

Infinity Acute Care System



Quick Reference Guide

M540

This Infinity Quick Reference Guide is not a replacement or substitute for the Instructions for Use (IFU). It is for informational purposes only.

Software Level: VG4

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Warning! This “Quick Reference Guide” is not intended to replace the Instructions for Use manual. For full information concerning the performance characteristics of the Dräger devices described in this Quick Reference Guide, each user must carefully read and fully comprehend the Instructions for Use before operating the respective device.

Electrode & Lead Placement

DO'S & DO NOT'S

- ✓ Do place the electrode on a clean and dry area of skin.
- ✓ Do utilize soap, water, and dry skin thoroughly.
- ✓ Do remove hair if necessary for proper electrode placement.
- ✓ Do change electrodes Q 24-48 hours, or per hospital policy.
- ✗ Do Not utilize alcohol to dry and clean area of skin for electrode placement.
- ✗ Do Not place electrodes over bony prominences or area of increased muscle movement/activity.
- ✗ Do Not assume electrodes are “good” if the tape portion is attached to the patient’s skin.
- ✗ Do Not braid, tie or knot leads.

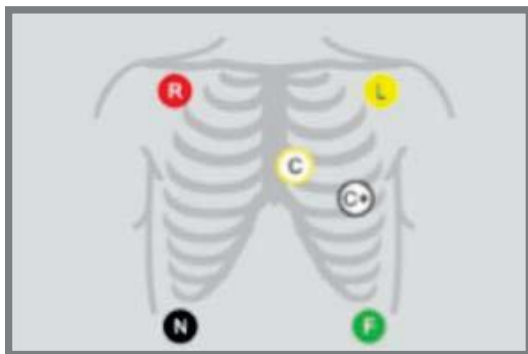
Note: Always follow hospital-approved practices or the recommendations of the electrode manufacturer.

Electrode Colors*

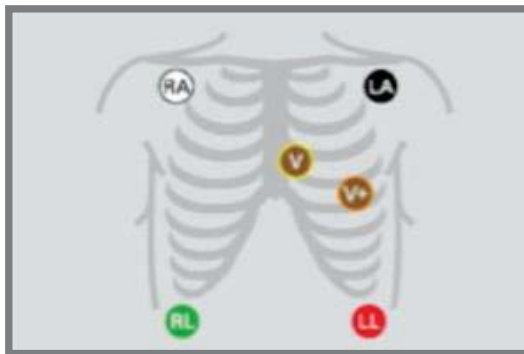
IEC		AHA/US		Electrode Location
L	Yellow	LA	Black	Left arm
F	Green	LL	Red	Left leg
R	Red	RA	White	Right arm
N	Black	RL	Green	Right leg (neutral)
C	White	V	Brown	Moveable chest
C+	Gray & White	V+	Gray & Brown	2 nd Moveable chest

