

Non-Invasive Blood Pressure

Clinical Troubleshooting Guide

For Dash* and Solar* devices

Oscillometric technology overview

GE Healthcare's patient monitors use the GE DINAMAP* oscillometric non-invasive blood pressure (NIBP) technology. This technology is an indirect measure of cuff pressure oscillations that are caused by the changes in arterial volume during cuff deflation. The GE DINAMAP algorithm utilizes a step deflation process and requires at least two matching oscillations per step deflation to determine mean arterial blood pressure, systolic and diastolic blood pressure values.

Influences of obtaining an accurate non-invasive blood pressure reading

Certain clinical scenarios and applications should be considered when troubleshooting NIBP inaccuracies and/or error messages:

- Awareness of physiological patient factors
 1. Patient movement (e.g., shivering)
 2. Low blood pressures and/or the presence of arrhythmias may cause low pulse pressure
 3. Drug therapies
 4. Hypovolemia
- Worn cuffs and cuff hoses
- Compromised blood pressure hose, cuff tubing and connections
- Improper sizing and placement of cuff. see Figure 1

Improper placement

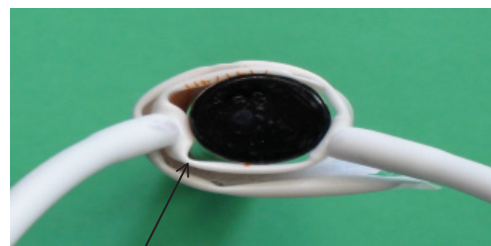


Figure 1. Improper placement (e.g., loose cuff) can cause erroneous readings.

Optimizing NIBP readings

- Use the correct sized BP cuff and ensure proper cuff placement. see Figure 2 and refer to IFU - Instructions for Use
- Ensure the monitor's target inflation pressure is set correctly (refer to the device's Operator's Manual)
- Ensure the air hose is seated properly in the monitor, and the connection between the cuff and hose is secure
- Ensure there are no air leaks in cuff and/or hose
- Encourage the patient not to move during the measurements
- Do not attempt to obtain a BP reading while turning the patient, suctioning a patient's airway or other procedures that could introduce artifacts

Proper placement

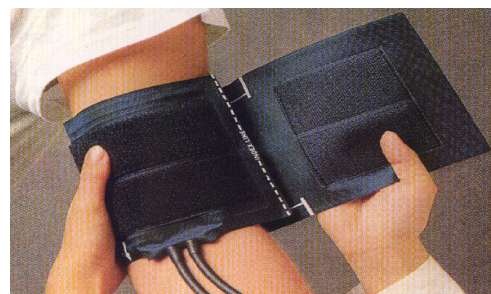


Figure 2. Arrow on cuff aligns with patient's artery, falls within range of cuff.



Troubleshooting

There are circumstances when additional troubleshooting may be required. Below are some suggested troubleshooting techniques for oscillometric technology:

- Start BP procedure over – Disconnect the hose from the monitor, squeeze out any air in the cuff, check the connections of the cuff tubing to the hose, reconnect hose to the monitor, then reapply the cuff. Consider placing the cuff on an alternate location
- Decrease the target inflation pressure on the monitor (refer to the monitor's Operator's Manual)
- Observe if the patient is shivering or experiencing other movement, and try to minimize, if possible
- Observe the patient's ECG rhythm, remembering arrhythmias may interfere with blood pressure readings
- Assess patient's perfusion, knowing poor circulation may interfere with readings
- When the monitor is not able to obtain a reading, check the patient's pulse and consider alternate BP measurement methods (e.g., auscultatory (manual), Doppler, or use of an arterial line)
- For the error message "No Determination" and "Pump Timeout":
 - Verify cuff placement and try a manual measurement
 - Check connections between hose and monitor, and hose and cuff tubing
 - Verify the patient is not moving excessively or experiencing an arrhythmia condition and try a manual measurement

Refer to the Operator's Manual for additional error messages and troubleshooting.

Determining mean arterial pressure (MAP)

There are three commonly used methodologies to determine blood pressure values:

- **Auscultatory** (Figure 1) – Blood pressure values (systolic and diastolic) are values measured by a clinician and, with the use of the formula $(2 \times D) + S/3$, the clinician can calculate an estimation of the MAP
- **Oscillometric** (Figure 2) – Blood pressure values (systolic, diastolic and mean arterial) are values determined by the GE DINAMAP algorithm:
 - MAP – Measures maximum oscillation amplitude to determine MAP
 - Systolic – Reviews oscillation amplitude above MAP at about 0.50 to obtain systolic value
 - Diastolic – Reviews oscillation amplitude below MAP at about 0.625 to obtain diastolic value
- **Arterial** (invasive and direct) – Blood pressure values (systolic, diastolic and mean arterial) are values calculated on a beat-by-beat basis based on the monitor's invasive blood pressure algorithm

Refer to monitor's Operator's Manual for detailed instructions.

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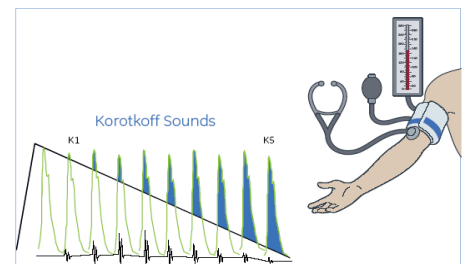


Figure 1. Auscultatory (manual) method

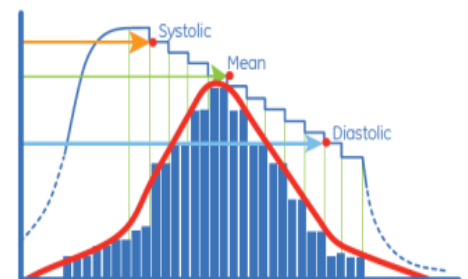


Figure 2. GE DINAMAP technology

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