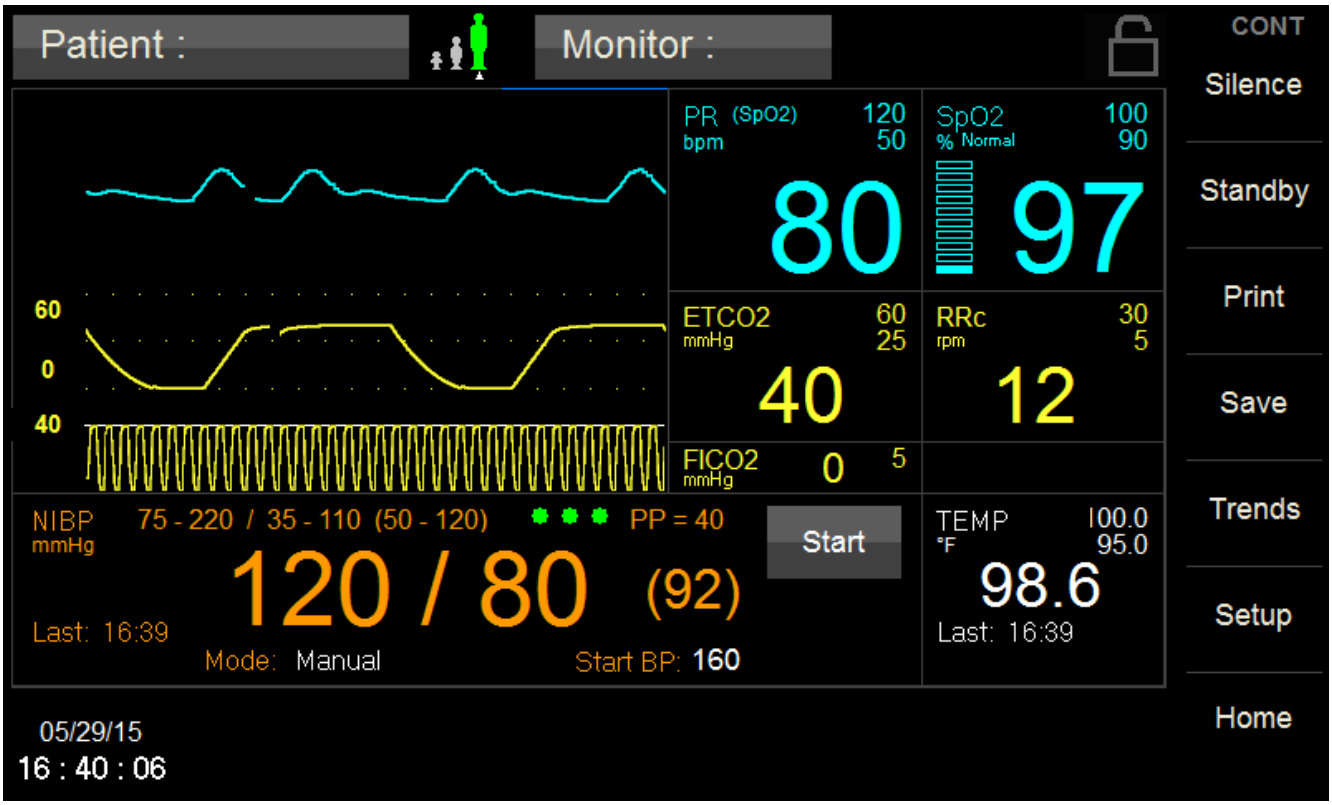
740 SELECT™



Multi-Parameter Monitor

User Manual Addendum - CO2 Parameters

ZOE Medical

This User Manual Addendum describes the features and operations of the 740 SELECT Multi-Parameter monitor: Software Version 2.2 or above.

1. OVERVIEW

TRADEMARKS

Trademarked names appear throughout this document. Instead of inserting a trademark symbol with each mention of the trademarked name, the publisher states that it is using the names only for editorial purposes and to the benefit of the trademark owner with no intention of improperly using that trademark.

ZOE Medical	is a registered trademark of Zoe Medical, Inc.
740 SELECT ™	is a trademark of Zoe Medical, Inc.
Covidien ®	is a registered trademark of a Covidien company
Oridion ®	is a registered trademark of a Covidien company
FilterLine ®	is a registered trademark of a Covidien company
Smart CapnoLine ®	is a registered trademark of a Covidien company
CapnoLine ®	is a registered trademark of a Covidien company
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Microstream ™	is a trademark of Covidien AG registered in the U.S. and foreign countries
Smart Capnography ™	is a trademark of Covidien AG registered in the U.S. and foreign countries
Integrated Pulmonary Index (IPI) ™	is a trademark of Covidien AG registered in the U.S. and foreign countries
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Masimo ISA ™	is a trademark of Masimo Corporation
Masimo IRMA ™	is a trademark of Masimo Corporation
Nomoline ™	is a trademark of Masimo Corporation
ISA Light Emitting Gas Inlet (LEGI) ™	is a trademark of Masimo Corporation

Refer to the 740 SELECT User Manual, Zoe Medical PN 21-22-0316, for a list of trademarks.

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CONVENTIONS USED IN THIS MANUAL

Warning: Directions that warn of conditions that put the patient or the caregiver at risk.

Caution: Directions that help to avoid damaging the monitor or losing data.

Note: Directions that make it easier to use the monitor.

IMPORTANT:

Read the 740 SELECT User Manual, Zoe Medical PN 21-22-0316 carefully before patient use of the Monitor.

This Manual addresses all optional ETCO2 parameters of the 740 SELECT monitor.

Read this Manual carefully before patient use with the 740 SELECT monitor.

Zoe Medical reserves the right to make changes to this Manual and improvements to the product it describes at any time without notice or obligation.

REVISION HISTORY

This Manual has a revision number located at the bottom of each page. It changes whenever the Manual is updated.

Rev A	July 2015
Rev B	March 2019
Rev C	April 2020
Rev D	October 2021

WARRANTY

Refer to the 740 SELECT User Manual, Zoe Medical PN 21-22-0316, for full Warranty Policy for Zoe Medical 740 SELECT monitor. In all cases, policy applies from date of purchase from Zoe Medical or its authorized distributors or agents.

ETCO2 Accessories:	Out-of-box failure only

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TABLES

2. INTENDED USE AND PRINCIPLE OF OPERATION

INTENDED USE

Indications for Use and Contraindications may be found in the 740 SELECT User Manual, Zoe Medical PN 21-22-0316

The **740** SELECT monitor with the Oridion MicroStream (MicroPod) is indicated for use in adult, pediatric and infant/neonate patient populations.

The **740** SELECT monitor with the Masimo ISA or IRMA module is indicated for use in adult, pediatric and infant patient populations

The **740** SELECT monitor, with CO_2 software enabled, facilitates the monitoring of:

- End-tidal CO_2, Respiration Rate & Fractional Concentration of Inspired CO_2 and with the Oridion option Integrated Pulmonary Index (IPI)

The **740** SELECT monitor is a prescription device intended to be used by healthcare professionals in all areas of a healthcare facility.

Note: For Continuous CO2 monitoring, configure the **740** SELECT Workflow setting to ***Continuous*** in the Setup System screen. Refer to User Manual 21-22-0316 for detailed instructions on how to configure the monitor workflow feature.

PRINCIPLE OF OPERATION

ORIDION MICROSTREAM (MicroPod)

CO_2 monitoring (also known as capnography) is a non-invasive method for monitoring the level of carbon dioxide in a patient's breath in order to help assess their ventilation status. The Oridion Microstream modules used in the **740** SELECT monitor utilize a process known as sidestream capnography, whereby a portion of a patient's inhaled and exhaled gases are diverted and continuously passed through an infrared spectrometer. From the amount of infrared light absorbed, the amount of CO_2 present can be determined. In order to sample the patient's breath, a sampling line is typically placed in the nose and/or in the mouth for non-intubated patients and in-line with the airway tubing for intubated patients.

Note: The Oridion Microstream module requires Zoe Medical PN 01-02-0880 Interface Cable to properly connect the module to a **740** SELECT monitor.

The CO_2 monitoring capabilities of the **740 SELECT** monitor configured with optional Oridion capnography software include:

- Measuring the patient's end-tidal carbon dioxide (ETCO2)
- Measuring the patient's fractional inspired carbon dioxide (FICO2)
- Calculating the patient's respiration rate (RRc) from CO_2
- CO_2 Units: mmHg or kPa
- Patented Oridion Smart Capnography Measurement Technology
  - Calculating the patient's Integrated Pulmonary Index (IPI)*
  - Smart Breath Detection (SBD)**
  - Smart Alarm for Respiratory Analysis (SARA)***
- Displaying continuous CO_2 waveform (capnograph) and Trend waveform and freeze waveform
- CO_2 waveform size adjustment: 0-20, 40, 60 or 80 mmHg (0-2.5, 5, 8 or 11 kPa)
- Detecting No Breath Time conditions with a configurable time setting (6, 10, 15, 20 , 25 or 30 seconds)
- Hi and Low alarm limits
- Audio and visual alerts
- Alarm History Log
- Tabular Trends (automatic 1 min avg. of all CO_2 measured values, stores 72 hrs. of 1 min avg) review and Snapshot Capture
- Optional external printer (CO_2 waveform, CO_2 measured values, print on alarm, print on save settings)

* The IPI is a single index of an adult or pediatric patient's ventilator status, based on four parameters provided by the host monitor: end tidal carbon dioxide, respiration rate, oxygen saturation and pulse rate. The IPI is an adjunct to, and is not intended to replace, vital sign monitoring.

** SBD mitigates the effects of artifact, enabling quality monitoring for non-intubated general floor patients.

*** SARA recognizes and reduces nuisance alarms, promoting caregiver alarm vigilance.

Note: For comprehensive clinical education and support visit www.capnographyeducation.com

Refer to Table 11 for the Oridion CO_2 parts and accessories to be used with the **740 SELECT** monitor. Contact the Oridion sales representative directly for a listing of cannulas available for use with the MicroPod CO_2 module.

MASIMO ISA CO_2 AND IRMA CO_2

CO_2 monitoring is a method for assessing a patient's ventilation status through the monitoring of carbon dioxide levels in their breath. Two different Masimo capnography modules – the ISA CO_2 and the IRMA CO_2 are available for use with the **740** SELECT.

The Masimo ISA utilizes a non-invasive approach known as sidestream capnography, whereby a portion of a patient's inhaled and exhaled gases are diverted into a disposable nasal cannula. The gases collected through the cannula are continuously passed through a moisture-eliminating wick/bacterial filter (Nomoline Adapter) and then through an infrared spectrometer, which is housed within the small ISA module. Based on the amount of infrared light absorbed, the amount of CO_2 present and the respiration rate can be determined.

The Masimo IRMA utilizes an approach known as mainstream capnography in which a disposable airway adapter is inserted directly in-line with the patient's breathing circuit, such that all of their inhaled and exhaled gases are analyzed. The IRMA module, which contains the infrared spectrometer, clips around the outside of the airway adapter.

Masimo Sidestream ISA Module with Nomoline Adapter

Masimo Mainstream IRMA Module with Adult/Pediatric Airway Adapter

(Infant Adapter available)

Figure 1: Masimo Capnography Modules

The CO_2 monitoring capabilities of the **740** SELECT monitor configured with the optional Masimo capnography software include:

- Measuring the patient's end-tidal carbon dioxide (ETCO2)
- Measuring the patient's fractional inspired carbon dioxide (FICO2)
- Calculating the patient's respiration rate (RRc) from CO_2
- CO_2 Units: mmHg or kPa
- Displaying continuous CO_2 waveform (capnograph) and Trend waveform and freeze waveform
- CO_2 waveform size adjustment: 0-20, 40, 60 or 80 mmHg (0-2.5, 5, 8 or 11 kPa)
- Detecting No Breath Time conditions with a configurable time setting (6, 10, 15, 20, 25 or 30 seconds)
- Hi and low alarm limits
- FiCO2 alarm delay
- Audio and visual alerts
- Alarm History Log
- Tabular Trends (automatic 1 min avg. of all CO2 measured values, stores 72 hrs. of 1 min avg) review and Snapshot Capture
- Optional external printer (CO_2 waveform, print on alarm, print on save settings)

Note: For additional product information for ISA, IRMA and the Nomoline Adapter visit www.masimo.com/capnography/technology.htm

Table 12 indicates the ISA and IRMA CO_2 parts and accessories to be used with 740 SELECT monitor.

Note: Masimo ISA and IRMA modules require Zoe Medical PN 01-02-0494 Interface Cable to properly connect the Module to a **740** SELECT monitor.

ISA NOMOLINE ADAPTER FUNCTION, DESIGN AND FEATURES

The Nomoline "No Moisture" Sampling Line is exclusively designed for use as a system with the Masimo ISA Sidestream CO_2 Analyzer.

The Nomoline Adapter eliminates both water and water vapor.

- The Nomoline fluid protection technology incorporates a standard sampling tube, a unique water separation section, the nomo section, made of a special polymer and a hydrophobic bacterial filter. Refer to Figure 2.

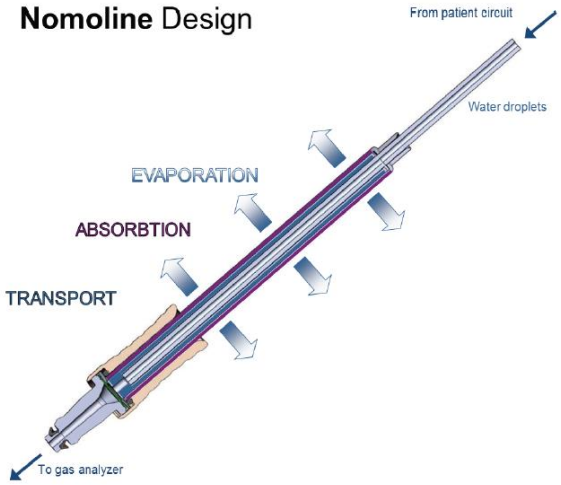


Figure 2: Nomoline Adapter

- The Nomoline Adapter removes water vapor and aspired or condensed water. Water and water vapor passes through the membrane-like surface of the Nomoline and evaporates into the surrounding air, while leaving oxygen, carbon dioxide and anesthetic gases unaffected.
- No cross contamination
  - The Nomoline contains a bacterial filter (BFE ≥ 99.9980 %) to protect the ISA analyzers from water intrusion and cross contamination.
- Specially designed for low-flow applications (50ml/min)
  - The Nomoline is specially designed for low flow applications. It has excellent response time making CO_2 measurement possible even at high respiratory rates.
  - The Nomoline can be used for all type of patients from adults to neonates.

- May be used with non-proprietary sampling lines and nasal cannulas.
  - The ISA CO2 analyzer with Nomoline Adapter may be used with other third party sampling lines and cannulas. Please however note that the “Nomoline Family” of sampling lines are specifically designed for optimal performance and measurement fidelity when used with the ISA gas analyzers. For instance, when connecting to a respiratory circuit, the Masimo T-adapter provides a central gas sampling point thereby minimizing the risk of sampling line occlusion (Refer to Figure 3).

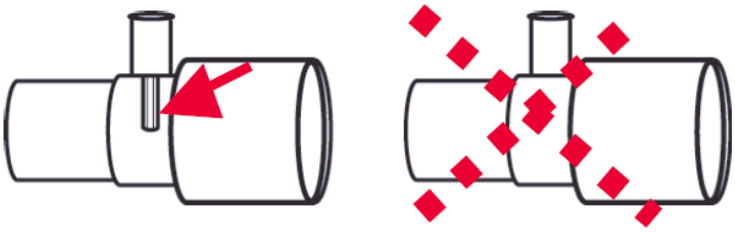


Figure 3: T-Adapter Placement

  - For optimal water handling, always use T-adapters with the sampling point in the center of the adapter, as shown to the left above.

Note: Using sample line tubing or cannulas with larger inner diameter than 1 mm will increase the total system response time.

ISA LIGHT EMITTING GAS INLET – LEGI

The LEGI gas inlet and status indicator detects the presence of the Nomoline Adapter sampling line, and conveys color-coded information about the module status and the alarm system. Refer to Figure 4.

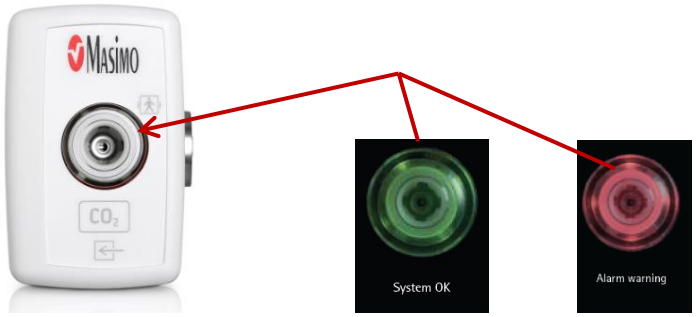


Figure 4: Front View ISA CO2 Module showing LEGI and status indicator

- The LEGI interfaces directly with the Nomoline Adapter and provides protection from water, mucus, and bacterial contamination.
- When no sampling line is connected, the ISA module automatically enters into a low power, standby mode. Once the sampling line is connected, ISA enters into a measuring mode and starts delivering samples gas data.

NOMOLINE SAMPLING LINE REPLACEMENT

Nomoline sampling lines should be replaced according to good clinical practice or when the sampling line becomes occluded. Occlusion occurs when water, secretion etc. is aspired from the respiratory circuit to such extent that ISA cannot maintain the normal 50 ml/min sample flow. This situation is indicated by a red flashing sampling gas connector and an alarm message; Replace the Nomoline and wait until the sampling gas connector switches to green indicating that the ISA gas analyzer is ready for use.