Standard 6 Lead Configuration

IEC

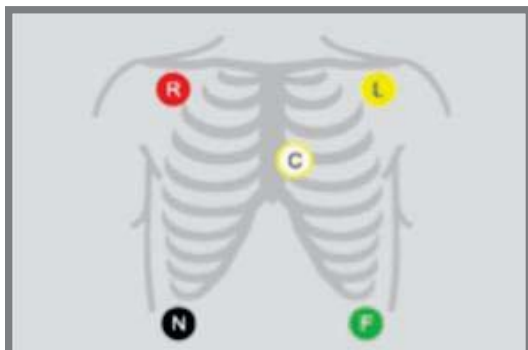


AHA

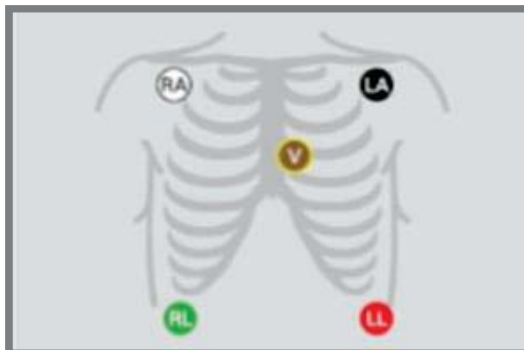


Standard 5 Lead Configuration

IEC

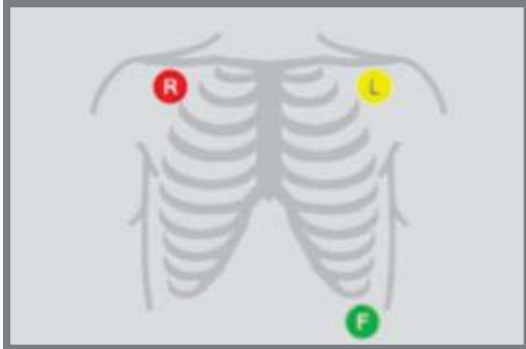


AHA

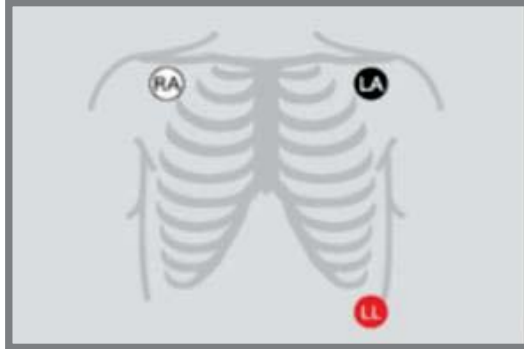


Standard 3 Lead Configuration

IEC

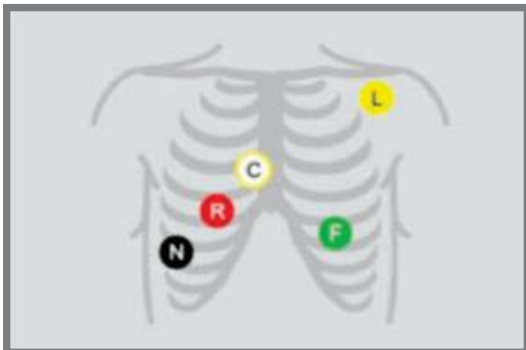


AHA

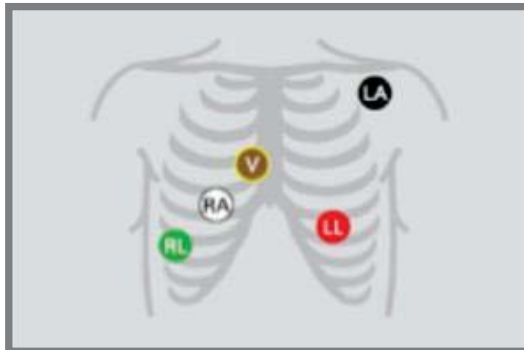


Pacemaker Configuration 5 electrodes

IEC



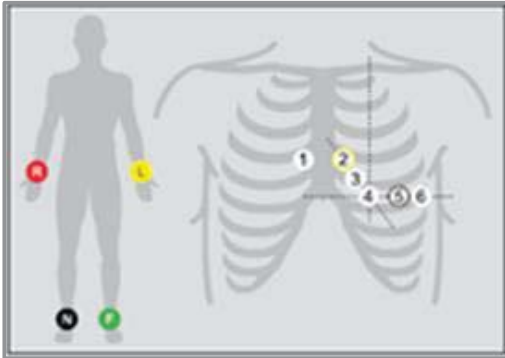
AHA



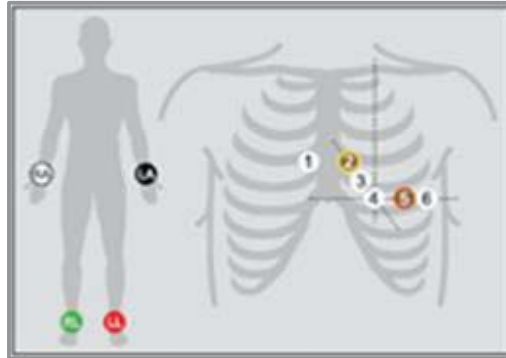
Warning: Make sure the pacemaker detection is turned OFF for patients without pacemakers and that it is ON for patients with pacemakers. Always keep pacemaker patients under close surveillance.

