttons to adjust the settings.

Step3) Press the [MENU] button while on 'EXIT' to go to the EtCO2 menu.



Item	Description	Range
ZERO GAS	Set ZERO GAS.	N2, ROOM AIR
START	Begin EtCO2 Zeroing. * Make sure no CO2 passes through the Airway adapter and sampling line. Disconnect from the patient if it is connected.	HIGH, MEDIUM, LOW

Note
<ul style="list-style-type: none"> ◆ System does not allow adapter zero for 20 seconds after the last breath is detected. ◆ System does not allow adapter zero if temperature is not stable. ◆ An adapter zero cannot be performed if a sample cell is not connected to the module.

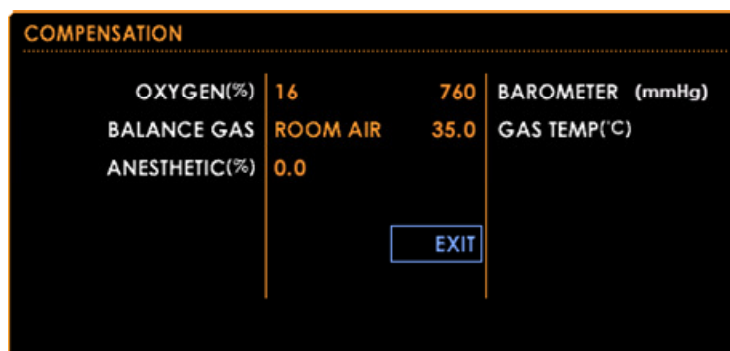
EtCO2 COMPENSATION

Step1) If you see 'COMPENSATION' in the 'ETCO2' menu, press the [MENU] button to enter the COMPENSATION screen.

Step2) Use the [^](up) and [v](down) buttons to move to the item you wish to modify.

Step3) At the item you wish to modify, use the [<](left) and [>](right) buttons to adjust the settings.

Step3) Press the [MENU] button while on 'EXIT' to go to the EtCO2 menu.



Item	Description	Range
OXYGEN	Set the oxygen concentration of the gas mixture administered to the patient.	0~100%
BALANCE GAS	Set balance gas.	ROOM AIR, N2O, He
ANESTHETIC(%)	Set concentration of anesthetic Agent. If the Balance gas is He, no anesthetic Agent is used.	0~20.0%
BAROMETER	Set the current atmospheric pressure.	480~850mmHg
GAS TEMP	Set temperature for the gas mixture.	0 ~ 50°C

Part 7**Save and Confirm TREND data****Save Measured Data**

The value of the measured EtCO₂, awRR value is saved as below.

1. The EtCO₂, awRR value is saved in a 10 second unit span.
2. Saves the limit alarm state.
3. When data exceeds the capacity, old data is deleted and new data is saved.
4. Data is only saved when the EtCO₂ modules is connected and operational.

Note

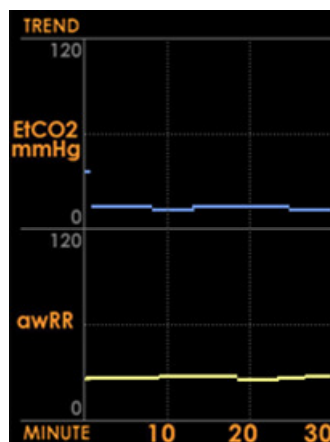
- ◆ If the EtCO₂ UNIT is changed, the saved value will be deleted.

Check TREND Screen

TREND screen be checked by three different states: Short Trend, Tabular Trend, Graphic Trend

1). Display Short Trend Screen

The recorded EtCO₂ and awRR value for the previous 30 minutes can be shown in a graph as shown below on the screen 2 of the main screen.



2) Tabular Trend Screen

Moves to the Tabular Trend screen by selecting SETUP MENU>> TREND > TABULAR as shown below.

Displays by the recent data order.

TABULAR		PAGE		←: ▲		→: ▼		☰: EXIT	
TIME	EtCO2	RR	TIME	EtCO2	RR	TIME	EtCO2	RR	TIME
2012/06/19 00:42:50	36	26	2012/06/19 00:41:50	36	26	2012/06/19 00:41:50	36	26	2012/06/19 00:41:50
2012/06/19 00:42:40	36	26	2012/06/19 00:41:40	36	26	2012/06/19 00:41:40	36	26	2012/06/19 00:41:40
2012/06/19 00:42:30	36	26	2012/06/19 00:41:30	36	26	2012/06/19 00:41:30	36	26	2012/06/19 00:41:30
2012/06/19 00:42:20	36	26	2012/06/19 00:41:20	36	26	2012/06/19 00:41:20	36	26	2012/06/19 00:41:20
2012/06/19 00:42:10	36	26	2012/06/19 00:41:10	36	26	2012/06/19 00:41:10	36	26	2012/06/19 00:41:10
2012/06/19 00:42:00	36	26	2012/06/19 00:41:00	36	26	2012/06/19 00:41:00	36	26	2012/06/19 00:41:00