INTERFACING TO AN ETCO2 MODULE

Note: The Oridion Microstream module require Zoe Medical PN 01-02-0880 Interface Cable to properly connect the module to a **740** SELECT monitor.

Note: Masimo ISA and IRMA modules require Zoe Medical PN 01-02-0494 Interface Cable to properly connect the module to a **740** SELECT monitor.

1) Connect the appropriate Interface Cable to the ETCO2 module (see above)
2) Connect the RJ45 connector, of the Interface Cable, to Port (5), that is marked ***IOIO etCO$_2$***, of the monitor's Rear Panel (Refer to Figure 33 and Figure 34).
3) Refer to Section 6, ACCESSORIES for the appropriate guide for assistance in configuring your **740** SELECT monitor for ETCO2.

Note: Directions to mount the ETCO2 Module to the monitor should be included with the mounting kit.

LOSS OF SUPPLY MAINS

The **740** SELECT monitor is equipped with an internal rechargeable battery. The battery is charging whenever the monitor is plugged into a power source. The monitor shall automatically switch to battery operate if supply mains power is interrupted. The monitor shall automatically switch back to supply mains operation when power is restored.

Refer to the **740** SELECT User Manual, Zoe Medical PN 21-22-0316, for additional operation of the monitor on supply mains and internal battery.

FREEZING WAVEFORMS

In some clinical environments the user may want to freeze the displayed waveforms.

Touching the right side of the waveform area (under the blue line) will cause all displayed waveforms to be frozen (Refer to Figure 6 - SpO2 & ETCO2 waveforms frozen).

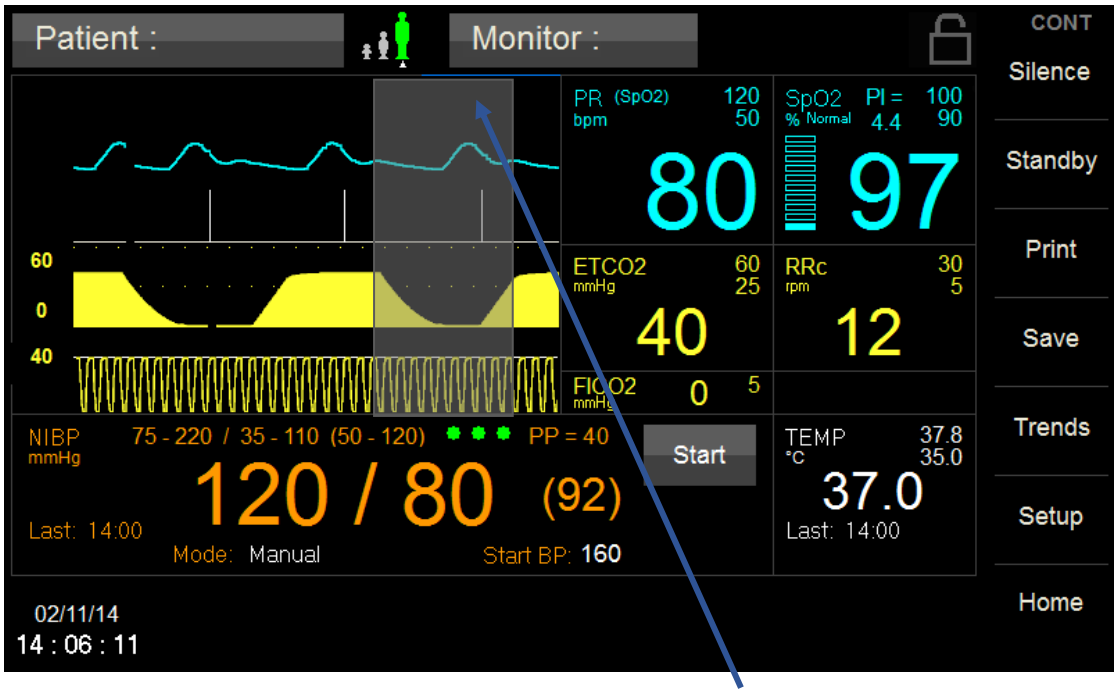


Figure 5: Waveform - Touch Area is under blue line

Note: "Waveforms frozen" will be proximately displayed in yellow background when selected. Refer to Figure 6.

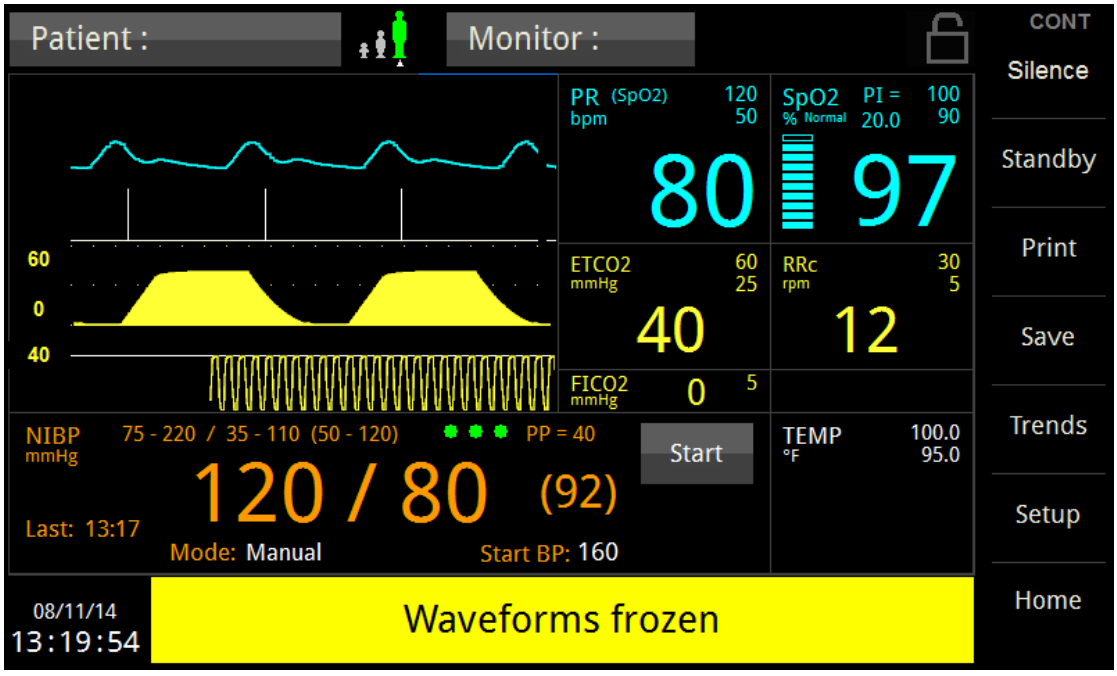


Figure 6: SpO_2 & $ETCO_2$ Waveform Frozen

Only the waveforms are frozen. Numeric values will continue to be updated, and alarm conditions continue to be generated as they occur.

To unfreeze the displayed waveforms perform one of the following:

- Touch the right side of the waveform area again.

  OR

- Touch anywhere on the screen that will open a menu (e.g., most buttons, numerics, left side of waveform area)

Touching **Alarm Silence** or **Home** button **will not unfreeze** displayed waveforms

NO BREATH ALARM PRIORITY

The No Breath alarm can be set to annunciate a High or Medium priority alarm. Refer to the AUDIBLE AND VISUAL INDICATORS section of the **740** SELECT User Manual, Zoe Medical PN 21-22-0316, for additional information regarding High and Medium priority alarm tones and visual indicators.

To set the No Breath priority:

1) Touch the **SETUP** button.
2) Touch the **Administrator** button.
3) Touch the **Alarms** button.
4) Adjust the desired No Breath priority to the desired selection (Refer to Figure 7).
5) Touch **OK** to accept or **Cancel** to ignore the selection.
6) Touch the **Home** button to return to the Main screen.

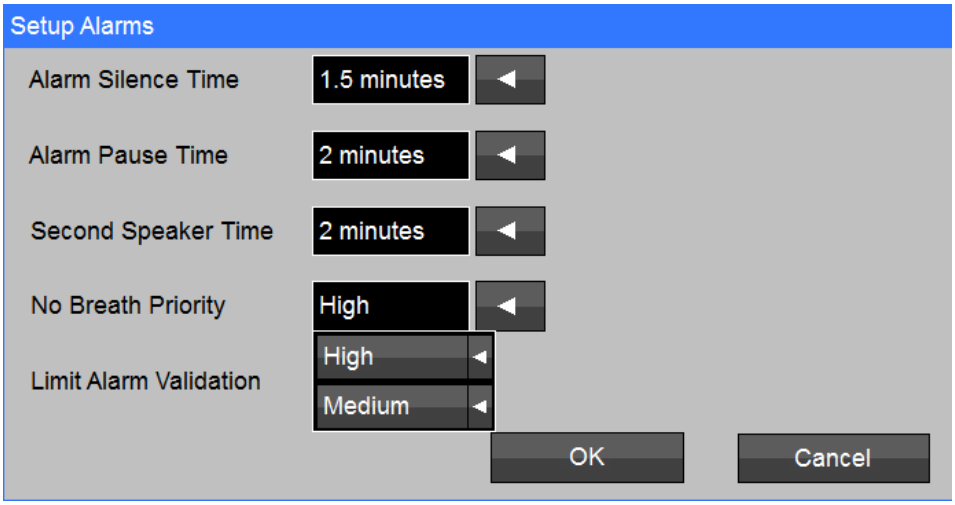


Figure 7: Setup Alarms - No Breath Priority

Note: Changing the No Breath alarm priority while a No Breath alarm is active will not change the current alarm priority. The No Breath alarm must be resolved and then become active again before the new priority will take effect.

Note: If during Alarm Pause condition, a High Priority alarm occurs (No Breath set to High Priority), the Alarm Pause condition will be exited and the High Priority Alarm shall be annunciated immediately.

3. ORIDION CO_2 MONITORING

The capnography component of this product is covered by one or more of the following US patents: 6,428,483; 6,997,880; 6,437,316, 7,488,229; 7,726,954 and their foreign equivalents. Additional patent applications pending.

Note: For Continuous CO2 monitoring, configure the **740** SELECT Workflow setting to ***Continuous*** in the Setup System screen. Refer to User Manual 21-22-0316 for detailed instructions on how to configure the monitor workflow feature.

Note: The following Warnings and Cautions are directed toward the Oridion CO_2 monitoring function. Additional Warnings and Cautions for the **740** SELECT monitor are found in the **740** SELECT User Manual, Zoe Medical PN 21-22-0316.

WARNINGS

Warning: Do not use the FilterLine H Set Infant/Neonatal during magnetic resonance imaging (MRI) scanning. Using the FilterLine H Set Infant/Neonatal during MRI scanning could harm the patient.

Warning: If uncertain about the accuracy of any measurement, first check the patient's vital signs by alternate means, and then make sure the module is functioning correctly.

Warning: The module should not be used as an apnea monitor.

Warning: To ensure patient safety, do not place the module in any position that might cause it to fall on the patient.

Warning: Do not lift the module by the FilterLine, as the FilterLine could disconnect from the module, causing the module to fall on the patient.

Warning: If calibration does not take place as instructed in the relevant service manual, the monitor may be out of calibration. A monitor that is out of calibration may provide inaccurate results.

Warning: Operating the monitor with CO_2 x limit alarms set to "Off" (where x = ETCO2, RRc, FICO2, and IPI) means that no low or high CO_2 x alarm conditions will produce alarm notifications. Use this feature with extreme caution. Patients must be closely observed if CO_2 x limit alarms are set to "Off".

Warning: When monitoring an anesthetized patient in an operating room environment, it is recommended to connect the CO_2 exhaust port of the monitor to the hospital's waste gas scavenging system so as to prevent exposure for other patients and hospital personnel to the patient's respiratory sample. Ensure that sampled gases are not returned from the exhaust port to a breathing system such as a ventilator. Use standard clinical guidelines and/or hospital procedures. Scavenge vacuum greater than 1 mmHg may result in damage to the monitor.

Warning: Always inspect the airway for a tight connection before attaching it to the patient.

Warning: Remove the airway sampling line from the patient's airway while nebulizing medications are being delivered.

Warning: Route all tubing away from the patient's throat to avoid strangulation.

Warning: Do not apply pressurized air to any outlet or tubing connected to the monitor. Pressure may destroy sensitive elements.

Warning: When using a sampling line for intubated patients with a closed suction system, do not place the airway adapter between the suction catheter and endotracheal tube. This is to ensure that the airway adapter does not interfere with the functioning of the suction catheter.

Warning: If too much moisture enters the sampling line (i.e., from ambient humidity or breathing of unusually humid air), the message "Purging Line" will appear in the message area. If the sampling line cannot be cleared, the message "Occluded Line" will appear in the message area. Replace the sampling line once the "Occluded Line" message appears.

Warning: Do not cut or remove any part of the sampling line. Cutting the sampling line could lead to erroneous readings.

CAUTIONS

Caution: During MRI scanning, the module must be placed outside the MRI suite. When the module is used outside the MRI suite, ETCO2 monitoring can be implemented using the FilterLine XL.

Caution: A strong magnetic field located 1 cm or less from the MicroPod may temporarily affect performance of the MicroPod.

Caution: Use of a CO_2 sampling line with H in its name (indicating that it is for use in humidified environments) during MRI scanning may cause interference. The use of non H sampling lines is advised.

Caution: Do not pull the module so that it becomes detached from the host monitor. After readjusting the position of the module for any reason, ensure that it has not become detached from the host monitor.

Caution: To ensure accurate performance and prevent device failure, do not expose the module to extreme moisture, such as rain.

Caution: If the MicroPod sustains structural damage so that its internal components are visible, it should not be used.

Caution: An extension cable should not be used with the USB version or either RS-232 version of the MicroPod.

Caution: Exercise care when removing the MicroPod from a mount so that your finger does not get caught in the clip during removal.

Caution: The monitor does not produce a CO_2 alarms until a valid CO_2 signal is obtained. This is intended to reduce nuisance alarms during initial patient connection.

Caution: Microstream ETCO2 sampling lines are designed for single patient use, and are not to be reprocessed. Do not attempt to clean, disinfect, sterilize or flush any part of the sampling line as this can cause damage to the monitor.

Caution: Before use, carefully read the Microstream ETCO2 sampling lines Directions for Use.

Caution: Only use Microstream ETCO2 sampling lines to ensure the monitor functions properly.

NOTES

Note: When disconnecting a sampling line from the device, hold the CO2 input connector door open while removing the sampling line, to avoid catching the sampling line on the connector door.

Note: The MicroPod should be mounted with the CO2 connector facing upwards or to the side during use.

Note: When the caution message "Occluded Line" appears on the screen, indicating that the sampling line which is attached to the monitor is blocked, the monitor's CO_2 pump will stop pumping the patient's breath into the monitor for testing. Follow the instructions that appear in the Troubleshooting chapter of this manual: First disconnect and reconnect the sampling line. If the message still appears, disconnect and replace the line. Once a working sampling lie is attached to the monitor, the pump will automatically resume operation.

Note: The IPI is not intended to replace accurate clinician assessment of the patient's ventilatory status. The IPI can be used as another data point in the overall assessment of the patient

GETTING STARTED WITH ORIDION CO_2

The 740 SELECT monitor Open Technology Platform (OTP) allows CO_2 monitoring software to be installed at any time on any monitor as a CO_2 parameter upgrade. Software specifically designed for use with the Oridion MicroPod must be enabled from the Service menu. Oridion CO_2 Software may be enabled in the Zoe Medical factory or in the field as a parameter upgrade. Refer to Table 13 for license/ordering information.

To begin CO_2 monitoring with Oridion Microstream sidestream capnography, use the following procedure:

Note: For Continuous CO2 monitoring, configure the 740 SELECT Workflow setting to ***Continuous*** in the Setup System screen. Refer to User Manual 21-22-0316 for detailed instructions on how to configure the monitor workflow feature.

1. Complete all physical connections between the CO_2 module and monitor:
   a. Connect the electrical/data cable, which is part of the Oridion ETCO2 module adapter, into the port labeled "***IOIO etCO$_2$***" on the rear panel of the monitor. Refer to REAR PANEL PORTS section on page 52.
   b. The cable connection to the monitor serves both data and communications and power supply, with the module receiving power from the monitor through this connection.
2. Enable **ETCO2** monitoring on the monitor (if not already enabled):
   a. Touch the **Setup** button;
   b. Touch the **Home** button;
   c. Touch the **YES** selection adjacent to **ETCO2 Enabled** and touch **OK**; and
   d. Touch **Home** button to return to the Main Screen.
3. Enable **IPI** (Integrated Pulmonary Index)
   a. Touch the **ETCO2** parameter cell;
   b. Touch the **YES** selection adjacent to the **IPI Enable** and touch **OK**; and
   c. Touch **Home** button to return to the Main Screen.
4. Enable **CO2** or **CO2 Trend** Waveform
   a. Touch the **left side** of the **ETCO2 waveform** area
   b. Touch the  adjacent to the waveform selection displayed (Refer to Figure 8 below);
   d. Touch **CO2** (or **CO2 Trend**) and touch **OK**; and
   e. Touch **Home** button to return to the Main screen.