12-Lead Configuration (ten electrodes)

IEC

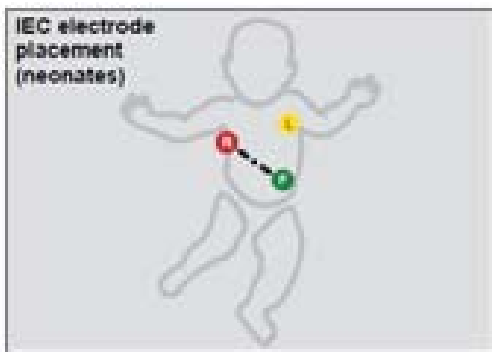


AHA

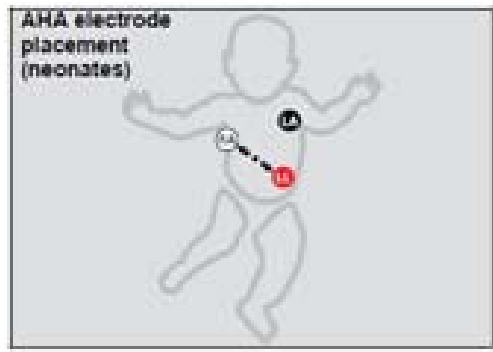


Respiratory lead placement for infants

IEC



AHA



Terminology

INFINITY ACUTE CARE SYSTEM (IACS)

- Monitors located at the bedside of the patient or accompanying the patient on transport. They provide continuous monitoring and data collection of multiple parameters.
- Includes M540, Cockpit (C700/500), and M500.

M540

- Transport component and patient connection point of the IACS.

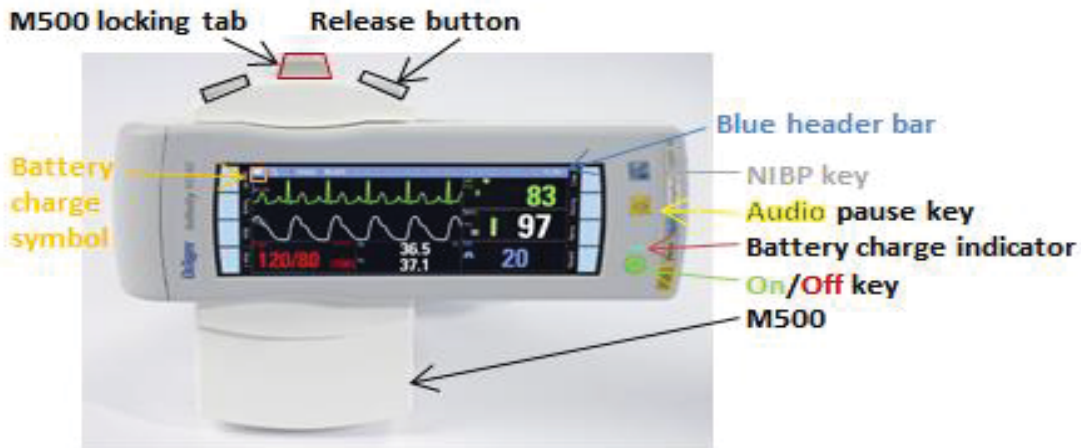
M500

- Docking Station that secures the M540 and charges the internal battery.
- Provides communication between the M540 and the C700/500.
- If the M540 is part of an IACS configuration, the M500 controls the communication between the M540, the Cockpit, and the Infinity Central Station.

INFINITY CENTRAL STATION (ICS)

- Provides simultaneous central monitoring and critical care management of up to 32 patients per ICS. It is the secondary patient monitoring display and alarm source for Infinity patient monitors displayed on the main screen.
- Provides a bed view port for each M540 device, a waveform area, a parameter box and a header bar.

Docking and Transport, Power & Frequently Used Keys



M500 DOCKING STATION WITH M540

- M500 secures and powers the M540 monitor.
- M500 stores default profile settings that can be adopted upon docking.
- M500 connects M540 to Infinity network that may include an Infinity Central Station (centralized alarm management and data retrieval station for up to 32 patients), a network recorder, and a network printer.
- M540 facilitates transport of patient when undocked, by maintaining all patient connections and alarm settings.

TO UNDOCK M540 (release for transport)

1. Push locking tab toward the back of M500
2. While holding the M540 firmly with one hand press one of the release buttons on M500 and remove from M500

TO DOCK M540

1. Align curved portion of M540 with curved portion of M500
2. Press M540 into M500 until it clicks in place.
3. Push the locking tab toward the front of M500.

ON/OFF FIXED KEY

- Turns the M540 on or off. The button LED flashes when the M540 is undocked; is solid when the M540 is docked.

BATTERY LED SYMBOL

- This symbol lights up when the M540 is docked to indicate the battery is being charged; it does not light up when the M540 is undocked.