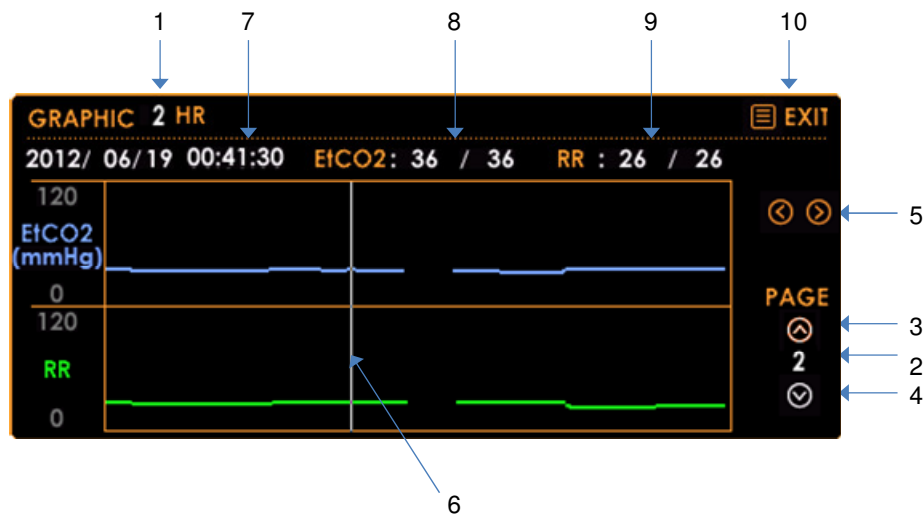
No	Description
1	Button key instructions [^] Button : Displays the previous page.. Moves quickly to the page after pressing more than 2 seconds [v] Button : Displays the next page. Moves quickly to the page after pressing more than 2 seconds [<] Button : Displays the page of the newest saved data. [>] Button : Displays the page of the oldest saved data. [MENU] Button : Moves to the upper menu (TREND) screen.
2	Recorded trend data During measurement, if a limit alarm rings for the relevant value, it will be displayed in red.

3) View Graphic Trend Screen

Go to the SETUP>TREND menu screen, and press the [MENU] button on the time interval you wish to view(1hr~48hrs).



The designated time periodic trend graph is shown as below.



No	Description
1	Displays the size of time of the Graphic trend screen.
2	Displays the current trend screen page.
3	Displays the status whether moving to the previous page is possible. Press the ▲ button to move to the previous page.
4	Displays the status whether moving to the next page is possible. Press the ▼ button to move to the previous page.
5	The trend bar of 6 moves using the ◀ button and ▶ button.
6	Displays the location of the trend bar. Can move to check to the designated area like 5.
7	Displays the saved date and time in the trend bar.
8	Displays the min/max saved EtCO2 values at the Trend bar.
9	Displays the min/max saved awRR values at the Trend bar.
10	Moves to the upper menu (TREND) screen using the 'MENU' button.

Part 8

Alarm

Alarm categories

Alarm consists and is managed in two types, Patient alarm and Technical alarm.

- Patient Alarm
This alarm occurs from the patient data. Occurs when the measured physiological signal value initiate the limit alarm or alerts through the patient status.
- Technical Alarm
This alarm occurs from the system. Occurs for product related actions or system errors.
- General Message
The alarm does not occur and shows a related message to the user.

Alarm Levels

Single alarm is classified and managed in high, medium and low priority level.

- High Priority
Occurs when the danger is detected in life of the patient.
- Medium Priority
Occurs when the physiological signal is abnormal or requires treatment.
- Low Priority
Occurs when the user has to be notified or the system confronts an error during measurement.

Patient alarm and Technical alarm are prioritized according to the content, and some parts can be set by the user from alarm settings.

Note . Refer to Appendix 2 for alarm message and alarm level content.

Alarm Indicators

The alarm is displayed as below when alarm occurs.

- Alarm message

In the upper portion of the screen the alarm message field shows as below.



1. Patient alarm message area : Displays the Patient alarm message.
2. Technical alarm message area : Displays the Technical alarm message..

Displays the message according to high priority, and shows the message with same priority in a sequence.

- High Priority : The background is red, and displays patient alarm attaches ***.
- Medium Priority : The background is orange, and displays patient alarm attaches **.
- Low Priority : The background is yellow, and displays patient alarm attaches *.