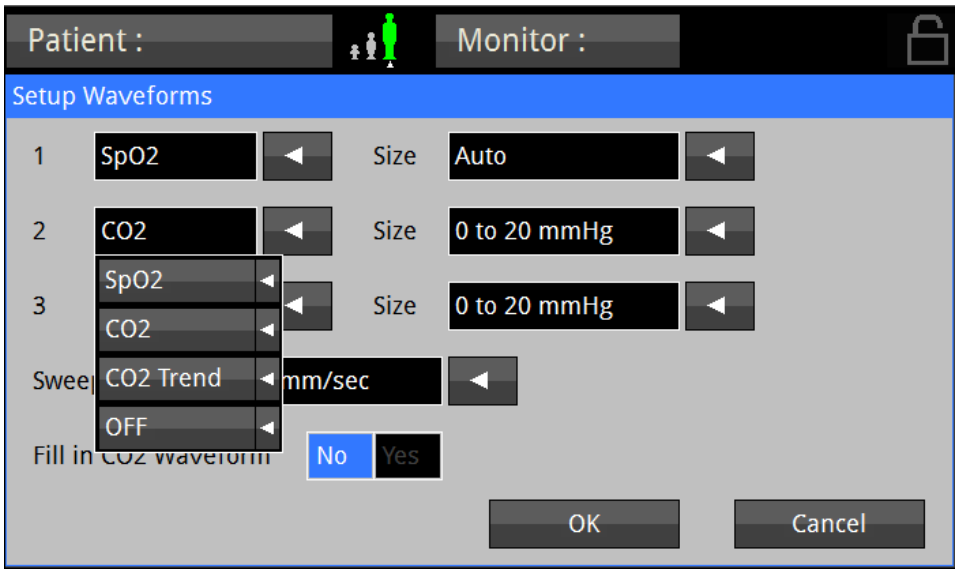


Figure 8: Waveform Setup screen (Oridion CO_2 enabled)

5. If Oridion CO_2 monitoring software has *not* been enabled (indicated by the presence of respiration parameter cells with *yellow* ETCO2, RRc or FICO2 labels), perform the following on the monitor:

   a) Touch the **Setup** button;

   b) Touch the **Administrator** button;

   c) Touch the **System** button; (Valid password may be required, contact Zoe Medical Service Department for required password).

   d) Touch the ◄ on the **CO2** line (Refer to Figure 9 below); **Note** Oridion may be the only selection.

   e) Touch the **Oridion** Selection and touch OK; and

   f) Touch **Home** button to return to the Main screen

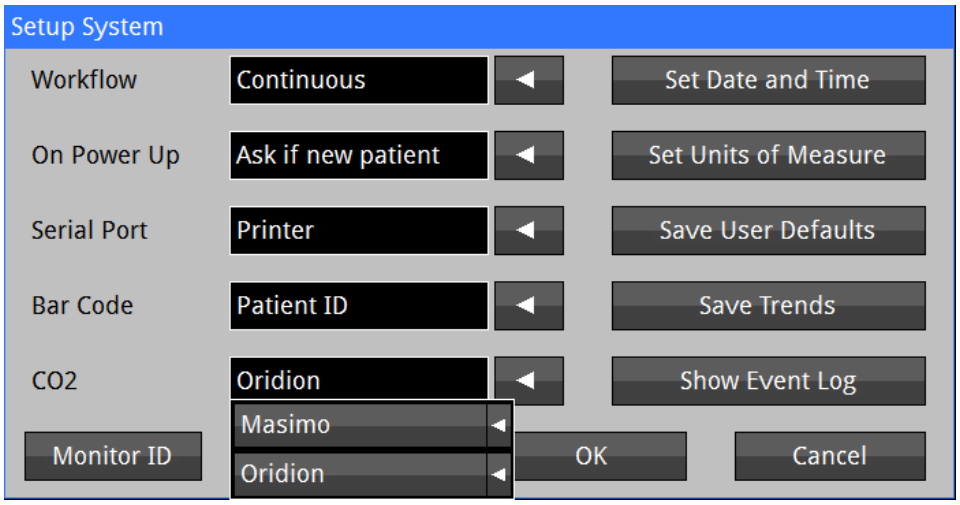


Figure 9: System Setup screen (Oridion CO_2 enabled)

6. Select the proper Oridion CapnoLine or FilterLine single-use sampling line based on clinical guidelines and hospital standard of care
7. Open the cover labeled with the input symbol ( ) on the Oridion Microstream MicroPod ETCO2 Module. Refer to Figure 10.
8. Place the orange or yellow threaded connector of the sampling line into the CO_2 input port beneath the opened cover. Refer to Figure 10.
   a. Gently turn the connector clockwise into the CO_2 input port until a secure connection is achieved.

Caution: DO NOT OVER TIGHTEN. Over tightening may warp the connector such that ventilation or the CO_2 measurement may be compromised. This assures that there is no leakage of gases during measurement at the connection point and that measurement accuracy is not compromised.

   b. When the connector is secure, the CO_2 pump should start and the "CO2 Warming Up" message will briefly appear.

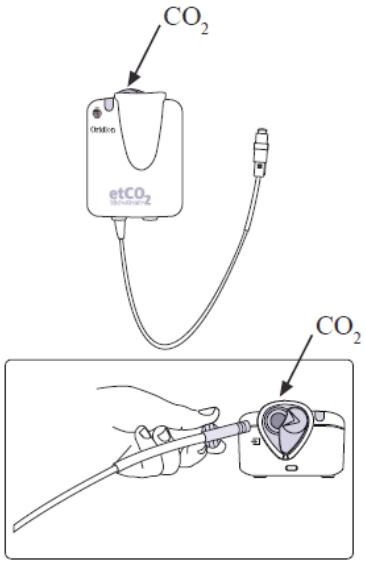


Figure 10: Inserting sample line into module

9. Securely connect all components and check connections for leaks according to standard clinical procedures.
10. Connect the patient applied end of the sampling line to the patient as per instructions included with the CapnoLine or FilterLine packaging.
11. The CO_2 waveform and numeric parameter values should appear within approximately 10 seconds.

MICROPOD INDICATORS

The LED on the MicroPod will indicate functioning, as follows:

1. During startup the LED will blink slowly
2. During normal operation the LED will remain on continuously
3. During a communication failure, malfunction, or disconnection of the MicroPod, the LED will be off

Refer to Figure 11.

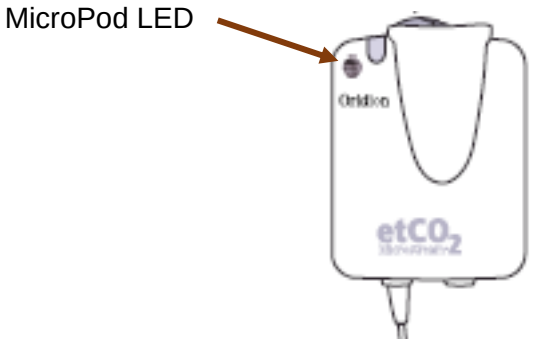


Figure 11: MicroPod LED indicator

CHECKING THE CO_2 SIGNAL

When you have connected the patient following the steps listed above, you should be able to see a CO_2 waveform on the monitor display as shown below. The monitor should also display values for the patient's end-tidal carbon dioxide (ETCO2), fractional inspired carbon dioxide (FICO2), respiration rate from CO_2 (RRc), Integrated Pulmonary Index (IPI), and alarm limit settings. The infrared light source used in the Microstream module generates only the specific wavelengths characteristic of the CO_2 absorption spectrum. Therefore, no compensations are required when different concentrations of N_2O, O_2, anesthetic agents, and water vapor are present in the patient's gases.

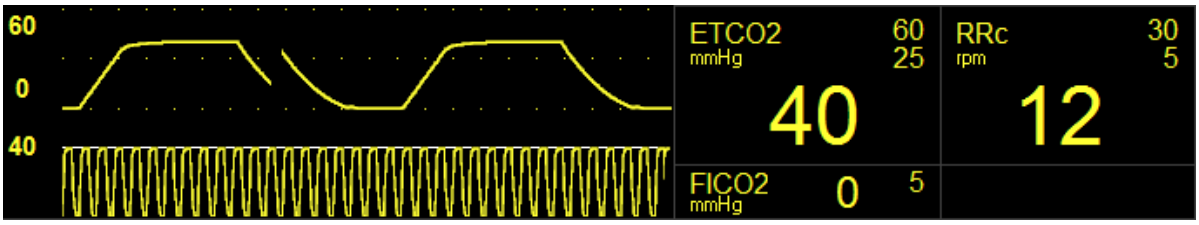


Figure 12: Oridion CO_2 Waveform and Values (IPI Enabled)

To manually test CO_2 monitoring alarm functionality on a daily basis, you may use the following approach:

1. Either connect the patient to the monitor using the above procedure or continue as follows with a patient who is already being monitored;
2. Enable the alarms ETCO2, RRc, FICO2, and IPI;
3. Lower the ETCO2 upper alarm limit setting below its current value;
4. Verify that "ETCO2 < [upper limit]" annunciates as a medium grade alarm;
5. Press the **ALARM SILENCE** key, and return the ETCO2 upper alarm limit to its previous value; and
6. Verify that the alarm is no longer active, and that CO_2 monitoring continues normally.

   Repeat this process in turn for the RRc, FICO2, and IPI parameters (lower limit).

The CO_2 monitoring settings and specifications may be found Section 9 SPECIFICATIONS.

ORIDION CO_2 MAIN SCREEN

The following pages illustrate the procedures for changing configuration settings, such as adjusting alarm limits, changing the waveform size (amplitude), setting the No Breath Time, or enabling or disabling IPI.

Note: For Continuous CO2 monitoring, configure the 740 SELECT Workflow setting to ***Continuous*** in the Setup System screen. Refer to User Manual 21-22-0316 for detailed instructions on how to configure the monitor workflow feature.

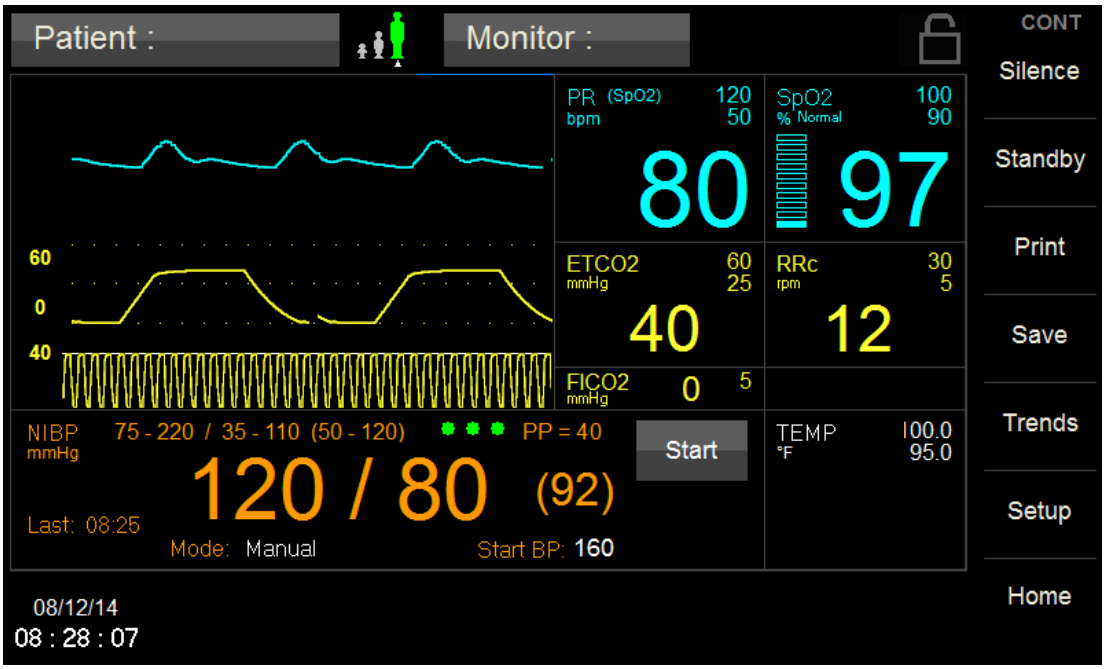


Figure 13: Main Screen w/Oridion CO_2 Parameter

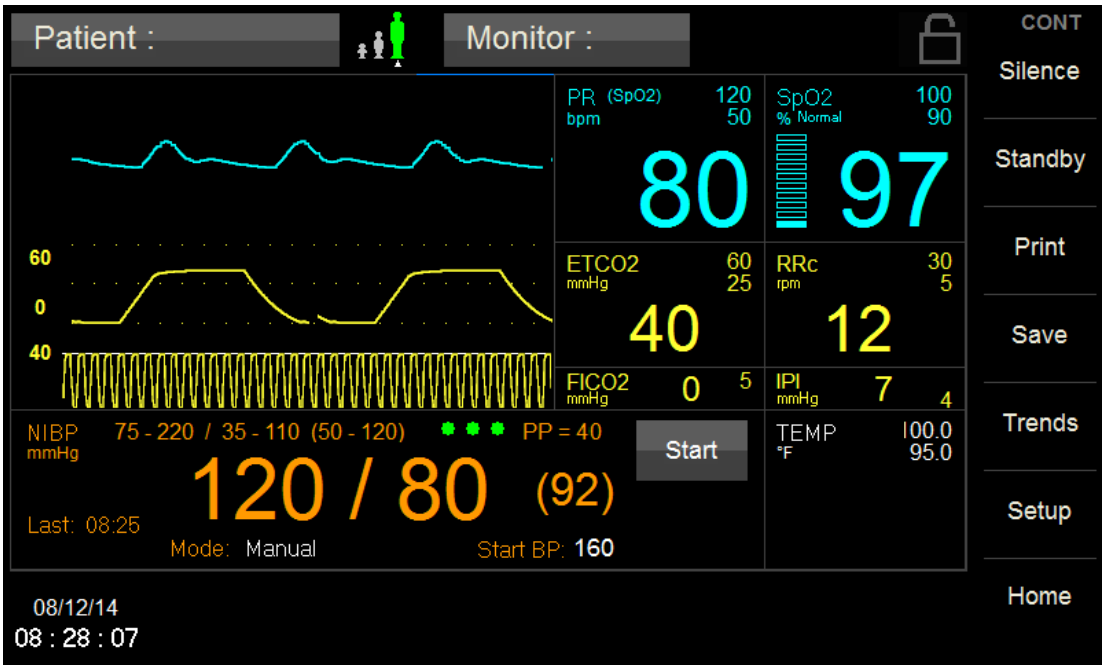


Figure 14: Main Screen w/Oridion CO_2 Parameter (IPI Enabled)

ORIDION ETCO2 SETUP

Figure 15 illustrates the Oridion Setup ETCO2 menu when the ETCO2 field is pressed and Adult Patient mode is selected.

Figure 16 illustrates the Oridion Setup ETCO2 menu when the ETCO2 field is pressed and Pediatric Patient mode is selected.

Figure 17 illustrates the Oridion Setup ETCO2 menu when the ETCO2 field is pressed and Neonatal Patient mode is selected.

From these menus, the Upper and Lower ETCO2 Alarm Limits may be adjusted. No Breath Time, Waveform size, IPI Enabling (Adult & Pediatric), IPI Age Range (Pediatric), Auto limits and disabling ETCO2 Alarms may be selected in this menu as well.