AUDIO PAUSE FIXED KEY

- Pauses acoustic alarm signals for two minutes

Note: *Quiet Mode is **Activated** – If a new alarm condition with a priority higher than the currently paused alarm occurs, a truncated alarm tone sounds. In **addition**, the alarm is represented by visual alarm signals corresponding to the alarm priority. If the new alarm is of lower priority than the paused alarm, the new alarm condition is only represented by a visual alarm signal. No acoustic alarm tones sound.*



*If Quiet Mode is **Deactivated** - Any new alarm condition breaks through the Audio Pause period with full acoustic and visual alarm annunciation.*

NIBP START/STOP FIXED KEY

- Starts/stops non-invasive blood pressure measurements



TO CALIBRATE THE M540 TOUCH SCREEN

If the Touch screen is out of alignment, calibration should be performed.

1. Push and hold the following two keys   simultaneously.
2. Touch each **cross** appearing successively on screen with fingertip.

BLUE HEADER BAR

The blue header bar appears along the top of the screen. It is always visible and displays the following:

- Remaining battery charge symbol  when fully charged all segments are filled in. Segments appear empty as battery depletes. With fully charged battery, undocked M540 life is approximately 3 hours. Low Battery message appears and low priority alarm sounds when 10 minutes of battery run time remains before M540 shuts down automatically.
- Network connection symbol when connected to the network
- Patient category (adult pediatric, & neonate)
- Bed label
- Patient name and alarm message field
- Current time
- Wireless symbol when M540 on wireless transport 
- Alarm banner field indicating if and how an alarm is silenced

Function Keys, Tabs, & Dialog Boxes



TABS

Tabs along the top and sides of dialog boxes open more setup options

DIALOG BOXES

Windows within screens that offer setup or review functions

Function Keys

8 Configurable keys that offer access to patient and monitor setup and review screens

Key	Function
<i>ALARMS (fixed)</i>	Opens Alarm settings dialog window. Activate All Alarms Pause or adjust Alarm volume.
<i>REVIEW (fixed)</i>	Opens the Event recall dialog window.
<i>MENU (fixed)</i>	Opens the Main menu dialog window. It also closes any open dialog and returns to the monitoring view.
<i>VIEW (fixed)</i>	Scrolls through (up to) five preconfigured screen layouts.
<i>STANDBY (option)</i>	Places the M540 into the Standby mode.
<i>CODE (option)</i>	Starts the Code functions within the Cockpit when the M540 is docked in an IACS configuration.
<i>DISCHARGE (option)</i>	Discharges patient.
<i>RECORD (option)</i>	When on a network and connected to strip recorder will prompt a recording
<i>PRIVACY (option)</i>	When connected to a Central if activated displays blank screen at M540 and all monitoring is done at Central.
<i>MARK (option)</i>	Stores an event in the Event recall dialog window or at Central.
<i>PATIENT (option)</i>	Opens the Demographics dialog window.
<i>Rest ECG report (option)</i>	Generates a diagnostic quality 12 lead ECG report.

Patient Category, Admit and Discharge

Confirm Patient Category for Adult, Pediatric, or Neonatal Mode.

If Category incorrect:

1. Press the **Menu** function key.
2. Touch the **Patient setup** tab.
3. Touch **Patient category** and Select the appropriate category (Adult, Pediatric, & Neonate). Each patient category has specific alarm defaults associated with it.
4. The message “Changing category will change alarm settings and algorithmic processing” appears.
5. Press **OK**. The **Patient setup** dialog window closes and label changes to indicate new patient category.

Enter Patient’s Demographic Information for Admission

1. Press the **Menu** function key
2. Touch the **Patient setup** tab.
3. Select **Name**, **ID**, and **Admit date** and use onscreen keyboard to enter data.
4. Press **Confirm**.

Note: When connected to a Central Station data entry is easily achieved with keyboard and mouse. Height and weight may be entered at the Infinity Central Station.

TO DISCHARGE A PATIENT

1. Press **Discharge** function key.
2. Press **Discharge** to confirm or **Cancel** to resume monitoring of patient.
3. Main Screen will show “**Discharged, Touch screen to resume monitoring**”.

Note: All patient data is deleted upon discharge and default limit settings are restored.

