Alaris® EtCO$_2$ Module Pocket Guide

Setting Alarm Limits:
1. Press **CHANNEL SELECT** key.
2. Press **LIMITS**.
3. Select limit parameter to be changed.
4. Enter a numeric value using keypad or up/down arrow keys.
5. Press **CONFIRM**.
6. Press **MAIN SCREEN**.

Trend Data:
1. Press **CHANNEL SELECT** key.
2. Select **TREND**.
3. Press **PAGE UP** and **PAGE DOWN** to navigate through trend data pages. To move cursor bar press up or down arrow keys.
4. Press **ZOOM** to change time period.
5. To exit press **EtCO2 Main**.
6. Press **MAIN SCREEN**.

PCA/EtCO2 Trend Data:
Note: This function requires use of Alaris® PCA module.
1. Press **CHANNEL SELECT** key.
2. Press **OPTIONS**.
3. Select **PCA/EtCO2 Trend Data**. Navigate as described above in section titled Trend Data.
4. To exit press **EtCO2 Main**.
5. Press **MAIN SCREEN**.

Operator Precautions: For proper operation of the Alaris® System (formerly Medley® System) the user must be familiar with the features, disposables, administration sets, set-up and programming.

This guide includes selected information and suggestions and is not intended to be comprehensive instructions for the set-up and operation of the Alaris® System. For complete instructions along with Warnings and Cautions, refer to Alaris® System Directions for Use (v8).

Change Waveform Height:
1. Press **CHANNEL SELECT** key.
2. Press **OPTIONS**.
3. Select **WAVEFORM HEIGHT**.
4. Select 60mmHg or 99mmHg.
5. Press **MAIN SCREEN**.

Change Waveform Time Scale:
1. Press **CHANNEL SELECT** key.
2. Press **OPTIONS**.
3. Select **WAVEFORM TIME SCALE**.
4. Select 5 or 10 seconds (for lower respiratory rates select 10 seconds).
5. Press **MAIN SCREEN**.

Pre-Silencing Alarm:
1. Press **SILENCE** to pre-silence monitoring alarms for 2 minutes.
Note: Infusion alarms will not be silenced.

Troubleshooting

Clearing Disposable Alarm

The module is trying to clear the clogged disposable. If cleared, the module will automatically resume monitoring. If unable to clear, the module will go into a **DISCONNECT OCCLUDED DISPOSABLE** alarm.

Disconnect Occluded Disposable Alarm

The disposable is occluded or needs to be reset. First try disconnecting disposable and then reattach. If the device again reads **DISCONNECT OCCLUDED DISPOSABLE**, obtain and attach a new disposable.

Autozero In Progress Alarm

The module is performing an autozero calibration. During this time no data is obtained. Monitoring will automatically resume when completed. No intervention is necessary.

Low EtCO$_2$ Alarm

Possible causes:
• Patient has true measurement of low EtCO$_2$
• Disposable not correctly attached to patient or securely connected to module
Possible responses: Check disposable connections and assess patient and follow hospital protocol actions.

High EtCO$_2$ Alarm

Possible causes:
• Patient has true measurement of high EtCO$_2$
• Fever or hypermetabolic state
• Disposable is not properly attached to patient
Possible responses: Check disposable and compare value to baseline and follow hospital protocol actions.

High FiCO$_2$ Alarm

Possible causes:
• Patient is inspiring exhaled CO$_2$ or disposable not properly attached to patient
• O$_2$ mask may not be properly attached (if patient is wearing an O$_2$ mask)
• O$_2$ flow to mask may have stopped
• Drapes or covers may be over patient's face
Possible responses: Check disposable, O$_2$ flow, mask and/or drape position and follow hospital protocol actions.

No Breath Detected Alarm

Possible causes:
• Patient is not breathing
• Disposable is not properly attached to patient and/or device
• Disposable is not detecting exhaled breath (shallow breath)
Possible responses: Check disposable and assess patient. Consider using different disposable type and follow hospital protocol actions.

EtCO$_2$ Waveform Examples

The following are examples of common EtCO$_2$ waveforms. The waveform trends are examples only and do not represent all potential abnormal waveforms. Analysis of these waveform trends may provide an early indication of the noted possible causes. The associated possible responses are suggestions only and are not meant to replace current clinical practice or hospital protocols. Always consult hospital protocols. Abnormal waveforms are not always associated with alarms.