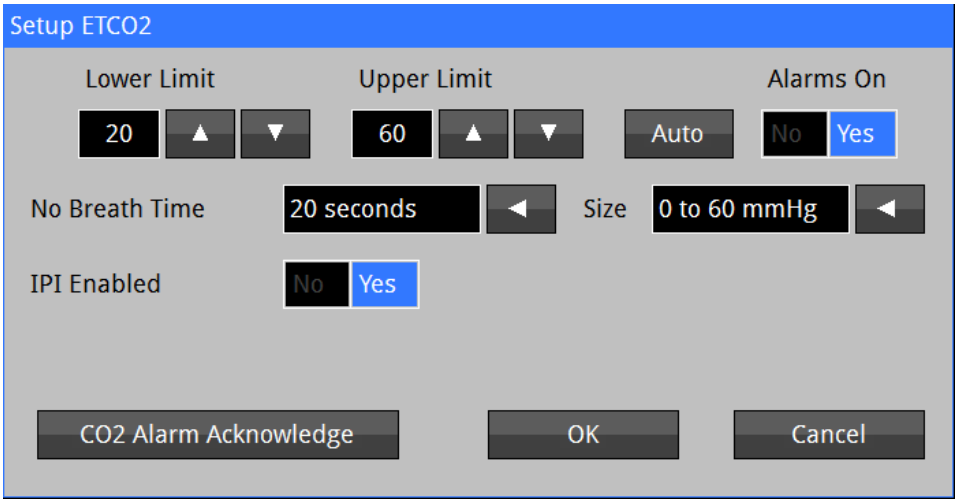


Figure 15: Oridion Setup ETCO2 Menu (w/IPI enabled) - **Adult Mode**

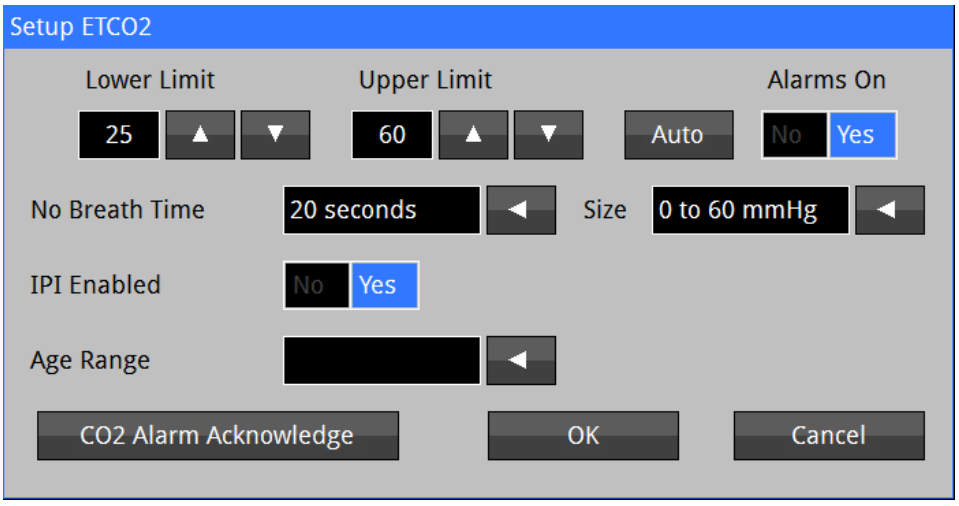


Figure 16: Oridion Setup ETCO2 Menu (w/IPI enabled) - **Pediatric Mode**

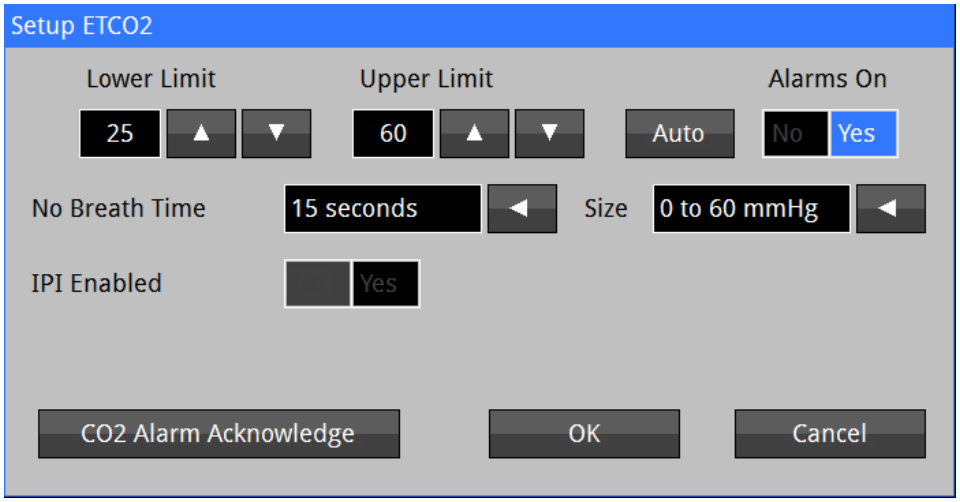


Figure 17: Oridion Setup ETCO2 Menu - **Neonatal Mode**

ETCO2 ALARM LIMIT VALUES

Table 17 lists the Default ETCO2 Alarm Limits for Adult, Pediatric, and Neonatal. ETCO2 Alarm Limits will operate on the ETCO2 for the current monitor patient mode.

To set the ETCO2 Alarm limits:

1) Touch the ETCO2 Numeric field.
2) Set Alarms On to Yes to enable ETCO2 alarms, or No to disable ETCO2 alarms.

Warning: If Alarms On is set to "No" the monitor will not generate any visual or audible indication of an alarm condition for ETCO2.

3) Adjust the desired ETCO2 Upper or Lower Limit value:
   - The Upper and Lower Alarm Limits can be adjusted independently.
4) Touch **OK** to accept or **Cancel** to ignore the selection.
5) Touch the **Home** button to return to the Main screen.

ETCO2 AUTO (set) ALARM LIMITS

The Upper and Lower alarm limits for ETCO2 can be set automatically using the Auto feature, which provides a structure to establish alarms limits based upon your patient's current measured value.

To enable Auto limits, open the applicable parameter Setup Window and touch the "**AUTO**" key on the same line with the parameter (Refer to Table 1 for ETCO2 percentages).

Parameter	**Alarm Limit Adjustment (x% of the current measured value)**	
	Lower	**Upper**
ETCO2	80%	125%

Table 1: Oridion ETCO2 Auto Alarm Limit Adjustment

NO BREATH TIME

The user-selectable No Breath Time feature allows the clinician to select the desired level of visibility to lack of breathing.

User Selectable settings: 6, 10, 15, 20 (Default), 25 & 30 seconds Adult, Pediatric
6, 10, 15 (Default), 20, 25 & 30 seconds Neonatal

Note: The No Breath alarm priority may be set to High (Default) or Medium priority level. Refer to NO BREATH ALARM PRIORITY on page 17 for additional information.

WAVEFORM SIZE

The user-selectable Waveform Size feature allows the clinician to select the desired level of visibility of the ETCO2 Waveform.

User Selectable settings: 0 to 20 (Default), 0 to 40, 0 to 60 & 0 to 80 mmHg (0 to 2.5, 5, 8 or 11 kPa)

IPI DISPLAY (Adult and Pediatric modes only)

The user-selectable IPI feature allows the clinician to select the desired level of visibility of the IPI numeric.

User Selectable settings: No (Default) & Yes

Warning: Selecting IPI as a numeric replaces the RRC Numeric. All Upper & Lower alarms associated with the RRc parameter are disabled. No Breath Limit is still enabled.

Note: IPI Display selection is disabled and not available when in Neonatal Patient mode.

IPI Age Range (Pediatric mode only)

The user-selectable IPI Age Range feature allows the clinician to select the desired age range for IPI parameter. The IPI Age Range selection is only available when the IPI Display is enabled (Yes).

User Selectable settings: none (Default), 1 to 3 Years, 3 to 6 Years & 6 to 12 Years

ORIDION RRc SETUP

Figure 18 illustrates the Oridion Setup RRc menu when the RRc field is pressed. From this menu, the Upper and Lower RRc Alarm Limits may be adjusted. Auto limits and disabling RRc Alarms may be selected in this menu as well.

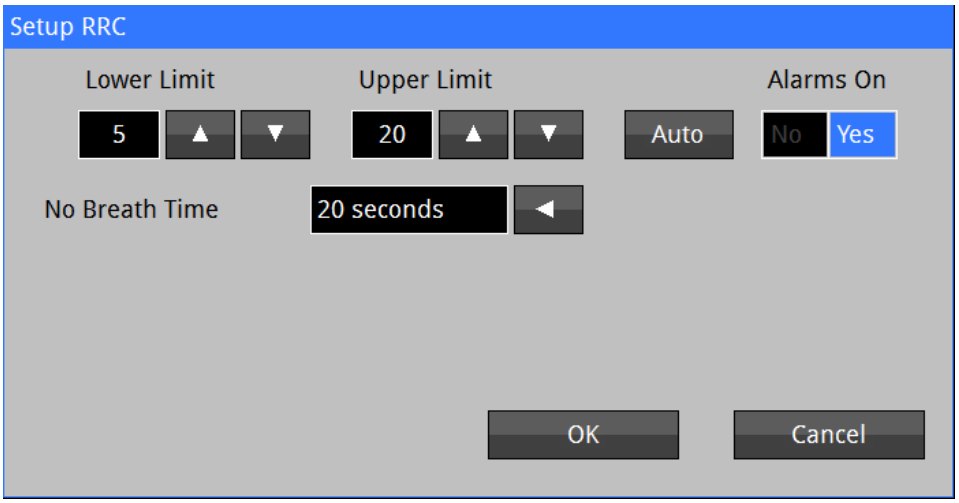


Figure 18: Oridion Setup RRc Menu

RRc ALARM LIMIT VALUES

Table 17 lists the Default RRc Alarm Limits for Adult, Pediatric, and Neonatal. RRa Alarm Limits will operate on the RRc for the current monitor patient mode.

To set the RRc Alarm limits:

1) Touch the RRc Numeric field.
2) Set Alarms On to Yes to enable RRc alarms, or No to disable RRc alarms.

Warning: If Alarms On is set to “No” the monitor will not generate any visual or audible indication of an alarm condition for RRc.

3) Adjust the desired RRc Upper or Lower Limit value:
   - The Upper and Lower Alarm Limits can be adjusted independently.
4) Touch **OK** to accept or **Cancel** to ignore the selection.
5) Touch the **Home** button to return to the Main screen.

RRc AUTO (set) ALARM LIMITS

Upper and Lower alarm limits for RRc can be set automatically using the Auto feature, which provides a structure to establish alarms limits based upon your patient's current measured value.

To enable Auto limits, open the applicable parameter Setup Window and touch the "**AUTO**" key on the same line with the parameter (Refer to Table 2 for RRc percentages).

Parameter	Alarm Limit Adjustment (x% of the current measured value)	
	Lower	Upper
RRc	80%	125%

Table 2: Oridion RRc Auto Alarm Limit Adjustment

NO BREATH TIME

The user-selectable No Breath Time feature allows the clinician to select the desired level of visibility to lack of breathing.

User Selectable settings: 6, 10, 15, 20 (Default), 25 & 30 seconds Adult, Pediatric
6, 10, 15 (Default), 20, 25 & 30 seconds Neonatal

Note: The No Breath alarm priority may be set to High (Default) or Medium priority level. Refer to NO BREATH ALARM PRIORITY on page 17 for additional information.

ORIDION FICO2 SETUP

Figure 19 illustrates the Oridion Setup FICO2 menu when the FICO2 field is pressed. From this menu, the Upper FICO2 Alarm Limits may be adjusted. Auto limits and disabling FICO2 Alarms may be selected in this menu as well.

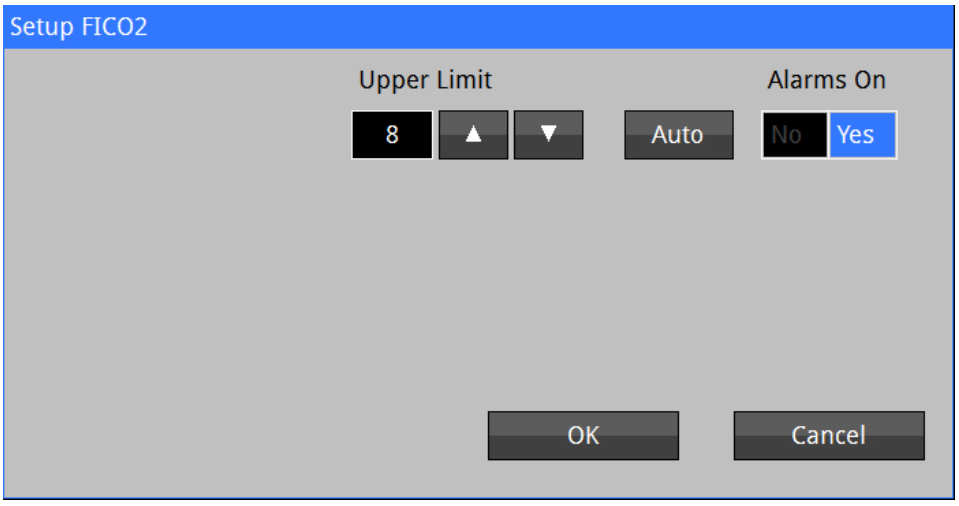


Figure 19: Oridion Setup FICO2 Menu

FICO2 ALARM LIMIT VALUES

Table 17 lists the Default FICO2 Alarm Limit for Adult, Pediatric, and Neonatal. RRa Alarm Limit will operate on the FICO2 for the current monitor patient mode.

To set the FICO2 Alarm limits:

1) Touch the FICO2 Numeric field.
2) Set Alarms On to Yes to enable FICO2 alarms, or No to disable FICO2 alarms.

Warning: If Alarms On is set to "No" the monitor will not generate any visual or audible indication of an alarm condition for FICO2.

3) Adjust the desired FICO2 Upper Limit value.
4) Touch **OK** to accept or **Cancel** to ignore the selection.
5) Touch the **Home** button to return to the Main screen.

FICO2 AUTO (set) ALARM LIMITS

The Upper alarm limit for FICO2 can be set automatically using the Auto feature, which provides a structure to establish alarms limits based upon your patient's current measured value.

To enable Auto limits, open the applicable parameter Setup Window and touch the "**AUTO**" key on the same line with the parameter (Refer to Table 3 for FICO2 Adjustment).

Parameter	Alarm Limit Adjustment	
	Lower	Upper
FICO2	Not Applicable	125%

Table 3: Oridion FICO2 Auto Alarm Limit Adjustment

ORIDION IPI SETUP

Note: The Integrated Pulmonary Index (IPI) is a numerical value from 1 to 10, which integrates ETCO2, RR, and SpO_2 and PR in order to provide a single value for a patient's overall pulmonary status. All four values are necessary in order to derive an IPI value.

Figure 20 illustrates the Oridion Setup IPI menu when the IPI field is pressed. From this menu, the Lower IPI Alarm Limits may be adjusted. Auto limits and disabling IPI Alarms may be selected in this menu as well.

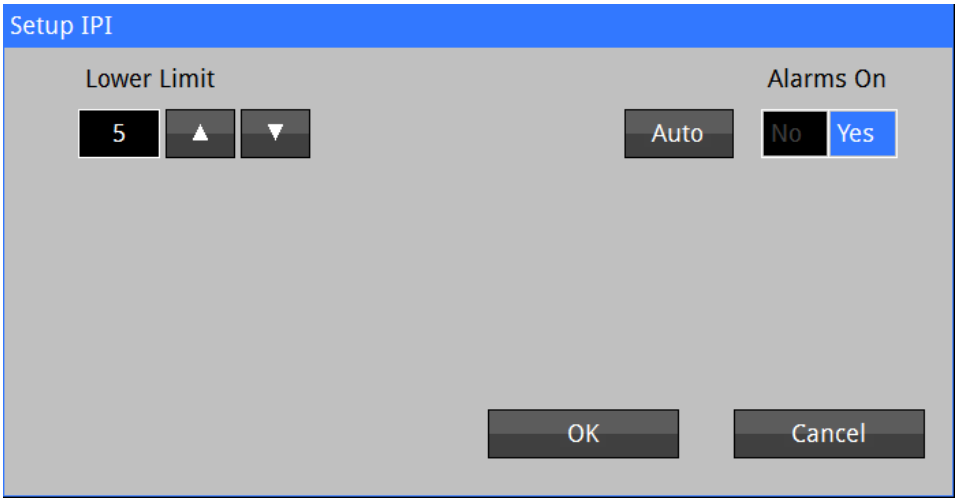


Figure 20: Oridion Setup IPI Menu

Note: IPI Display selection is disabled and not available when in Neonatal Patient mode.

IPI ALARM LIMIT VALUES

Table 17 lists the Default IPI Alarm Limit for Adult, Pediatric, and Neonatal. IPI Alarm Limit will operate on the IPI for the current monitor patient mode.

To set the IPI Alarm limits:

1) Touch the IPI Numeric field.

2) Set Alarms On to Yes to enable IPI alarms, or No to disable IPI alarms.

Warning: If Alarms On is set to "No" the monitor will not generate any visual or audible indication of an alarm condition for IPI.

3) Adjust the desired IPI Lower Limit value.

4) Touch **OK** to accept or **Cancel** to ignore the selection.

5) Touch the **Home** button to return to the Main screen.

IPI AUTO (set) ALARM LIMITS

The Lower alarm limit for IPI can be set automatically using the Auto feature, which provides a structure to establish alarms limits based upon your patient's current measured value.

To enable Auto limits, open the applicable parameter Setup Window and touch the "**AUTO**" key on the same line with the parameter (Refer to Table 4 for IPI Adjustment).

Parameter	Alarm Limit Adjustment	
	Lower	Upper
IPI	75%	Not Applicable

Table 4: Oridion IPI Auto Alarm Limit Adjustment

INTEGRATED PULMONARY INDEX

The Integrated Pulmonary Index (IPI) is a parameter that uses capnography, respiration rate, pulse rate (from SpO_2), and pulse oximetry to articulate a single numeric value to describe a patient's overall ventilatory status. All four values are necessary to calculate the IPI parameter. The IPI may provide an early indication of ventilatory changes that may not be evident in any of the four parameters individually. Also, since IPI is based on physiological parameters that can change with age, the monitor will prompt you to pick from one of three pediatric age changes (1-3 years, 3-6 years, and 6-12 years) when using IPI with a pediatric patient type selected.

The IPI is a numeric value ranging from 1 to 10, where 10 indicates optimal pulmonary status. According to Oridion Medical, the following table presents a guide for clinical intervention based on IPI numeric values. Contact Oridion Medical for further details on IPI clinical intervention. The monitor supports an IPI low alarm limit such that an alarm is annunciated when the IPI value drops below a configured low alarm limit setting.

IPI	Patient Status
10	Normal
8-9	Within Normal Range
7	Close to Normal Range – Requires attention
5-6	Requires attention and may require intervention
3-4	Requires intervention
1-2	Requires immediate intervention

Figure 21: Integrated Pulmonary Index

Note: If the system is configured for the maximum number of parameters, the IPI value may not appear in the Trends display or be printed with the Trend report.