Audio & Visual Alarms and Silencing

TO PAUSE AUDIO ALARMS FOR 2 MINUTES



1. Press **Audio Pause** key. 

Note: Quiet Mode is **Activated** – If a new alarm condition with a priority higher than the currently paused alarm occurs, a truncated alarm tone sounds. In addition, the alarm is represented by visual alarm signals corresponding to the alarm priority. If the new alarm is of lower priority than the paused alarm, the new alarm condition is only represented by a visual alarm signal. No acoustic alarm tones sound.

If Quiet Mode is **Deactivated** - Any new alarm condition breaks through the Audio Pause period with full acoustic and visual alarm annunciation.

TO PRE-SILENCE ALARMS FOR 2 MINUTES

Allows one to audio pause in advance any potential alarm conditions before they occur. If multiple alarm conditions arise during an active pre-silence period, the M540 triggers a single alarm tone sequence for the highest-grade alarm event.

1. Press the **yellow**  key on the M540
 - Any alarm conditions are reported visually by a corresponding alarm message and a blinking parameter box.
 - A single alarm tone sequence is generated for the first occurrence of an alarm condition of low, medium or high priority.
 - The alarm message **Audio paused** appears in the far right field of the header bar along with a countdown timer and the following symbol: 


Note: Pre-Silence functions only if Quiet Mode is activated.

TO ADJUST ALARM VOLUME


1. Press **Alarms** function key.
2. Touch **Alarm Volume** and change to desired %.

Alarm Priorities

HIGH-PRIORITY ALARMS

- Report conditions that require immediate intervention; for example, asystole.
- The alarming parameter's box and alarm message field have red background, and audible alarms* sound when active.
- Are **latched**, (audio / visual alarms continue until the alarm is acknowledged, even if the alarm condition has ceased to exist). To acknowledge press .

MEDIUM-PRIORITY ALARMS

- Report conditions that require prompt attention but may not be life-threatening; for example, low SpO2.
- The alarming parameter's box and alarm message field have a yellow background, and audible alarms* sound when alarms are active.
- Are **non-latched** (audio / visual flashing alarms stop when situation corrects self), but alarm status message will remain in the header bar. To remove message press .

LOW -PRIORITY ALARMS

- Alerts to technical issues that may compromise the ability of the system to monitor the patient; for example, SpO2 probe off. Also may be set to alert to lower risk arrhythmias, such as couplets.
- The alarming parameter's box and alarm message field have cyan background, and audible alarms* sound when active.
- Are also **non-latched** alarms, *except* status bar does not remain active when situation resolved.

Note: Audible alarm signals are distinct for each alarm priority. Specific characteristics including break through alarms will vary depending on the default alarm pattern (Infinity, IEC fast or IEC slow) & software level.

Views, Waveforms and Parameters

ECG, NIBP, SpO2, RRi, Temp, CO2, Invasive lines



Views

Each M540 supports five pre-configured views, which control the content and the appearance of the main screen. You can switch to a different view by touching the **View** key. Touching the **View** key brings up the next screen to view. Choose the view that allows you to view and interact with the waveforms and parameters that are connected and being monitored.

Parameter Waveforms

TO CONFIGURE THE WAVEFORMS

1. Touch desired waveform area to open the waveform channel dialog window.
2. Touch **Waveform** and select the desired label for the waveform you want to view in the waveform dialog window.
3. To adjust the size for each waveform, touch **Size**, or **Scale** and select the appropriate size.

Parameter Boxes

All setting changes are made by pressing the desired **parameter** box and using the **Alarm limits** or **Settings** tab.

Setting Parameter Alarm Limits



TO CONFIGURE ALARM LIMITS FOR EACH PARAMETER

1. Touch a parameter box to access the parameter's dialog window (i.e., HR, NIBP).
2. The parameter's limits tab is viewable
3. Touch the **Upper** or **Lower** alarm limit value.
4. Touch the **Up** or **Down** arrow to change the alarm setting.
5. Touch **OK**.

Note: For each parameter there may be more tabs along right side of dialog window for setting more limits (i.e. PVC's, Systolic, Diastolic, etc.).

TO TURN A PARAMETER ALARM OFF

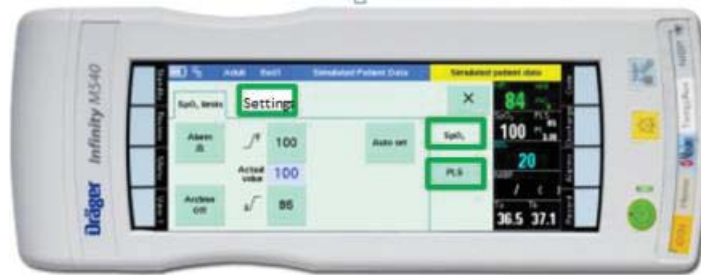
1. Touch the parameter box desired.
2. Press the **Alarm On** box and it turns **Off**

ALARM ARCHIVE

Determines what happens in response to an **Alarm**.