- Alarm sound

When multiple alarms occur, alarms will beep according to the order of top priority.

- High Priority : triple + double + triple+ double beep (960Hz)
- Medium Priority : triple beep (666Hz)
- Low Priority : single beep (~917Hz)

When the state is on alarm sound pause or alarm sound off, alarm sound will not occur.

- Alarm lamp


When multiple alarms occur, lamps will turn on according to the order of top priority.


- High Priority : Red lamp blinks 2 times for each second.
- Medium Priority : Yellow lamp blinks once for 2 seconds.
- Low Priority : Yellow lamp is turned on and maintains its state.

Pause Alarm Surveillance and Sound

- Alarm Status Symbol

 Alarm watch on state


 Alarm sound pause

 Alarm sound off

 Alarm watch off state


- Alarm off

This turns the patient alarm watch off. It is excluded in alarm messages and alarm sound operations for limit alarms.

The limit alarm watch of EtCO2 can stop when SETUP>>ALARMSET>ALARM is unchecked. And the alarm watch status switches to  in the EtCO2 screen window.

- Alarm sound off

This turns the alarm sound off. It operates the alarm message and alarm lamp when an alarm occurs.


When the value is set to '0' in SETUP>>SYSTEM>>ALARM VOLUME, the alarm sound stops, and the alarm watch status switches to .

When the alarm sound is off, an alarm sounds every 3 minutes to alert the current alarm status. This can be set when the alarm occurs and when SETUP>>SYSTEM>>ALARM0 REMIND is checked.

Caution

Turning the alarm off will prevent you from being alerted to important changes in the patient's status. Therefore, you should be very careful when deciding to turn the alarm off. If the alarm is turned off, you must frequently check on the patient's status.

- Alarm sound paused

Press the  button when the alarm occurs and the alarm sound is paused. The alarm does not sound when it is paused. During the audible alarm silence period, you can press Alarm button again to re - enable the audible alarm tone.

Set up the stop time by moving to SETUP>>SYSTEM>>ALARM PAUSE. The stop state and left time is displayed on the bottom of the alarm sound state display portion in the lower portion of the screen.

There are operations according to the alarm when alarm sound is paused.

- Patient Alarm : Stops the alarm sound during ALARM DURATION
- Technical Alarm : When this alarm occurs, Alarm sound stops and is maintained before each state is canceled.

Warning

Do not silence the audible alarm or decrease its volume if patient safety could be compromised.

Warning

Each time the monitor is used, check alarm limits to make sure that they are appropriate for the patient being monitored.

Warning

When an object is placed behind the back of the product, it will block the alarm sound by covering the speaker located in the back of the product. To prevent this issue, place the product so that the back doesn't face close to the wall or floor.

Part 9

Basic Troubleshooting

Here are some basic troubleshooting hints. There may be times when the product does not work as it is supposed to and you may not know how to proceed. Try the following steps to work through the problems.

▣ General

Situation	Cause
The power will not come on.	-Make sure the product is plugged in. -Make sure the battery is fully charged.
I can't hear the alarm or the pulse sounds	-Make sure the alarm is not turned off.
Coin battery image (⊕) is shown in the lower portion of the screen.	-Make sure the coin battery is not lacking capacity.
The saved value is initialized.	-Make sure the coin battery is not lacking capacity. -Make sure the memory has no problems

▣ Measuring the EtCO2

Situation	Cause
When EtCO2 measurement fails	- When the airway line is not properly connected to the EtCO2 module - When levels are outside the CO2 measurement range - When the airway adapter is disconnected from the CO2 module

Part 10

Product Specifications

End-tidal CO2 (EtCO2) – Sidestream LoFlo	
Range	0~150 mmHg (0~19.7%, 0~20kPa) at 760mmHg
accuracy	0~40mmHg ± 2mmHg, 41~70mmHg ± 5% of reading, 71~100mmHg ± 8% of reading, 101~150mmHg ± 10% of reading Above 80 BPM ±12% of reading.
awRR (respiration rate)	2~150 breaths/min
Compensation	Barometric pressure 400~850mmHg Gas compensations: O2, N2O, He, Anesthetic
End-tidal CO2 (EtCO2) – Mainstream	
Range	0~150 mmHg (0~19.7%, 0~20kPa) at 760mmHg
Accuracy	0~40mmHg ± 2mmHg, 41~70mmHg ± 5% of reading, 71~100mmHg ± 8% of reading, 101~150mmHg ± 10% of reading Above 80 BPM ±12% of reading.
awRR (respiration rate)	2~150 breaths/min