ORIDION CO_2 MONITORING MESSAGES

Table 5 indicates the monitor Messages associated with the Oridion CO_2 parameter:

Message	Parameter Value	Possible Cause	Suggested Action
CO_2 Warming Up[1]	---	• CO_2 module is preparing to acquire data.	• Allow more time.
IPI age range not set	---	• For pediatric patients, the age range must be set to correctly determine IPI.	• Set the age range in the CO_2 setup screen.
CO_2 Unplugged	---	• CO_2 sampling line is not connected.	• Connect the CO_2 sampling line to the monitor. • Disable CO_2 monitoring in the monitor Parameters menu if these parameters are no longer clinically required.
CO_2 Occluded Line	---	• CO_2 sampling line cannot be cleared due to moisture or other obstruction.	• Replace the sampling line. If connected to scavenging system, disconnect to see if message disappears.
CO_2 Purging Line[1]	---	• Microstream module is trying to clear excess humidity	• If the message disappears, resume usage. If the purging operation is unsuccessful or the Occluded Line message appears, disconnect the line and reattach. If the problem continues, replace the sampling line.
CO_2 problem detected	---	• CO_2 interface has encountered a problem.	• Check the CO_2 subsystem including sampling line and exhaust port. Verify that the exhaust port is not blocked.
ETCO2 < [lower limit]	[number]	• The patient's ETCO2 parameter value has fallen below the current lower alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
ETCO2 > [upper limit]	[number]	• The patient's ETCO2 parameter value has risen above the current upper alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
FICO2 > [upper limit]	[number]	• The patient's FICO2 parameter value has risen above the current upper alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
No Breath	---	• No breath has been detected for the user-configurable No Breath time.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
RRc < [lower limit]	[number]	• The patient's respiration rate (RRc) has fallen below the current lower alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
RRc > [upper limit]	[number]	• The patient's respiration rate (RRc) has risen above the current upper alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
RRc out of range (too high)	---	• The patient's respiration rate (RRc) has risen above the maximum value the monitor can accurately detect. • Monitor confused by signal artifact.	• Check the patient and provide any necessary clinical care.
IPI < [lower limit]	[number]	• The patient's IPI parameter value has fallen below the current lower alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.

Table 5: Oridion CO_2 Monitoring Messages

[1] "CO_2 Warming up" and "CO_2 Purging Line" alarms have no audio associated with the message.

ORIDION CO_2 CALIBRATION PROCEDURE

Trained service technicians with the Service password can perform the following procedure:

The Oridion Microstream CO_2 module with the monitor does not require calibration during normal clinical operation.

The monitor displays a "CO_2 Calibration Due" message when the manufacturer's suggested number of operating hours has been reached.

Calibrate the CO_2 module when this message is displayed. It is recommended to calibrate the CO_2 module on an annual basis or after 4000 hours of use, whichever comes first.

In the first year, the CO_2 module should be calibrated after 1200 hours of use.

The number of hours until calibration is due may be found in the monitor event log, which is accessed by touching the Setup Key, then selecting "Administration," then "System," and then "Show Event Log."

Note: Calibration should be performed by a trained technician.

Note: Ensure that the calibration gas and regulator are functioning properly before calibration.

Note: Calibration of the CO_2 module will require a calibrated gas mixture of 5% CO_2, 21% O_2, with the balance N_2. The calibration kit available from Air Liquide (Scott Medical); Part Number T4653ORFCD contains a canister of the above gas mixture, a T-piece connector and a Calibration Filterline.

To calibrate the CO_2 module:

1. Press the Setup Key, then select "Administration," followed by "Service," and "Diagnostics and Calibration" (password required to access this screen)
2. Prior to calibration initiation, connect the CO_2 calibration line to the monitor.
3. Attach the calibrated CO_2 gas mixture to the CO_2 calibration line.
4. Select "Start CO_2 Calibration" on the screen. The monitor displays "CO_2 Calibrating" for up to 1 minute.
5. Once completed, the monitor displays "CO_2 Calibration Complete" or "CO_2 Calibration Failed."
6. If the calibration fails, determine the cause of failure appropriate to the displayed error message given then repeat the CO_2 calibration procedure.
7. Upon successful completion, remove the calibration gas from the monitor. Dispose of it according to the instructions supplied with the kit.

If there is a failure in one of the above procedures, please contact the Zoe Medical Customer Service Department. Refer to page 3 for email, website and phone number information.

4. MASIMO CO_2 MONITORING

Note: For Continuous CO2 monitoring, configure the **740** SELECT Workflow setting to ***Continuous*** in the Setup System screen. Refer to User Manual 21-22-0316 for detailed instructions on how to configure the monitor workflow feature.

Note: The following Warnings and Cautions are directed toward the Masimo CO_2 monitoring function. Additional Warnings and Cautions for the **740** SELECT monitor are found in the **740** SELECT User Manual, Zoe Medical PN 21-22-0316.

WARNINGS (ISA)

Warning: The sidestream gas analyzer is intended for use by authorized healthcare professional only.

Warning: Carefully route the sampling line to reduce the risk of patient entanglement or strangulation.

Warning: Do not lift the sidestream gas analyzer or the monitor by the sampling line as it could disconnect from the analyzer or monitor, causing the analyzer or monitor to fall on the patient.

Warning: Dispose Nomoline sampling lines and cannulas in accordance with local regulations for biohazardous waste.

Warning: Use only airway T-adapters with the sampling point in the center of the adapter.

Warning: Do only use sample lines intended for anesthetic agents if N_2O or anesthetic agents are being used.

Warning: Do not use T-adapter with infants, as this adds 7 ml dead space to the patient circuit.

Warning: Do not use the analyzer with metered-dose inhalers or nebulized medications as this may clog the bacteria filter.

Warning: Since a successful zeroing requires the presence of ambient air (21% O_2 and 0% CO_2), ensure that the analyzer is placed in a well-ventilated place. Avoid breathing near the ISA sidestream gas analyzer before or during the zeroing procedure.

Warning: Never sterilize or immerse the sidestream gas analyzer in liquid.

Warning: Sidestream gas analyzer is intended only as an adjunct in patient assessment. It must be used in conjunction with other assessments of clinical signs and symptoms.

Warning: Measurements can be affected by mobile and portable RF communications equipment. Make sure that the sidestream analyzer is used in the electromagnetic environment specified in this manual.

Warning: Replace the sampling line if the sampling line input connector starts flashing red, or a "CO_2 Occluded Line" message appears on the monitor.

Warning: No modification of this equipment is allowed without authorization of the manufacturer. If this equipment is modified, appropriate inspection and testing must be conducted to ensure continued safe operation.

Warning: Sidestream gas analyzers are not appropriate for MRI environments.

Warning: During MRI scanning, the Sidestream gas analyzer must be placed outside the MRI suite.

Warning: Use of high frequency electrosurgical equipment in the vicinity of the analyzer may product interference and cause incorrect measurements.

Warning: Do not apply negative pressure to remove condensed water from the Nomoline family sampling line.

Warning: Too strong positive or negative pressure in the patient circuit might affect the sample flow.

Warning: Strong scavenging suction pressure might affect the sample flow.

Warning: Exhaust gases should be returned to the patient circuit or to a scavenging system.

Warning: Due to the risk of patient cross-infection, always use a bacteria filter on the exhaust port side if sampled gas is intended to be re-breathed.

Warning: Do not place the gas analyzer in any position that might cause it to fall on the patient.

Warning: Do not re-use disposable single-patient use Nomoline Family sampling lines due to the risk of cross contamination.

Warning: Do not sterilize or immerse Nomoline Family sampling lines in liquid.

Warning: Do not operate the sidestream gas analyzer if the enclosure is damaged.

CAUTIONS (ISA)

Caution: The analyzer should be securely mounted in order to avoid the risk of damage to the ISA.

Caution: Do not operate the sidestream gas analyzer outside the specified operating environment.

Caution: (U.S. only) Federal law restricts this device to sale by or on the order of a licensed healthcare practitioner.

WARNINGS (IRMA)

- **Warning:** The probe is intended for use by authorized and trained medical personnel only.
- **Warning:** The probe is intended only as an adjunct in patient assessment. It must be used in conjunction with other assessments of clinical signs and symptoms.
- **Warning:** The probe must not be used with flammable anesthetic agents.
- **Warning:** Disposable airway adapters shall not be reused. Reuse of the single use adapter can cause cross infection.
- **Warning:** Used airway adapters shall be disposed of in accordance with local regulations for medical waste.
- **Warning:** Do not use the Adult/Pediatric airway adapter with infants as the adapter adds 6 ml dead space to the patient circuit.
- **Warning:** Do not use the infant airway adapter with adults as this may cause excessive flow resistance.
- **Warning:** Measurements can be affected by mobile and RF communications equipment. It should be assumed that the probe is used in the electromagnetic environment specified in this manual.
- **Warning:** Do not place the airway adapter between the endotracheal tube and an elbow as this may allow patient secretions to block the adapter windows and result in incorrect operation.
- **Warning:** To keep secretions and moisture from pooling on the windows or oxygen sensor port, always position the probe in a vertical position with the LED pointing upwards.
- **Warning:** Do not use the airway adapter with metered dose inhalers or nebulized medications as this may affect the light transmission of the airway adapter windows.
- **Warning:** Incorrect probe zeroing will result in false gas readings.
- **Warning:** Incorrect agent selection by the user for IRMA OR (no automatic agent identification) will result in false agent readings.
- **Warning:** Replace the airway adapter if rainout or condensation occurs inside the airway adapter.
- **Warning:** Use only MASIMO manufactured IRMA airway adapters
- **Warning:** The IRMA probe is not intended to be in patient contact

CAUTIONS (IRMA)

- **Caution:** Never sterilize or immerse the probe in liquid.
- **Caution:** Airway adapters are non-sterile devices. Do not autoclave the devices as this will damage them.
- **Caution:** Do not apply tension to the probe cable.
- **Caution:** Do not operate the probe outside the specified operating environment.
- **Caution:** (U.S. only) Federal law restricts this device to sale by or on the order of a physician.

GETTING STARTED WITH MASIMO CO_2

The 740 SELECT monitor Open Technology Platform (OTP) allows CO_2 monitoring software to be installed at any time on any monitor as a CO_2 parameter upgrade. Software specifically designed for use with the Masimo ISA and IRMA CO_2 analyzers must be enabled from the Service menu. Masimo CO_2 Software may be enabled at the Zoe Medical factory or in the field as a parameter upgrade. Refer to Table 13 for license/ordering information.

To begin CO_2 monitoring with Masimo ISA or IRMA capnography, use the following procedure:

Note: For Continuous CO2 monitoring, configure the 740 SELECT Workflow setting to ***Continuous*** in the Setup System screen. Refer to User Manual 21-22-0316 for detailed instructions on how to configure the monitor workflow feature.

1. Complete all physical connections between the CO_2 module and monitor:
   a. Connect the electrical/data cable which is part of the ISA module or IRMA adapter into the port labeled "***IOIO etCO$_2$***" on the rear panel of the monitor. Refer to REAR PANEL PORTS section on page 52. The cable connection to the monitor serves both data and communications and power supply, with the module receiving power from the monitor through this connection.
2. Enable **ETCO2** monitoring on the monitor (if not already enabled)
   a. Touch the **Setup** button:
   b. Touch the **Home Screen** button;
   c. Touch the **YES** Selection adjacent to **ETCO2 Enabled** and touch **OK**; and
   d. Touch **Home** button to return to the Main screen
3. Enable **CO2** or **CO2 Trend** Waveform
   a. Touch the **left side** of the **waveforms** area;
   b. Touch the ◄ adjacent to the waveform selection displayed (Refer to Figure 22 below);
   c. Touch **CO2** (or **CO2 Trend**) and touch **OK** and;
   d. Touch **Home** button to return to the main screen

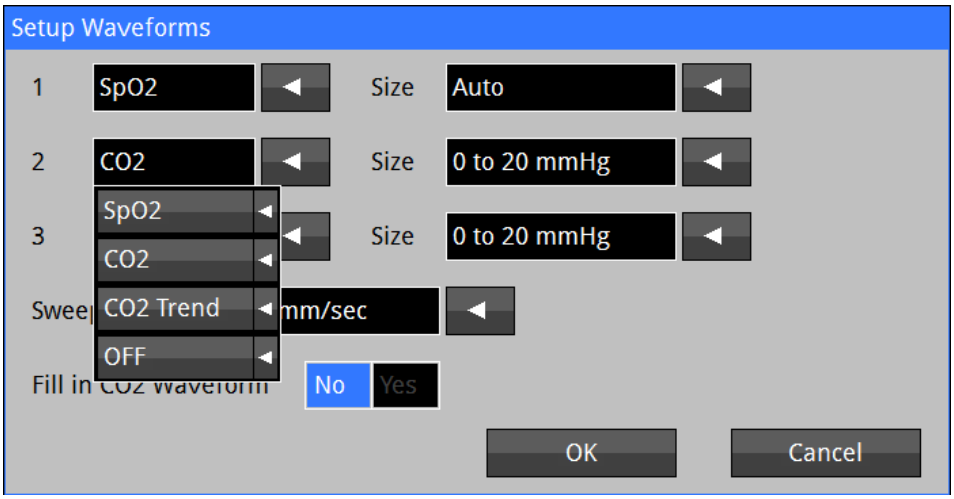


Figure 22: Waveform Setup screen (Masimo CO_2 Enabled)

4. **Fill in CO2** Waveform
   a. Touch the **left side** of the **waveform** area;
   b. Touch **YES** adjacent to **Fill in CO2 Waveform** and touch **OK** and;
   c. Touch **Home** button to return to the main screen.

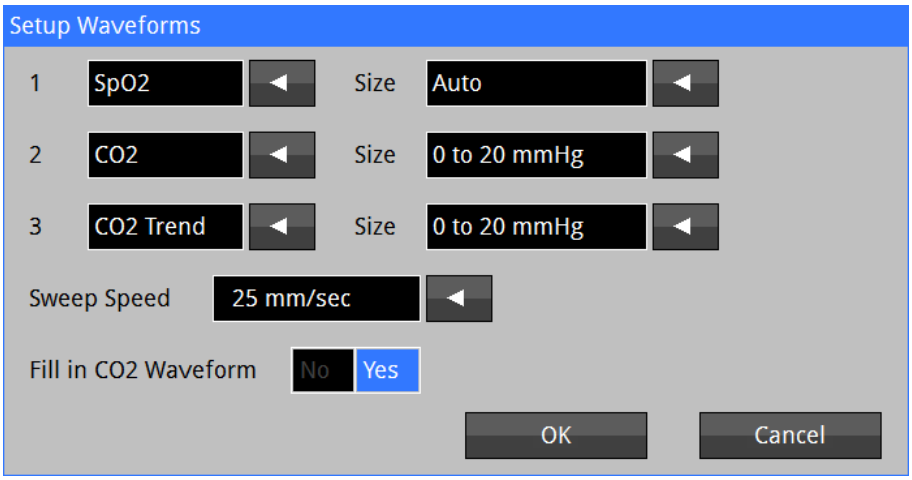


Figure 23: Waveform Fill in screen (Masimo CO_2 Enabled)

5. If CO_2 monitoring has *not* been enabled (indicated by the presence of impedance respiration box with *yellow* ETCO2, RRc or FICO2 labels), perform the following on the monitor:
   a) Touch the **Setup** button;
   b) Touch the **Administrator** button;
   c) Touch the **System** button; (Valid password may be required, contact Zoe Medical Service Department for required password).
   d) Touch the ◄ on the **CO2** line (Refer to Figure 24 below); **Note** Masimo may be the only selection.
   e) Touch the **Masimo** Selection and touch OK; and
   f) Touch **Home** button to return to the Main screen.

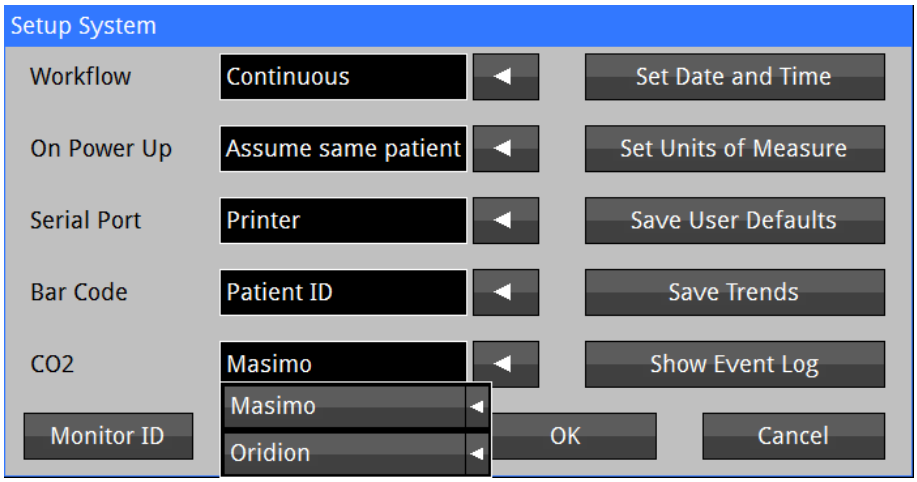


Figure 24: System Setup screen (Masimo CO_2 Enabled)

6. Connect Masimo Accessories:

   a. ISA (Sidestream):

      Connect a Masimo Nomoline accessory to the Light Emitting Gas Inlet (LEGI) connector on the front of the ISA module (Refer to Figure 25). The most commonly used accessory will be the Nomoline Adapter with a female Luer Lock connector. Once the adapter is plugged in, the LEGI will begin flashing in green as the ISA self-zeroes, and the message area on the monitor will display "CO_2 Warming Up."

      This will only last a few seconds, and the LEGI will change to a steady green when the module is ready.

Figure 25: Nomoline Adapter Female Luer Lock

   b. IRMA (Mainstream):

      Using the appropriate adult or pediatric IRMA airway adapter, snap the IRMA module in place onto the adapter (Refer to Figure 26). The LED on top of the module will begin flashing in green as the IRMA self-zeroes, and the message area on the monitor will display "CO_2 Warming Up." This will only last a few seconds, and the LED will change to a steady green when the module is ready.