1. **Off** – no event is stored and no recording is generated.
2. **Record** – Stores the event for later review
3. **Store** – stores the event for later review in **Event recall**.
4. **Str/Rec** – generates a timed recording and stores the event for later review.

Parameter Specific Settings



ECG

ARR (ARRHYTHMIA) LIMITS

1. Touch **HR** parameter box > touch ARR Limits tab
2. Touch bottom most tab along right side of dialog box to scroll to the Arrhythmia limit you want to adjust (i.e. **VF, Vtach, Brady**, etc.)
3. Touch **Alarm** to choose setting: **High, Medium, Low, or Off**
4. Touch **Archive** setting for the alarm; **Str/Rec, Store, Record, or Off**.
5. Touch and adjust **Rate** and/or **Count** if ARR has adjustable settings.

TO SHOW ALL LEADS

1. Touch **Heart rate** parameter box > touch **Settings** tab.
2. Touch **Show all leads**.
3. Touch center of **All Leads** screen to view additional leads.

TO SELECT LEADS FOR PROCESSING

1. Touch **Heart rate** parameter box > touch **Settings** tab.
2. Touch **ECG 2** tab
3. Touch **ARR lead 1** to change lead assignment for channel 1,
Touch **ARR lead 2** to change the assignment for channel 2
4. Select desired lead for processing of ECG Alarms

TO SELECT PACER DETECTION

1. Touch **Heart rate** parameter box > touch **Settings** tab
2. Touch > **ECG 2** tab
3. Touch **Pacer detection – On / or Off**.

TO ADJUST QRS DETECTION THRESHOLD

1. Touch **Heart rate** parameter box > touch **Settings** tab.
2. Touch > **ECG 2** tab
3. Select Normal or *Low* QRS Threshold

**Note – Low detects QRS complexes of low amplitude.*


TO RELEARN ECG

Not available in Neonatal mode


1. Touch **Heart rate** parameter box.
2. Touch **Settings** tab > **ARR** tab > **Relearn**.

NIBP - Non-Invasive Blood Pressure



TO START A NIBP SINGLE MEASUREMENT

1. Press the **NIBP Start / Stop** fixed key .
 - Pressing the key again stops the measurement.
 - NIBP inflation limit settings - **Adult, pediatric, and neonatal** - can be selected in **NIBP** parameter box > **Settings** tab

TO SET INTERVAL TIME

1. Touch **NIBP** parameter box.
2. On **Settings** tab, Touch the **Interval time** button and select desired time interval.
3. Press **NIBP** key  to initiate cycling.
 - An interval timer bar appears in the parameter box between interval measurements and indicates interval timed BP's are in use.

TO SUSPEND INTERVAL MODE

1. Press the **NIBP** key  longer than two seconds, to set the interval to **Off**.
2. To resume interval times > reset desired interval frequency in the **Settings** tab and initiate by pressing **NIBP** key .

SpO2 Monitoring

The accuracy of SpO2 monitoring depends largely on the strength and quality of the SpO2 signal.

TO CHANGE PULSE TONE VOLUME

1. Touch **SpO2** parameter box > touch **Settings**.
2. Touch **Tone Volume** and select desired % volume.

TO CHANGE PULSE TONE SOURCE

1. Touch **SpO2** parameter box > touch **Settings**.
2. Touch **Tone Source** and select **ECG** or **SpO2**.

Note: Refer to M540 Instructions for Use manual for further device specific information for Masimo or Nellcor.

RRi - Impedance Respiration

TO RELEARN RESP PROCESSING

1. Touch **RRi** parameter box > touch **Settings**.
2. Touch **Relearn**.
3. **RRi** waveform is re-analyzed and saved as a reference for counting the Resp waveform.

TO CHANGE RESP PROCESSING MODE

1. Touch **RRi** parameter box > touch **Settings**.
2. Touch **Mode** and change to **Auto** or **Manual**.
 - o **Auto** – Optimal breath-detection threshold calculated at the beginning of RESP monitoring, or with **RESP Relearn**. Intended for patients with regular breathing patterns. **Re-**

learn the **RRi** waveform regularly to reduce artifact and optimize breath count.