- Electrical**

AC Adapter	
Power Input	100-240 Vac, 50/60Hz
Fuse rating	5A, 250V
Battery	
Type	Li-ION internal battery
Charge time	5hours
Battery Capacity	Typically 5hours using new, fully charged battery
Warranty	6 months

● **Environmental**

Operating Temperature	5°C ~ 40°C
Transport/Storage Temperature	-20°C ~ 70°C
Operating Humidity	5% ~ 95%, noncondensing
Operating Attitude	-1,000 ft ~ 12,000 ft

● **Physical Characteristics**

Weight	1200g
Dimensions	24.5mm x 8.4mm x 8.5mm
Package unit	1ea

● **Accessories**

Basic	DC power supply	1ea
	Power cord	1ea
	User manual	1ea
Optional	EtCO2 mainstream	
	EtCO2 sidestream LoFlo	
	Stand	

● **General**

Display	
Display	color TFT LCD
Size	6 inch
Brightness	1~5
LED Lamp	
Display power status	DC Power Status Lamp Battery Power Status Lamp Screen Display
ALARM	
Alarm indicators	Alarm message, alarm sound, alarm lamp
Alarm level	High Priority,

	Medium Priority, Low Priority
Alarm volume	0~7
Alarm duration	30, 60, 90, 120 seconds
Trends	
Memory	Save continuously for 10 days (10 seconds unit)
Display	Tabular, Graphic(1~48 hour unit)
External Output	
RS-232 Serial	Program Upgrade

Appendix 1 Factory Defaults

The value maintains after setting the value of the oxygen saturation device and turning the power off and back on.

The default value of the product is as shown below.

SYSTEM Setup	Factory Default
ALARM VOLUME	4
ALARM 0 REMIND	OFF
ALARM PAUSE(s)	120
BRIGHTNESS	3
SCREEN	SCREEN 1
PATIENT	ADULT

ETCO2 SETUP	Adult	Pediatric	Neonate
UNIT	mmHg		
AVERAGE	10 seconds		
NO BREATH(s)	20 seconds		
WAVE FILL	OFF		
SWEEP SPEED	6.25 mm/s		
WAVE SCALE	60 mmHg		
ALARM CHECK	ON		
EtCO2 level	MEDIUM		
awRR level	MEDIUM		
FiCO2 level	MEDIUM		
NO BREATH level	HIGH		
EtCO2 High	50	50	45
EtCO2 Low	15	20	30
awRR High	30	30	100
awRR Low	8	8	30
FiCO2 High	4	4	4
ZERO GAS	ROOM AIR		
OXYGEN(%)	16%		
BALANCE GAS	ROOM AIR		

BAROMETER	760 mmHg
GAS TEMP	35.0 °C

Appendix 2 Alarm message

The level and cause of a single alarm is presented. "*" mark can be changed according to the value, and when the value does not need to be changed it is set to a fixed value.

● Patient Alarm message

Module	Alert	Level	Cause
EtCO2	NO BREATH	*High	Apnea detected. Check the patient's status. Also, check if the adapter kit is disconnected from the patient.
	EtCO2 ▲	*Medium	This occurs when the measured value is over the High Limit or below the Low Limit. Check the status of patient. Also, check if the set Limit values are adequate.
	EtCO2 ▼	*Medium	
	awRR ▲	*Medium	
	awRR ▼	*Medium	
	FiCO2 ▲	*Medium	

● Technical Alarm message

Module	Alert	Level	Cause
EtCO2	NO MODULE	Low	The module is not connected.
	NO BREATHS	*High	State of apnea. Check the status of the patient. Also, check if the sampling line is disconnected from the patient.
	SENSOR OVER TEMP	Low	Discontinue measurement and exchange the sensor.
	SENSOR FAULTY	Low	There is a problem with the sensor. Reboot the system or conduct zeroing.
	COMPEN. NOT YET SET	Low	Initial compensation not set. Turn off the device and turn it back on to check if it is operational.
	CHECK SAMPLE LINE	Low	Check the Sampling line.
	ZERO REQUIRED	Low	Zeroing needed.
	OUT OF RANGE	Low	Measurement out of range. Restart the system.

	CHECK ADAPTER	Low	Check the Airway adapter. You may need to clean or exchange the Adapter.
	ZERO FAILED	Low	Check the CO2 connection. Conduct zeroing again.
	SAMPLE LINE Disconn.	Low	The sampling line is disconnected from the module.

Charmcare Co., Ltd.

714ho, Woolim Lions2-cha, Gasan-Dong Geumcheon-Gu, Seoul, Korea (ZIP 153-787)

Tel. : +82-2-862-5052, Fax:+82-2-862-5065

Home Page : [HTTP://www.charmcare.com](http://www.charmcare.com)

Product : CAPNO3

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