Figure 26: Snapping IRMA onto Adapter

7. Apply to patient or breathing circuit:

   a. ISA (Sidestream):

      Connect an appropriate nasal cannula or other sampling line with a male Luer Lock fitting to the Nomoline Adapter. Apply the other end to the patient according to the instructions supplied.

Note: Using sampling lines or cannulas with an inner diameter larger than 1 mm will increase the ISA's total response time.

   b. IRMA (Mainstream):

      Connect the IRMA airway adapter between the breathing circuit Y-piece and the patient's endotracheal tube – or into any other suitable ventilation system. Perform a tightness check of the breathing circuit.

With the ISA or IRMA module the CO_2 waveform and numeric parameter values should appear on the monitor main screen within a few seconds. Verify parameter values and waveforms for correctness.

CHECKING THE CO_2 SIGNAL

When you have connected the patient following the steps listed above, you should be able to see a CO_2 waveform on the monitor display as shown below. The monitor should also display values for the patient's end-tidal carbon dioxide (ETCO2), fractional inspired carbon dioxide (FICO2), respiration rate from CO_2 (RRc), and alarm limit settings. With either the ISA or IRMA modules there is negligible impact on CO_2 measurement accuracy in the presence of O_2 or N_2O as long as the correct O_2 and/or N_2O Compensation value has been selected (Refer to Figure 27)

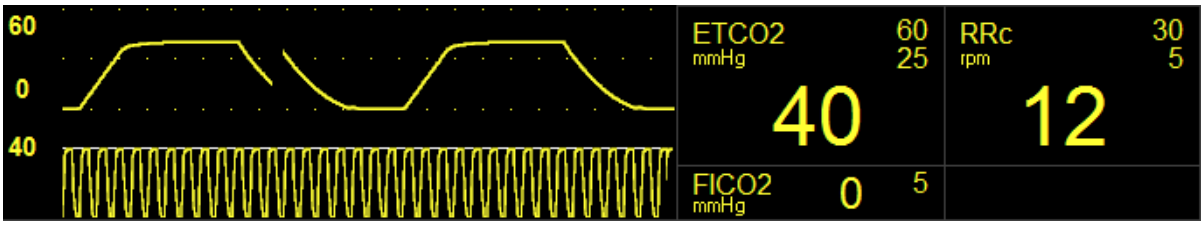


Figure 27: Masimo CO_2 Waveform and Values

To manually test CO_2 monitoring alarm functionality on a daily basis, you may use the following approach:

1. Connect the patient to the monitor using the above procedure or continue as follows with a patient who is already being monitored;
2. Enable the alarms ETCO2, RRc, and FICO2;
3. Lower the ETCO2 upper alarm limit setting below its current value;
4. Verify that "ETCO2 < [upper limit]" annunciates as a medium grade alarm;
5. Press the **ALARM SILENCE** key, and return the ETCO2 upper alarm limit to its previous value; and
6. Verify that the alarm is no longer active, and that CO_2 monitoring continues normally.

   Repeat this process in turn for the RRc and FICO2 parameters.

The CO_2 monitoring settings and specifications may be found in Section 9 - SPECIFICATIONS.

MASIMO LED INDICATOR

The LEGI Status Indicator on the ISA module and the Status LED on the IRMA module may be interpreted according to the Table 6 presented below. Also consult any result messages the monitor may present as found in the MASIMO CO2 MONITORING MESSAGES section.

Color and Pattern	Indication
Steady green light	System OK
Blinking green light	Zeroing in progress
Steady red light	Sensor error
Blinking red light	Check adapter

Table 6: LED Indications

ZEROING MASIMO CO_2 MODULES

For the IRMA (mainstream) CO_2 module, zeroing is performed by snapping a new IRMA airway adapter onto the IRMA module, without connecting the airway adapter to the patient circuit, and then pressing the Zero Set menu button in the Setup CO_2 menu. An alert tone will sound when the zeroing procedure has started, along with a "CO_2 zeroing" message. The alert tone will resound when the zeroing procedure has completed.

Special care should be taken to avoid breathing near the airway adapter before or during the Zeroing procedure. The presence of ambient air (21% O_2 and 0% CO_2) in the IRMA airway adapter is of crucial importance for a successful zeroing.

Zeroing needs to be performed only when an offset in gas values is observed, or when the "CO_2 needs zeroing" message is displayed. When initially connecting the IRMA CO_2 probe to the monitor or when changing IRMA airway adapters, allow a 10-second warm-up period before initiating the zeroing procedure.

Once zeroing has completed, reconnect the airway adapter into the breathing circuit, using the Getting Started instructions that are described earlier in this section.

For the ISA (sidestream) CO2 module, zeroing is performed automatically by the module by switching the gas sampling from the breathing circuit to ambient air. This auto-zeroing is performed 1 to 3 times per 24 hours, and takes less than 3 seconds to complete. The zeroing procedure can also be initiated via the Zero Set menu button in the Setup $ETCO_2$ menu, though this is not usually needed. Refer to ZERO SET section on page 47.

MASIMO CO_2 MAIN SCREEN

The following pages illustrate the procedures for changing configuration settings, such as adjusting alarm limits, changing the waveform size (amplitude), setting the No Breath time, or enabling or disabling IPI.

Figure 28 illustrates the Masimo CO_2 parameters that will appear on the monitor screen.

Note: For Continuous CO2 monitoring, configure the 740 SELECT Workflow setting to ***Continuous*** in the Setup System screen. Refer to User Manual 21-22-0316 for detailed instructions on how to configure the monitor workflow feature.

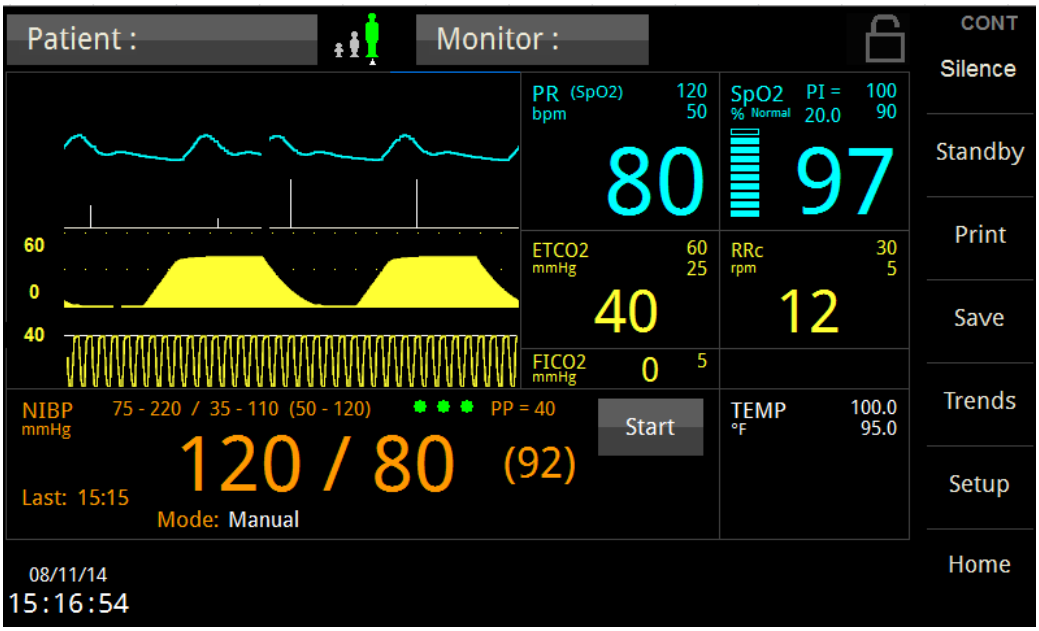


Figure 28: Main Screen w/Masimo CO_2 Parameter

MASIMO ETCO2 SETUP

Figure 15 illustrates the Masimo Setup ETCO2 menu when the ETCO2 field is pressed. From this menu, the Upper and Lower ETCO2 Alarm Limits may be adjusted. No Breath Time, Waveform size, O_2 & N_2O Compensation, Zero Set, Auto limits and disabling ETCO2 Alarms may be selected in this menu as well.

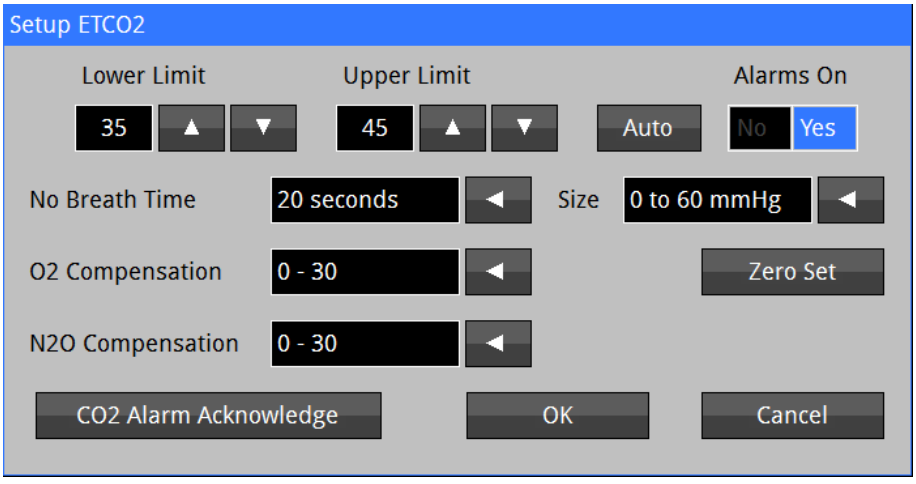


Figure 29: Masimo Setup ETCO2 Menu

ETCO2 ALARM LIMIT VALUES

Table 17 lists the Default ETCO2 Alarm Limits for Adult, Pediatric, and Neonatal. ETCO2 Alarm Limits will operate on the parameters for the current monitor patient mode.

To set the ETCO2 Alarm limits:

1) Touch the ETCO2 Numeric field.
2) Set Alarms On to Yes to enable ETCO2 alarms, or No to disable ETCO2 alarms.

Warning: If Alarms On is set to "No" the monitor will not generate any visual or audible indication of an alarm condition for ETCO2.

3) Adjust the desired ETCO2 Upper or Lower Limit value:
   - The Upper and Lower Alarm Limits can be adjusted independently.
4) Touch **OK** to accept or **Cancel** to ignore the selection.
5) Touch the **Home** button to return to the Main screen.

ETCO2 AUTO (set) ALARM LIMITS

The Upper and Lower alarm limits for ETCO2 can be set automatically using the Auto feature, which provides a structure to establish alarms limits based upon your patient's current measured value.

To enable Auto limits, open the applicable parameter Setup Window and touch the "**AUTO**" key on the same line with the parameter (Refer to Table 7 for ETCO2 percentages).

Parameter	Alarm Limit Adjustment (x% of the current measured value)	
	Lower	Upper
ETCO2	80%	125%

Table 7: Masimo ETCO2 Auto Alarm Limit Adjustment

NO BREATH TIME

The user-selectable No Breath Time feature allows the clinician to select the desired level of visibility to lack of breathing.

User Selectable settings: 6, 10, 15, 20 (Default), 25 & 30 seconds Adult & Pediatric
6, 10, 15 (Default), 20, 25 & 30 seconds Neonatal

Note: The No Breath alarm priority may be set to High (Default) or Medium priority level. Refer to NO BREATH ALARM PRIORITY on page 17 for additional information.

WAVEFORM SIZE

The user-selectable Waveform Size feature allows the clinician to select the desired level of visibility of the ETCO2 Waveform.

User Selectable settings: 0 to 20 (Default), 0 to 40, 0 to 60 & 0 to 80 mmHg (0-2.5, 5, 8 or 11 kPa)

O2 COMPENSATION

The user-selectable O_2 Compensation feature allows the clinician to select the desired level of Compensation for the O_2 supplied.

User Selectable settings: 0 - 30 (Default), 31 - 70 & 71 – 100

N2O COMPENSATION

The user-selectable N_2O Compensation feature allows the clinician to select the desired level of Compensation for the N_2O supplied.

User Selectable settings: 0 - 30 (Default) & 31 – 70

ZERO SET

The user-selectable Zero Set feature allows the clinician to compensate for atmospheric conditions by removing any offset in the ETCO2 calculation by performing an Auto Zero.

Note: The Zero Set function should only be attempted while sample lines or cannulas are not connected to a patient. The ETCO2 Module will ignore any attempt to Zero Set while actively monitor ETCO2.

Note: The Zero Set function can only be performed once every 10 (IRMA) or 30 (ISA) seconds.

MASIMO RRc SETUP

Figure 18 illustrates the Masimo Setup RRc menu when the RRc field is pressed. From this menu, the Upper and Lower RRc Alarm Limits may be adjusted. Auto limits and disabling RRc Alarms may be selected in this menu as well.

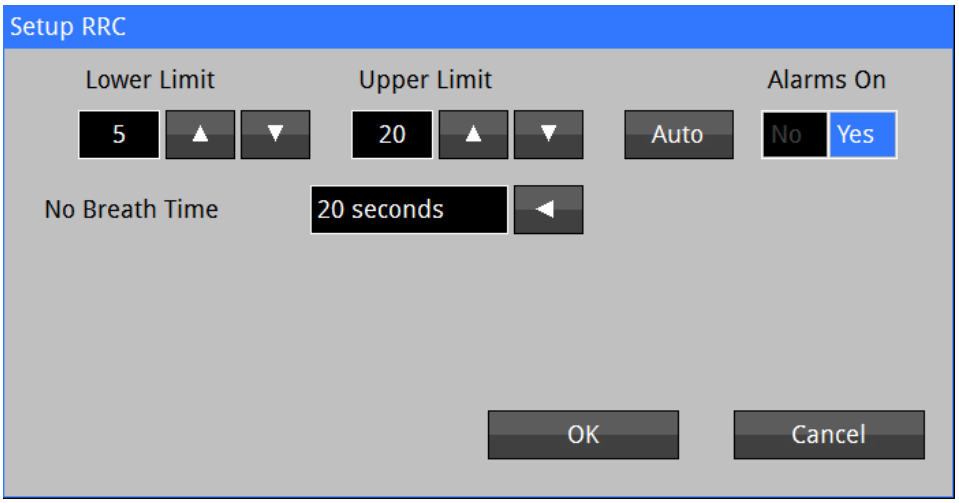


Figure 30: Masimo Setup RRc Menu

RRc ALARM LIMIT VALUES

Table 17 lists the Default RRc Alarm Limits for Adult, Pediatric, and Neonatal. RRc Alarm Limits will operate on the parameters for the current monitor patient mode.

To set the RRc Alarm limits:

1) Touch the RRc Numeric field.
2) Set Alarms On to Yes to enable RRc alarms, or No to disable RRc alarms.

Warning: If Alarms On is set to "No" the monitor will not generate any visual or audible indication of an alarm condition for RRc.

3) Adjust the desired RRc Upper or Lower Limit value:
   - The Upper and Lower Alarm Limits can be adjusted independently.
4) Touch **OK** to accept or **Cancel** to ignore the selection.
5) Touch the **Home** button to return to the Main screen.

RRc AUTO (set) ALARM LIMITS

Upper and Lower alarm limits for RRc can be set automatically using the Auto feature, which provides a structure to establish alarms limits based upon your patient's current measured value.

To enable Auto limits, open the applicable parameter Setup Window and touch the "**AUTO**" key on the same line with the parameter (Refer to Table 8 for RRc percentages).

Parameter	Alarm Limit Adjustment (x% of the current measured value)	
	Lower	Upper
RRc	80%	125%

Table 8: Masimo RRc Auto Alarm Limit Adjustment

NO BREATH TIME

The user-selectable No Breath Time feature allows the clinician to select the desired level of visibility to lack of breathing.

User Selectable settings: 6, 10, 15, 20 (Default), 25 & 30 seconds Adult & Pediatric
6, 10, 15 (Default), 20, 25 & 30 seconds Neonatal

Note: The No Breath alarm priority may be set to High (Default) or Medium priority level. Refer to NO BREATH ALARM PRIORITY on page 17 for additional information.

MASIMO FICO2 SETUP

Figure 30 illustrates the Masimo Setup FICO2 menu when the FICO2 field is pressed. From this menu, the Upper FICO2 Alarm Limits may be adjusted. Auto limits and disabling FICO2 Alarms may be selected in this menu as well.

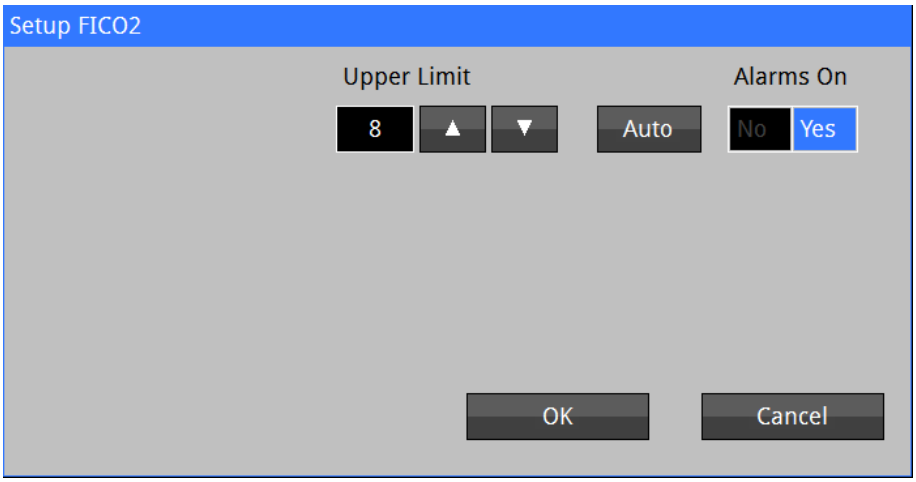


Figure 31: Masimo Setup FICO2 Menu

FICO2 ALARM LIMIT VALUES

Table 17 lists the Default FICO2 Alarm Limit for Adult, Pediatric, and Neonatal. RRa Alarm Limit will operate on the parameters for the current monitor patient mode.