Normal Waveform (Normal Ventilation; 35-45 mmHg)

Clinical findings:
- Normal breathing, Normal EtCO$_2$

A - B: Baseline period of no CO$_2$, End of inhalation

B - C: Exhalation begins, Begin rapid rise in CO$_2$

C - D: Sustained exhalation, Alveolar plateau

D: End of expiration, end tidal CO$_2$ (EtCO$_2$) value

D - E: Inhalation, Rapid decrease in CO$_2$
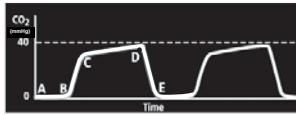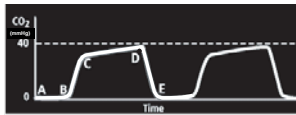
Hypoventilation (Abnormal Waveform)

Clinical findings:
- Slow breathing, High EtCO$_2$

Possible Causes:
- Over medication or increased sedation
- Snoring or possible obstruction

Possible Responses:
- Always follow hospital protocols
- Access ABCs
- Assess sedation level
- Stimulate patient
- Notify RT or MD
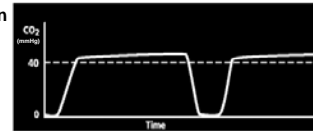
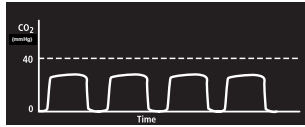## Partial Airway Obstruction (Abnormal Waveform)

Clinical findings:
- Irregular breathing, possible audible sound or snoring, EtCO$_2$ may be above or below baseline

Possible Causes:
- Poor head or neck alignment
- Over medication or sedate

Possible Responses:
- Always follow hospital protocols
- Assess ABCs
- Encourage patient to take deep breaths
- Perform a head tilt or chin lift; Check position of cannula
- Notify RT or MD
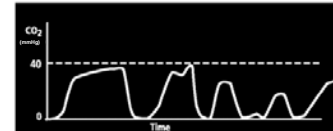
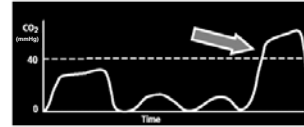## Hyperventilation (Abnormal Waveform)

Clinical findings:
- Rapid breathing, Low EtCO$_2$

Possible Causes:
- Increase in pain level or splinting area of pain
- Increase in anxiety or fear
- Respiratory distress or shortness of breath

Possible Responses:
- Always follow hospital protocols
- Treat cause of increased respiratory rate
- Assess ABCs (Airway, Breathing, Circulation)
- Decrease pain stimulus or encourage calm
- Notify RT or MD
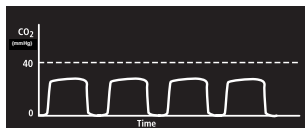
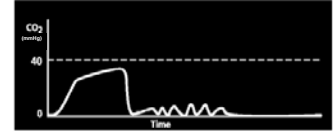## Hypoventilation with Shallow Breathing (Abnormal Waveform)

Clinical findings:
- Slow breathing, Low EtCO$_2$ followed by deep breath (see pointing arrow)

Possible Causes:
- Over medication or increased sedation
- Low tidal volume

Possible Responses:
- Always follow hospital protocols
- Assess ABCs
- Maintain patient airway
- Encourage patient to take deep breaths
- Notify RT or MD
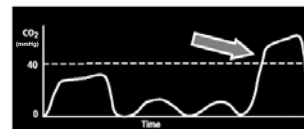
No Breath (Abnormal Waveform)

Clinical findings:
- Sudden loss of EtCO$_2$ reading, Very shallow or no respiratory rate pattern observed

Possible Causes:
- No Breath or Apnea
- Very shallow breathing
- Over medication or sedate
- Displaced cannula

Possible Responses:
- Always follow hospital protocols
- Assess ABCs
- Stimulate patient
- Open airway
- Notify RT or MD

References: 1. Capnography in the Management of the Critically Ill Patient, EducationPAK for Critical Care and Procedural Sedation - A Guide to Capnography, CD-ROM - Needham, MA Oridion Medical, 2003.
2. AACN Procedure Manual for Critial Care 4th Ed. (2001). Ed. Lynn-McHale, D.J. & Carlson K.K., American Association of Critical-Care Nurses.
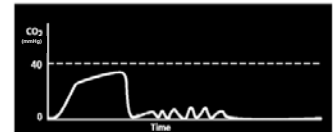3. Thalan's Critical Care Nursing Diagnosis and Management 4th Ed. (2001) Ed. Urden, L.D., Stacy, K.M. & Lough, M.E., C.V. Mosby