- **Manual** –The monitor detects breath based on the size of the waveform. After turning on **Manual mode** adjust waveform size by touching the **Resp waveform** dialog box and adjust up or down to optimize the breath count. Intended for adult or pediatric patients whose breathing patterns show excessive variation; or for neonates whose breathing rhythms tend to be irregular, and whose signals may not be reliably detected in Auto mode.

TO ADJUST RRI WAVEFORM SIZE

1. Touch **RRi** waveform.
2. Touch **Size** and select desired amplitude.

TO DISPLAY RESPIRATORY MARKERS

1. Touch **RRi** parameter box > touch **Settings** tab,
2. Touch **Marker** and touch to turn **On**.

Note: *Respiration markers indicate the time of breath detection. A white vertical line displays on the Resp waveform where each breath is detected.*

TO CHANGE RRc APNEA TIME

1. Touch **etCO2** parameter box > touch **Settings** tab
2. Touch RRc **Apnea Archive**.
3. Select time duration of apnea event for an alarm to occur.

Mainstream etCO2 Monitoring

CONNECTING THE CO2 SENSOR

1. Connect yellow end of CO2 sensor cable to yellow CO2 connector on M540.
2. Insert correct airway adapter for patient between endotracheal tube adapter and the ventilator Y-piece.

3. Snap the CO₂ mainstream sensor firmly onto the airway adapter and make sure the cable is directed away from the patient.

Note: Always position the sensor windows of the airway adapter vertically to prevent patient secretions from obscuring the adapter window.

ADJUST GAS COMPENSATION

Compensates for supplemental O₂ 50% or greater, N₂O, or Heliox. Failure to adjust compensation can cause inaccurate measurements.

1. Touch **etCO₂** parameter box > Touch **Settings** tab
2. Touch **Gas compens.**
3. Select correct compensation.

TO CHANGE RR_c APNEA TIME

1. Touch **etCO₂** parameter box > touch **Settings** tab
2. Touch RR_c **Apnea Archive**.
3. Select time duration of apnea event for an alarm.

TO ZERO CO₂

1. Touch **CO₂** parameter box > touch **Settings** tab.
2. Touch **Zero**. Replace sensor when "**Zero accepted**".

Note: Only zero a Draeger sensor when the measurement value is suspect, or when you are prompted to re-zero. The sensor must be removed from the airway adapter before zeroing. The sensor is zeroed in room air.

12 Lead Monitoring

Requires an additional 4 lead wire set be added to an existing 6 lead set, and 12 lead option must be enabled.

TO OBTAIN A DIAGNOSTIC 12-LEAD REPORT

1. Touch **ECG** parameter box > touch **Settings** tab.
2. Press **Rest ECG setup**, enter patient **gender** and **race**.
3. Press **Rest ECG report**.

OR

1. Press **Menu** function key.
2. Press **Rest ECG report**.

Invasive Pressures

Connect Dual Hemo MCable, Quad Hemo or Hemopod to gray Invasive Blood Pressure connector on end of M540. Attach Transducer to Transducer adapter cable. Assign correct label for invasive line.

TO ASSIGN/CHANGE A PRESSURE LABEL

1. Press **Menu** function key.
2. On **Main** settings tab, touch **Label IBP**.
3. Touch the new pressure name (ART, CVP, PA, ICP, GP1, GP2, GP3, etc.) Each label can only be used once.

TO ZERO AN INDIVIDUAL TRANSDUCER

1. Prior to zeroing, align the transducer **stopcock** to the level of the heart (phlebostatic axis point, fourth intercostal space at mid-axillary line), or other appropriate zero level depending on parameter, i.e. ICP.
2. Touch parameter box of the desired pressure to zero.
3. Touch **Settings** tab.
4. Open that transducer to air and off to the patient.
5. Press **Zero**.

TO ZERO ALL TRANSDUCERS

1. Touch **Zero all** button on Hemopod, QuadHemo, or on C700/500.
 - Zeroes all transducers open to air sequentially.

Note: *IBP Alarms are silenced for 30 seconds for all open transducers*

HEADQUARTERS

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The quality management system at Draeger Medical Systems is certified according to ISO 13485, ISO 9001 and Annex II.3 of Directive 93/42/EEC (Medical Devices).