To set the FICO2 Alarm limits:

1) Touch the FICO2 Numeric field.

2) Set Alarms On to Yes to enable FICO2 alarms, or No to disable FICO2 alarms.

Warning: If Alarms On is set to “No” the monitor will not generate any visual or audible indication of an alarm condition for FICO2.

3) Adjust the desired FICO2 Upper Limit value.

4) Touch **OK** to accept or **Cancel** to ignore the selection.

5) Touch the **Home** button to return to the Main screen.

Note: The annunciation of the FICO2 alarm may have an associated delay of up to 10 seconds. Refer to the
FICO2 ALARM DELAY section on page 50 for additional information.

FICO2 AUTO (set) ALARM LIMITS

The Upper alarm limit for FICO2 can be set automatically using the Auto feature, which provides a structure to establish alarms limits based upon your patient's current measured value.

To enable Auto limits, open the applicable parameter Setup Window and touch the "**AUTO**" key on the same line with the parameter (Refer to Table 9 for FICO2 Adjustment).

Parameter	Alarm Limit Adjustment	
	Lower	Upper
FICO2	Not Applicable	125%

Table 9: Masimo FICO2 Auto Alarm Limit Adjustment

FICO2 ALARM DELAY

The FICO2 Lower Alarm annunciation can be delayed by up to 10 seconds.

To set the FICO2 Delay:

1) Touch the **SETUP** button.
2) Touch the **Administrator** button.
3) Touch the **Alarms** button.
4) Adjust the **FICO2 Delay** to the desired selection (Refer to Figure 32).

   The **FICO2 Delay** selections are **Off** (0 Seconds) and **10 seconds**
5) Touch **OK** to accept or **Cancel** to ignore the selection.
6) Touch the **Home** button to return to the Main screen.

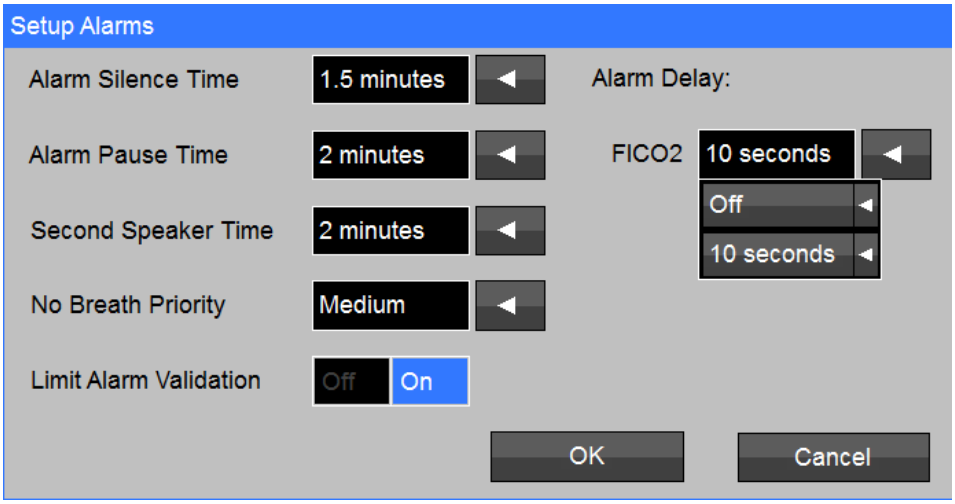


Figure 32: Setup Alarms - FICO2 Alarm Delay

MASIMO CO_2 MONITORING MESSAGES

Table 10 indicates the monitor Messages associated with the Masimo CO_2 parameter:

Message	Parameter Value	Possible Cause	Suggested Action
CO_2 Warming Up	---	• CO_2 module is preparing to acquire data.	• Allow more time.
CO_2 Unplugged	---	• ISA module or IRMA sensor have become unplugged from 740 SELECT.	• Reconnect the electrical/data cable to port labeled "EtCO2".
CO_2 Occluded Line	---	• ISA CO_2 sampling line cannot be cleared due to moisture or other obstruction.	• Replace the sampling line. • If connected to scavenging system, disconnect to see if message disappears.
CO_2 No Sampling Line	---	• ISA CO_2 sampling line has become unplugged from the LEGI connector on the front of the module.	• Reconnect the sampling line.
CO_2 Check Adapter	---	▪ The lens within IRMA airway adapter has become fogged or blocked. • 2) IRMA airway adapter has become unplugged from the sensor.	• Replace or reconnect the airway adapter.
CO_2 Needs Zeroing	---	• CO_2 zero offset needs to be removed.	• Follow the zeroing procedure provided in this chapter.
CO_2 Check Sensor	---	• ISA module or IRMA sensor have reported an internal error.	• Disconnect the module or adapter from the monitor and then reconnect. • Contact technical support if the problem continues.
CO_2 problem detected	---	• CO_2 interface has encountered a problem.	• Check the CO_2 subsystem including sampling line and exhaust port. • Verify that the exhaust port is not blocked. Power-cycle the monitor. • Contact technical support if the problem continues.
ETCO2 < [lower limit]	[number]	• The patient's ETCO2 parameter value has fallen below the current lower alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
ETCO2 > [upper limit]	[number]	• The patient's ETCO2 parameter value has risen above the current upper alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
FICO2 > [upper limit]	[number]	• The patient's FICO2 parameter value has risen above the current upper alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
No Breath	---	• No breath has been detected for the user-configurable No Breath time.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
RRc < [lower limit]	[number]	• The patient's respiration rate (RRc) has fallen below the current lower alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
RRc > [upper limit]	[number]	• The patient's respiration rate (RRc) has risen above the current upper alarm limit.	• Check the patient and provide any necessary clinical care. • Change the alarm limit if it is no longer clinically appropriate.
RRc out of range (too high)	---	• The patient's respiration rate (RRc) has risen above the maximum value the monitor can accurately detect. • Monitor confused by signal artifact.	• Check the patient and provide any necessary clinical care.

Table 10: Masimo CO_2 Monitoring Messages

5. REAR PANEL CONNECTION

REAR PANEL VIEW

Figure 33 illustrates the view of the monitor Rear Panel. Refer to the **740** SELECT User Manual, Zoe Medical PN 21-22-0316 for monitor views.

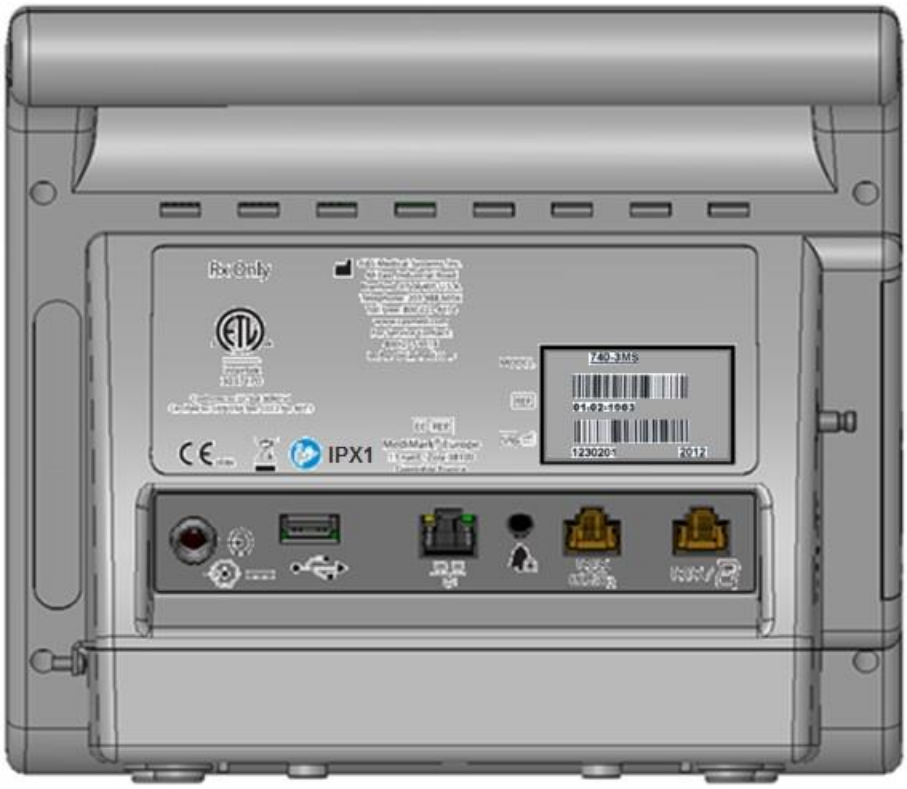


Figure 33: **740** SELECT monitor - Rear Panel View

REAR PANEL PORTS

Figure 34 Illustrates the Rear Panel Ports and Connections. The external ETCO2 module cable should be connected into the Port (5) that is marked ***IOIO etCO$_2$***.

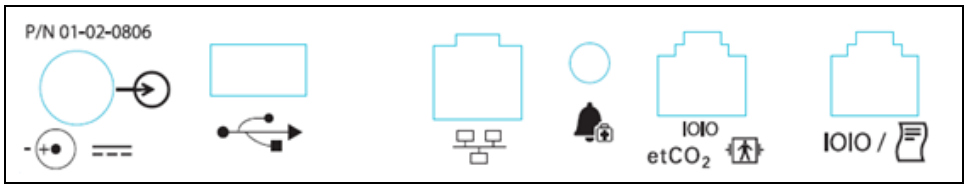


Figure 34: **740** SELECT monitor Rear Panel Ports & Connections

Refer to the **740** SELECT User Manual, Zoe Medical PN 21-22-0316 for description of Ports (1), (2), (3), (4) and (6). Port 5 is a dedicated for connection to CO_2 modules.

6. ACCESSORIES

Contact our Customer Service Department or go to our website for the latest product information. Refer to page 3 for email, website and phone number information.

ORIDION CO_2

Table 11 indicates the Oridion CO_2 parts and accessories to be used with 740 SELECT monitor.

Catalog No.	Description	Reference
01-02-0841	Oridion Microstream MicroPod Capnography Module, Qty. 1	 MicroPod RS-232 LEMO
	Requires the following:	Zoe Medical PN
	• 740 SELECT ETCO2 Parameter Enable license	01-02-0884
	• 740 SELECT - MicroPod Interface Cable	01-02-0880
	Order optional fixation accessories as needed:	Zoe Medical PN
	➢ MicroPod Cradle and Clip, PN	01-02-0882
	➢ MicroPod Cradle and VESA Mount	01-02-0883
01-02-0861	Oridion MicroPod Start-Up Kit, Qty. 1, Kit Contains:	Zoe Medical PN
	• Microstream MicroPod CO2 module, Qty. 1	01-02-0841
	• Oridion Filterline Sample Pack (Adult Mixed) Qty. 1 each	 Ref. XS04620 Ref. 009818
	• 740 SELECT - MicroPod Interface Cable	01-02-0880
	Requires the following:	Zoe Medical PN
	• 740 SELECT ETCO2 Parameter Enable license	01-02-0884
	Order optional fixation accessories as needed:	Zoe Medical PN
	➢ MicroPod Cradle and Clip, PN	01-02-0882
	➢ MicroPod Cradle and VESA Mount	01-02-0883

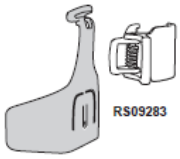
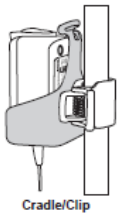
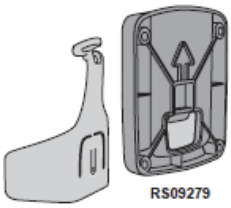
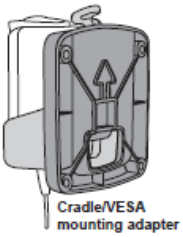
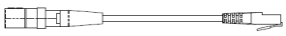
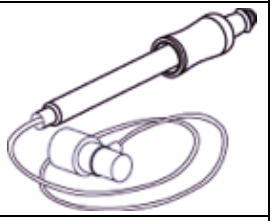
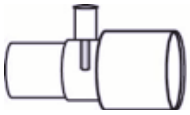
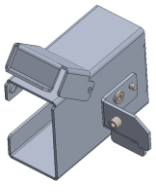
Catalog No.	Description	Reference
01-02-0882	MicroPod Cradle and Clip, Qty. 1 ➢ For Pole Mounting Solution	 
01-02-0883	MicroPod Cradle and VESA Mount, Qty. 1 ➢ For VESA Mounting Solution	 
01-02-0880	**740 SELECT** monitor MicroPod Interface cable, Qty. 1	

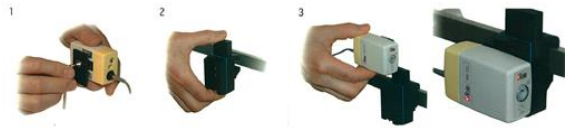
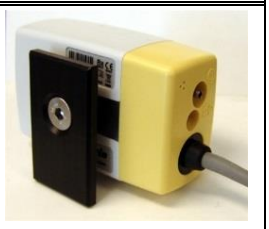
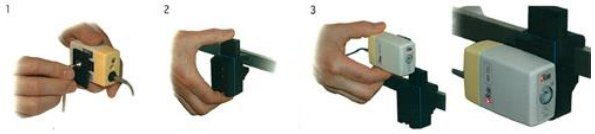
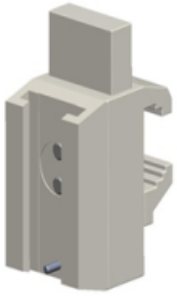
Table 11: Oridion CO_2 parts and accessories

Contact the Oridion sales representative directly for a listing of sample lines and cannulas available for use with the MicroPod CO_2 module.

MASIMO CO_2

Table 12 indicates the Masimo CO_2 parts and accessories to be used with 740 SELECT monitor.

Catalog No.	Description	Reference
	ISA CO_2 Accessories	
01-03-0256	Masimo ISA ETCO2 Module, Qty. 1 **Requires the following:** • 740 SELECT ETCO2 Parameter Enable license • Masimo ETCO2 Module to 740 SELECT monitor Interface Cable Order optional fixation accessories as needed: ➢ Masimo ISA Module Holster Kit ➢ ISA Analyzer Clamp Adapter ➢ ISA Analyzer Modura Holder	 Zoe Medical PN 01-02-0884 01-02-0494 Zoe Medical PN 01-02-0881 01-02-0935 01-02-0936
01-02-0844	ISA Nomoline Adapter with Male Luer Lock Connector (108210), Box of 25 With integrated water removal and hydrophobic bacteria filter For general use, Length: 2 meters	
01-02-0488	ISA Nomoline Adapter (108220), Box of 25 Sampling line with female luer lock connector With integrated water removal and hydrophobic bacteria filter, Adult/Pediatric/Infant	
01-02-0845	ISA Nomoline Airway Adapter Set (108230), Box of 20 Sampling line with straight airway adapter Adult/Pediatric, Single patient use Integrated water removal and hydrophobic bacteria filter, Length: 2 meters	
01-02-0848	ISA T-Adapter (108250), Box of 25 Airway Adapter with female luer lock connector Adult/Pediatric	
01-02-0494	Masimo (ISA/IRMA) CO_2 Module to 740 SELECT monitor Interface cable, Qty. 1	
01-02-0881	Masimo ISA Module Holster Kit, Qty. 1 Bracket is designed to physically attach to the 740 SELECT monitor Provides a fixed or mobile mounting solution for the ISA CO_2 module	

Catalog No.	Description	Reference
01-02-0935	ISA Analyzer Clamp Adapter, Qty. 1 Use with ISA Analyzer Modura Holder 	
01-02-0936	ISA Analyzer Modura Holder, Qty. 1 Use with ISA Analyzer Clamp Adapter Movable jaw provides solution for rail attachment ISA Analyzer slides in and out of guide track 	
01-02-0859	ISA CO_2 Start-Up Kit, Qty. 1, Kit contents: • ISA ETCO2 analyzer, Qty. 1 • Nomoline Airway Adapter Qty. 1 • Adult - Salter Labs CO_2 Nasal Cannula, Qty. 1 • Pediatric - Salter Labs CO_2 Nasal Cannula, Qty. 1 • Infant - Salter Labs CO_2 Nasal Cannula, Qty. 1 • Intermediate Infant - Salter Labs CO_2 Nasal Cannula, Qty. 1 • Masimo ETCO2 Module to **740 SELECT** monitor Interface Cable, Qty. 1 **Requires the following:** • **740 SELECT** ETCO2 Parameter Enable license Order optional fixation accessories as needed: ➢ Masimo ISA Module Holster Kit ➢ ISA Analyzer Clamp Adapter ➢ ISA Analyzer Modura Holder	Zoe Medical PN 01-03-0256 01-02-0844 Adult (4000) Pediatric (4100) Infant (4200) Inter. Infant (4300) 01-02-0494 Zoe Medical PN 01-02-0884 Zoe Medical PN 01-02-0881 01-02-0935 01-02-0936
01-02-0865	Adult - Salter Labs CO_2 Cannula Sample Line (4000), Box of 25 7’ (2.1 meters) supply tube, male luer connector, Single patient use, Latex free	
01-02-0867	Pediatric - Salter Labs CO_2 Cannula Sample Line (4100) , Box of 25 7’ (2.1 meters) supply tube, male luer connector, Single patient use, Latex free	
01-02-0869	Infant - Salter Labs CO_2 Cannula Sample Line (4200), Box of 25 7’ (2.1 meters) supply tube, male luer connector, Single patient use, Latex free	

Catalog No.	Description	Reference
01-02-0871	Intermediate Infant - Salter Labs CO_2 Cannula Sample Line (4300), Box of 25 7' (2.1 meters) supply tube, male luer connector, Single patient use, Latex free	
IRMA CO2		
01-02-0843	Masimo IRMA ETCO2 Module, Qty. 1 **Requires the following:** • 740 SELECT ETCO2 Parameter Enable license • Masimo ETCO2 Module to 740 SELECT monitor Interface Cable	 Zoe Medical PN 01-02-0884 01-02-0494
01-02-0879	Adult/Pediatric - IRMA CO_2 Airway Adapter, Box of 25 </= 6 ml dead space 0.3 cmH20 resistance@30 lpm ET tubes > 4mm	 Ref 106220
01-02-0877	Infant - IRMA CO_2 Airway Adapter, Box of 10 </= 1 ml dead space 1.3 cmH20 resistance@30 lpm ET tubes </= 4mm	 Ref 106260
01-02-0860	IRMA CO_2 Start-Up Kit, Qty. 1, Kit contents: • IRMA ETCO2 Analyzer, Qty. 1 • Adult/Pediatric Airway Adapter, Qty. 1 • Infant Airway Adapter, Qty. 1 • Masimo ETCO2 Module to 740 SELECT monitor Interface Cable, Qty. 1 **Requires the following:** • 740 SELECT ETCO2 Parameter Enable license	Zoe Medical PN 01-02-0843 01-02-0879 01-02-0877 01-02-0494 Zoe Medical PN 01-02-0884
01-02-0494	Masimo (ISA/IRMA) ETCO2 Module to 740 SELECT monitor Interface cable, Qty. 1	

Table 12: Masimo CO_2 parts and accessories

ETCO2 ENABLE LICENSE

Table 13 indicates the Zoe Medical Part Number required to enable the ETCO2 Parameter in a 740 SELECT monitor:

FACTORY INSTALLATION

Catalog No.	Description
01-02-0852	740 SELECT Masimo CO_2 Software Factory Enable license
01-02-0853	740 SELECT Oridion CO_2 Software Factory Enable license
01-02-0856	740 SELECT Oridion IPI Software Factory Enable license Requires the 740 SELECT Oridion CO_2 Software Factory Enable license, Zoe Medical PN 01-02-0853

FIELD INSTALLATION

Catalog No.	Description
01-02-0854	740 SELECT Masimo CO_2 Software Field Enable license
01-02-0855	740 SELECT Oridion CO_2 Software Field Enable license
01-02-0857	740 SELECT Oridion IPI Software Field Enable license Requires the 740 SELECT Oridion CO_2 Software Field Enable license, Zoe Medical PN 01-02-0855

Table 13: ETCO2 Parameter Installation

CO_2/IPI Enable Licenses may requires one of the following packages:	Zoe Medical PN
• Oridion Microstream MicroPod Capnography Module	01-02-0841
• 740 SELECT - MicroPod Interface Cable	01-02-0880
• Oridion MicroPod Start-Up Kit	01-02-0861
• Masimo ISA ETCO2 Module	01-02-0256
• Masimo ETCO2 Module to 740 SELECT monitor Interface Cable	01-02-0494
• Masimo ISA CO_2 Start-Up Kit	01-02-0859
• Masimo IRMA ETCO2 Module	01-02-0843
• Masimo ETCO2 Module to 740 SELECT monitor Interface Cable	01-02-0494
• Masimo IRMA CO_2 Start-Up Kit	01-02-0860

7. DISPOSAL

ACCESSORIES

The disposal of accessories such as CO_2 sampling lines & calibration gases should be carried out according to the manufacturer's recommendations.

MONITOR

At the end of its useful life, the **740 SELECT** monitor should be properly disposed of as well. In particular, the monitor contains a lithium coin battery, a lithium ion battery, and electronic circuit boards which should not be incinerated or exposed to extreme heat. Refer to Warnings and Cautions at the start of the **740 SELECT** User Manual, Zoe Medical PN 21-22-0316 for further precautions.

GUIDANCE

Contact your local waste disposal agency for guidance on the proper recycling or disposal of these components.

8. MAINTENANCE AND STORAGE

The following table shows the recommended maintenance procedures for the 740 SELECT monitor and its accessories.

ORIDION MICROSTREAM

The 740 SELECT monitor does not require periodic recalibration - with the exception of the external Oridion Microstream MicroPod CO_2 module (see the ORIDION CO2 CALIBRATION PROCEDURE section). However, it is a good idea to check that the monitor is in good working order, as described in the following table. These functional tests should be done every 12 months, and they can be performed by clinicians or qualified service personnel.

The following equipment is needed to perform these procedures:

Oridion Microstream calibration kit from Air Liquide (Scott Medical); Part Number T4653ORFCD - includes a canister of 5% CO_2, 21% O_2, with the balance N_2 along with a T-piece connection and a calibration Filterline.

FUNCTIONAL TESTS

Function	*Procedure*
Oridion Microstream CO_2	1. Connect the supplied CO_2 calibration FilterLine between the CO_2 Module monitor and the Cal gas canister. 2. Pulse the calibration gas actuator, holding it depressed for 10 seconds and released for 10 seconds (3 rpm). This will allow enough time for the ETCO2 to stabilize in both inhaled and exhaled states. 3. Verify that the ETCO2 value reads 38 ± 2 mmHg and the FICO2 value reads 0 ± 2 mmHg.

Note: Use only certified calibration gas apparatus that has not reached its expiration date. This Cal gas can be applied to the CO_2 Module in pulses that simulate patient breaths.

Note: Factor a ±0.05 correction for every 100mmHg of ambient barometric pressure above or below sea level respectively.

Note: The 740 SELECT monitor should be returned to Zoe Medical for periodic servicing of the CO_2 system after 30,000 hours of CO_2 use. Refer to page 3 for email, website and phone number information.

MASIMO IRMA/ISA

FUNCTIONAL TESTS

<table>
<tr><th>Function</th><th>Procedure</th></tr>
<tr><td>Masimo ISA CO_2</td><td>1. Connect the CO_2 Module to a calibration gas canister (5% CO_2, 21% 0_2, Balance N_2)
2. Pulse the calibration gas actuator, holding it depressed for 10 seconds and released for 10 seconds (3 rpm). This will allow enough time for the CO_2 values to stabilize.
3. Verify that the FICO2 value is 0-2 mmHg and that the ETCO2 value is within the range that is defined in the following table:
<table>
<tr><th colspan="2">Current Atmospheric Pressure</th><th>Expected $ETCO_2$</th></tr>
<tr><td>mmHg</td><td>mbar</td><td>mmHg</td></tr>
<tr><td>600 - 619</td><td>800 - 825</td><td>28 - 33</td></tr>
<tr><td>620 - 639</td><td>826 - 852</td><td>29 - 34</td></tr>
<tr><td>640 - 659</td><td>853 - 879</td><td>30 - 35</td></tr>
<tr><td>660 - 679</td><td>880 - 905</td><td>31 - 36</td></tr>
<tr><td>680 - 699</td><td>906 - 932</td><td>32 - 37</td></tr>
<tr><td>700 - 719</td><td>933 - 959</td><td>33 - 38</td></tr>
<tr><td>720 - 739</td><td>960 - 985</td><td>34 - 39</td></tr>
<tr><td>740 - 759</td><td>986 - 1012</td><td>35 - 40</td></tr>
<tr><td>760 - 779</td><td>1013 - 1039</td><td>36 - 41</td></tr>
<tr><td>780 - 799</td><td>1040 - 1065</td><td>37 - 42</td></tr>
</table>
</td></tr>
</table>

Note: Use only certified calibration gas apparatus that has not reached its expiration date. This Cal gas can be applied to the CO_2 Module in pulses that simulate patient breaths.

GAS SPAN CHECK

Refer to ***IRMA ISA Gas Span Check Manual 0000-8754-02*** for details regarding a gas span check on IRMA/ISA using PhaseIn Gas Master PC Software.

9. SPECIFICATIONS

ORIDION CO_2 / CAPNOGRAPHY

Table 14 indicates the Specifications associated with the Oridion CO_2 / Capnography.

OEM Board	Oridion microMediCO2
Method	Sidestream (Non-dispersive IR)
Units	mmHg
Parameters	ETCO2, FICO2, RRc, IPI
CO_2 Measurement Range	ETCO2 & FICO2: 0 to 150 mmHg
CO_2 Measurement Accuracy	ETCO2 & FICO2: 0 to 38 mmHg: ± 2 mmHg > 38 to 150 mmHg: ± (5% of expected reading in mmHg +[0.08% x (expected reading in mmHg - 39mmHg)]) Accuracy applies for breath rates of up to 80 rpm. For breath rates above 80 rpm, accuracy is 4 mmHg or ±12 % of reading whichever is greater, for ETCO2 values exceeding 18 mmHg. This is tested according to and is compliant with ISO 21647. To achieve the specified accuracies for breath rates above 60 rpm, the Microstream FilterLine H Set for Infant/Neonatal must be used. Above 55°C module temperature, ±1mmHg or ± 2.5% (whichever is greater) has to be added to the tolerance of the accuracy specs.
CO_2 Resolution	ETCO2 & FICO2: 1 mmHg
RRc (Resp. Rate) Measurement Range	0 to 120 rpm
RRc Measurement Accuracy	0 to 70 rpm: ± 1 rpm 71 to 120 rpm: ± 2 rpm ETCO2, FICO2, and Respiration rate accuracy tested according to ISO21647 using a mixture of gases (5% CO_2, 21% O_2, N_2 balance) supplied via function generator and breath simulator application. Respiration rates from 10-60 rpm for adults/pediatrics as measured in 10 rpm discrete steps were tested for 1 minute before moving forward to the next value and at the end of this one minute period modules readings were taken.
RRc Resolution	1 rpm
IPI Range	1 to 10
Barometric Pressure Range	430 to 795 mmHg
Barometric Pressure Compensation	Automatic
Report Interval	1 second
Flow Rate	50 ml / min (-7.5 to +15 ml / min), flow measured by volume
Warm-up Time Required to meet Accuracy Specifications	Typical: 30 seconds Max: 180 seconds (No readings until warm-up completed)
Total System Response Time	3.5 sec (typical) using standard Microstream FilterLine
Drift of Measurement Accuracy	Meets accuracy specifications when the calibration schedule is followed in the General Care & Maintenance section
Measurement Accuracy for Gas Mixture	Meets ISO 80601-2-55 Clause 201.12.1.101 (Tables 201.102 and 201.103) ISO 21647 Clause 51.101.3 (Tables 101 and 103): ± (volume fraction of 0.43% + 8% of gas level)
Measurement Accuracy in the presence of Interfering Gases	Meets ISO 80601-2-55 Clause 201.12.1.101 (Tables 201.101 and 201.105) ISO 21647 Clause 101.1 (Tables 101 and 105): ± (volume fraction of 0.43% + 8% of gas level)
Standards Conformance	ISO 80601-2-55:2011 (CO_2 Respiratory Gas Monitoring)

Table 14: Oridion CO_2 Specifications

MASIMO ISA CO_2 / CAPNOGRAPHY

Table 15 indicates the Specifications associated with the Masimo ISA CO_2 / Capnography.

Method	Sidestream (Non-dispersive IR)
Units	mmHg
Parameters	ETCO2, FICO2, RRc
CO_2 Measurement Range	ETCO2 & FICO2: 0 to 150 mmHg
CO_2 Measurement Accuracy	As measured with dry single gases: 0 to 15 vol%: ±(0.2 vol% + 2% of reading) 15 to 25 vol%: unspecified
CO_2 Resolution	1 mmHg
RRc (Resp. Rate) Measurement Range	0 to 150 ± 1 rpm
RRc Resolution	1 rpm
Barometric Pressure Range	525 to 1200 hPa
Barometric Pressure Compensation	Automatic
Report Interval	Per breath
Flow Rate	50 ± 10 sml/min
Warm-up Time Required to meet Accuracy Specifications	< 10 seconds (concentrations reported and full accuracy)
Total System Response Time	< 3 seconds (with 2m Nomoline sampling line)
Drift of Measurement Accuracy	Complies with EN ISO 21647:2004 standard
Measurement Accuracy for Gas Mixture	Complies with EN ISO 21647:2004 standard
Measurement Accuracy in the presence of Interfering Gases	Complies with EN ISO 21647:2004 standard
Standards Conformance	ISO 80601-2-55:2011 (CO2 Respiratory Gas Monitoring)

Table 15: Masimo ISA CO_2 / Capnography Specifications

MASIMO IRMA CO_2 / CAPNOGRAPHY

Table 16 indicates the Specifications associated with the Masimo IRMA CO_2 / Capnography.

Method	Mainstream
Units	mmHg
Parameters	ETCO2, FICO2, RRc
CO_2 Measurement Range	ETCO2 & FICO2: 0 to 150 mmHg
CO_2 Measurement Accuracy	Dry single gases at 22 ± 5°C and 1013 ± 40 hPa 0 to 15 vol%: ±(0.2 vol% + 2% of reading) 15 to 25 vol%: unspecified All conditions ±(0.3 kPa + 4% of reading)
CO_2 Resolution	1 mmHg
RRc (Resp. Rate) Measurement Range	0 to 150 rpm. RRc is displayed after 3 breaths and the average value is updated every breath.
RRc Resolution	1 rpm
Barometric Pressure Range	525 to 1200 hPa
Barometric Pressure Compensation	Automatic
Report Interval	Per breath
Warm-up Time Required to meet Accuracy Specifications	< 10 seconds (concentrations reported and full accuracy)
Total System Response Time	< 1 second
Drift of Measurement Accuracy	Complies with EN ISO 21647:2004 standard
Measurement Accuracy for Gas Mixture	Complies with EN ISO 21647:2004 standard
Measurement Accuracy in the presence of Interfering Gases	Complies with EN ISO 21647:2004 standard
Standards Conformance	ISO 80601-2-55:2011 (CO2 Respiratory Gas Monitoring)

Table 16: Masimo IRMA CO_2 / Capnography Specifications

PARAMETER ALARM LIMITS & SETTINGS

Table 17 lists the ETCO2 Parameter Alarm Limit Ranges.

Parameter	Units	Adult			Pediatric			Neonatal		
		Alarms On Default	Limit Default	Limit Range	Alarms On Default	Limit Default	Limit Range	Alarms On Default	Limit Default	Limit Range
$ETCO_2$ upper	mmHg	Yes	45	5 - 150	Yes	45	5 - 150	Yes	45	5 - 150
	kPa	Yes	6.0	0.7 – 20	Yes	6.0	0.7 – 20	Yes	6.0	0.7 – 20
$ETCO_2$ lower	mmHg	Yes	35	0 - 145	Yes	35	0 - 145	Yes	35	0 - 145
	kPa	Yes	4.7	0 – 19.3	Yes	4.7	0 – 19.3	Yes	4.7	0 – 19.3
$FICO_2$ upper	mmHg	Yes	5	0 - 25	Yes	5	0 - 25	Yes	2	0 - 25
	kPa	Yes	0.7	0 – 3.5	Yes	0.7	0 – 3.5	Yes	.3	0 – 3.5
RRc upper	rpm	Yes	20	6 - 150	Yes	45	6 - 150	Yes	75	6 - 150
RRc lower	rpm	Yes	5	5 - 149	Yes	10	5 - 149	Yes	10	5 - 149
No Breath Time	sec	Yes	20	6, 10, 15, 20, 25, 30	Yes	20	6, 10, 15, 20, 25, 30	Yes	15	6, 10, 15, 20
IPI lower (Oridion)	NA	Yes	4	1 - 9	Yes	4	1 - 9	NA	NA	NA
O_2 Compensation (Masimo)	NA	NA	0 - 30	0 - 30 31 - 70 71 - 100	NA	0 - 30	0 - 30 31 - 70 71 - 100	NA	0 - 30	0 - 30 31 - 70 71 - 100
N_2O Compensation (Masimo)	NA	NA	0 - 30	0 - 30 31 - 70	NA	0 - 30	0 - 30 31 - 70	NA	0 - 30	0 - 30 31 - 70

Note: Lower Alarm Limit cannot be set above the associated Upper Alarm Limit.

Note: Upper Alarm Limit cannot be set lower than the associated Lower Alarm Limit.

Table 17: ETCO2 Parameter Alarm Limit Ranges

Table 18 lists the ETCO2 Parameter Setting Defaults and Ranges.

Parameter	Defaults			Range
	Adult	Pediatric	Neonatal	
CO_2 Waveform size	0 to 40 mmHg	0 to 40 mmHg	0 to 40 mmHg	0 to 20 mmHg, 0 to 40 mmHg, 0 to 60 mmHg, 0 to 80 mmHg
ETCO2 Print on Alarm	No	No	No	Yes, No
No Breath Priority	High	High	High	Medium, High
FICO2 Print on Alarm	No	No	No	Yes, No
FICO2 Delay (Masimo)	10 Sec	10 Sec	10 Sec	Off, 10 Sec
RRc Print on Alarm	No	No	No	Yes, No
IPI Print on Alarm (Oridion)	No	No	No	Yes, No
IPI Pediatric Age Range (Oridion)	NA	<BLANK>	NA	1 to 3 years, 3 to 6 years, 6 to 12 years

Table 18: ETCO2 Parameter Setting Ranges

NOTES: