5 Alarms and Alerts

Overview

An **Alarm** warns of a patient condition, such as a vital-sign reading that is outside of acceptable limits. When an alarm occurs, the red light on the monitor flashes and the numerics of the violating alarm limits on the display turn red. If tones are not suspended, the alarm tone sounds.

An **Alert** warns of an equipment condition, such as a low battery or a detached lead. When an alert occurs, the yellow light on the monitor flashes and a message describing the error condition appears on the display. If tones are not suspended, the alert tone sounds.

Alarms have priority over alerts. If an alarm and an alert are detected simultaneously, the monitor notifies you of the alarm. It then notifies you of the alert only if the alert condition still exists after the alarm condition is removed.

Silencing an Alarm or Alert Tone

A tone sounds whenever the monitor detects an alarm or alert condition.

To Silence the Currently Sounding Tone for 90 Seconds
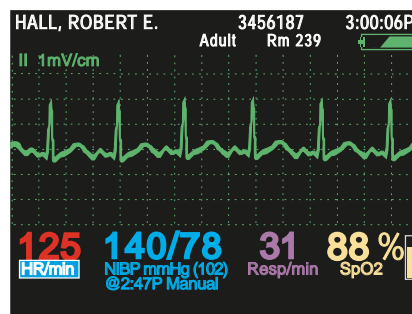
1.   Press ⌁.

Note   Silencing the tone does not affect the other alarm or alert indicators.

- The red light (alarm) or the yellow light (alert) flashes.
- After 90 seconds, if the condition is not corrected, the tone starts again.
- If the condition is corrected within 90 seconds of silencing the tone, the monitor resets the tones for the next alarm or alert.

If a new alarm or alert condition occurs while an earlier alarm or alert is silenced, the tone sounds again.

Figure 84. Sample Alarm Screen

Figure 85. Sample Alert Screen
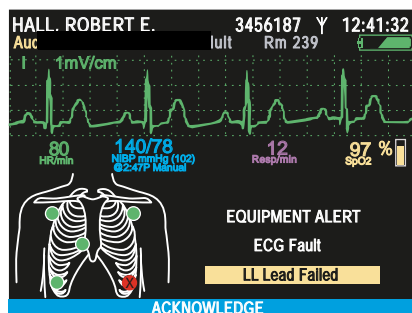
2.   Check the patient and provide appropriate care.

3. Press ⅍ to silence the audible tone for 90 seconds at the monitor and at Acuity.

   • Silencing the audible tone does not remove visual alarm or alert indications.

   • Silencing the audible tone causes an alarm or alert suspend at Acuity.

   • When the alarm or alert condition is corrected, all alarm or alert indicators cease and all alarms are immediately rearmed.

4. After caring for the patient, verify that alarm limits are enabled and correctly set.

⚠ **WARNING**   If you turn off or modify any alarm limits while responding to an alarm, restore the appropriate alarm limits before you resume monitoring.

Suspending the Alarm Tone

If this feature is enabled in the monitor configuration (See "Monitor Configuration" on page 111), you can suspend all alarm tones for all parameters—preventing the alarm tone from sounding if an alarm condition occurs—while monitoring a patient. If an alarm condition occurs while the alarm tones ars suspended, the monitor presents visual alarm indicators but does not sound the tone.

In the monitor configuration, the alarm tone suspension period can be set to **Disabled**, to **Always On**, or to a period: **90 sec** or **2**, **3**, **4**, **5**, **10**, **15**, **30**, or **60** minutes.

**Note**   The factory default suspension period is **4 minutes**.

   • If it is configured to **Disabled**, you cannot suspend the alarm tone at the monitor.
   • If it is configured to **Always On** and you set **Suspend Audible Alarms** to **On**, then the alarm tone remains suspended until:
      • you set **Suspend Audible Alarms** to **Off** or
      • monitor power is turned off and then turned on again or
      • the monitor is reconfigured

Note   **Suspend Audible Alarms** does not affect the behavior of the **alarm silence/ reset** feature (⅍). Pressing ⅍ always either silences a sounding alarm tone for 90 seconds or resets the audible alarm if it was already silenced.

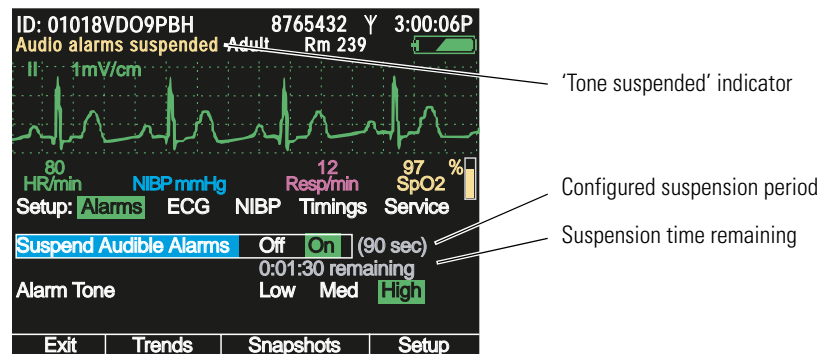**To Suspend the Alarm Tone**

1. Access the Setup menu. (See "To Access the Setup Menus" on page 38.)

2. Highlight **Suspend Audible Alarms** (Figure 86).

   The configured suspension period—90 seconds in this example—is displayed to the right of the line.

Figure 86. Suspend Audible Alarms: Off
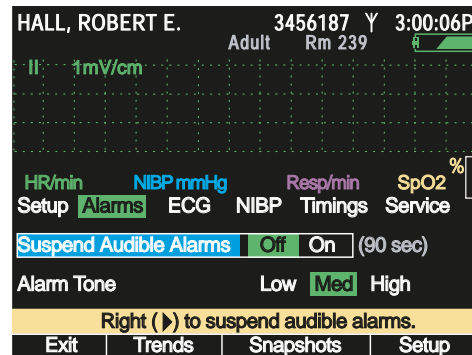
3. Highlight **On** (Figure 87).

Note If audible alarms are suspended, pressing ⅀ cancels the suspension.

Figure 87. Suspend Audible Alarms: On

'Tone suspended' indicator

Configured suspension period

Suspension time remaining

- The alarm tone is suspended immediately.

  If an alarm condition occurs during the suspension period, the alarm tone does not sound.

- A count-down timer appears below the line to indicate the <u>time remaining</u> in the suspension period.

- 'Audio alarms suspended' appears in yellow in the upper left corner of the screen.

- When the suspension period elapses, the alarm tone is again enabled.
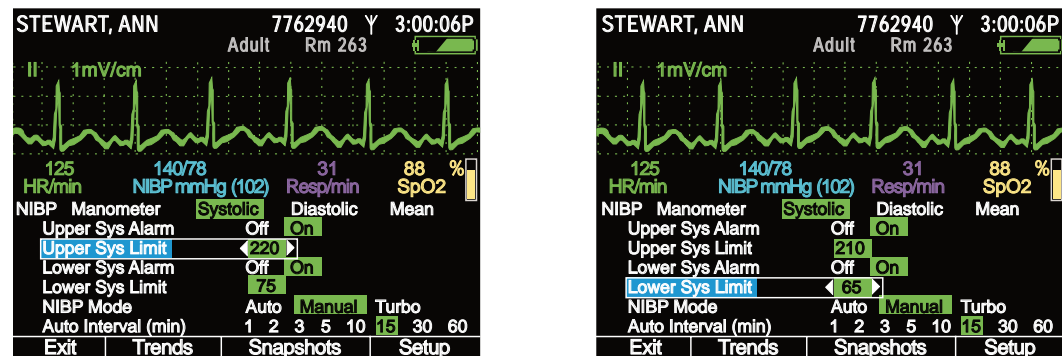
Customizing Alarm Limits

At the Monitor

Typically, each institution defines the patient alarm limits for adult, pediatric, and neonatal patients, and then configures the monitor with those alarm limits before putting the monitor into service.

Alarm limits can be temporarily customized for an individual patient while the monitor is in use. Later, when the monitor is turned off in preparation for monitoring another patient, the temporary alarm limits are lost and the configured alarm limits are restored.

To Temporarily Customize Alarm Limits for the Current Patient

1. Highlight the vital sign for which you want to set custom limits.

2. Press ⦿.

3. Highlight the limit you want to change.

4. Set a new alarm limit.

Figure 88. Customizing Alarm Limits for the Current Patient

5. Press ⦿.

At Acuity

For a wireless monitor, patient alarm limits can also be customized from Acuity. (See the user manual for any Acuity Central Monitoring Station.)

About ParamSet

Using ParamSet, you can quickly widen the alarm limits by a configured percentage (relative to the patient's alarming reading) for any vital sign.

For information about ParamSet, see "ParamSet" on page 154.

Responding to an Alarm

An alarm condition is indicated on the monitor in the following ways:
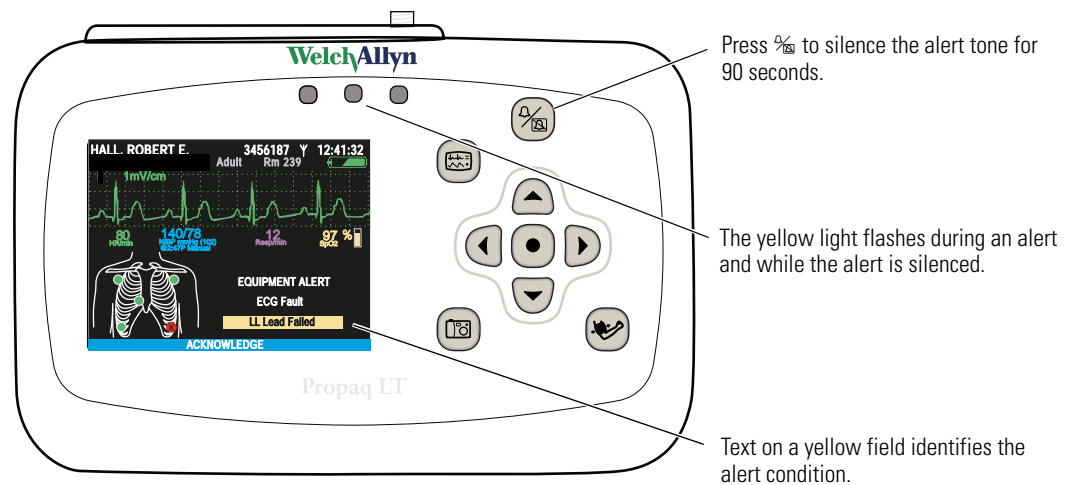
- The RED indicator (rightmost of three) above the display screen flashes.
- The numerics for the vital sign in alarm are displayed in RED.
- The alarm-tone sequence sounds repeatedly—3 short tones, a short pause, 2 short tones, and a long pause.

Responding to an Alert

An alert condition ("Overview" on page 85) is indicated on the monitor in the following ways:

- A flashing yellow light above the monitor display.
- A yellow alert message on the monitor display (for example, NO ECG CABLE DETECTED).
- Repeated sounding of the alert-tone sequence (if tones are not suspended): 3 long tones and a pause.

Figure 89. Example Alert Screen

Press 🔔 to silence the alert tone for 90 seconds.

The yellow light flashes during an alert and while the alert is silenced.

Text on a yellow field identifies the alert condition.

To Respond at the Monitor to an Alert

1. Press ⅔☒ to silence the tone for 90 seconds; press ⊙ to clear the alert.

2. Troubleshoot and correct the problem. (See "Alert Messages and Status Messages" on page 92.)

To Respond at Acuity to an Alert

For a monitor in communication with Acuity, alarms and alerts can be detected by either the monitor or Acuity, and are displayed in both places. See *Acuity Directions For Use*.

About Battery Charge Status

Table 8. Battery Status Indicators

Display	Status/Alert Text	Battery	Monitor	Recommended Action
Green	(none)	Fully charged	Okay	None
Green		Partially full	Okay	None
Green		Partially full; charging	Okay	None
Yellow	EQUIPMENT ALERT Low Battery. Charge battery soon.	Low	Can function for up to 30 minutes, but NIBP is disabled.	Prepare to discontinue monitoring. If possible, insert the monitor into a cradle.
Yellow		Low; charging	Normal function.	Do not remove the monitor from the cradle.
Red	EQUIPMENT ALERT Battery Too Low. Shutting down.	Almost completely discharged	Shutting down soon. Can function for up to 5 minutes, but NIBP is disabled.	Prepare to discontinue monitoring. If possible, insert the monitor into a cradle. If this indicator appears when the monitor is in a powered cradle, then the battery is damaged and must be replaced. In this case, all stored patient data will be deleted when the monitor is removed from the cradle.
Red		Almost completely discharged; charging	Normal function.	Do not remove the monitor from the cradle.

Alert Messages and Status Messages

Table 9. Alert Messages and Status Messages

Alert Type	Message	Possible Cause and Suggested Response
ECG	ECG Fault. *XX* lead failed.	Lead *XX* (LA, LL, RA, C, or RL) has very poor contact or no contact with the patient. Check for proper connection and replace the electrode if needed.
	ECG Fault. *XX, XX* leads failed.	Leads *XX* and *XX* (any two leads on a 5-lead cable) have very poor contact or no contact with the patient. Check for proper connection; replace electrodes if needed.
	ECG Fault. Multiple lead fail.	At least three leads of a 5-lead cable or at least two leads of a 3-lead cable have very poor contact or no contact with the patient. Check for proper connection; replace electrodes if needed.
	ECG Fault. Excessive offset.	At least one channel has excessive offset. At least one electrode is old, contaminated, or defective. Replace the electrodes.
	ECG Fault. Cable disconnected.	The ECG cable is unplugged.
NIBP	NIBP Fault. Air leak. Check hose.	The monitor could not properly inflate the cuff. Check the hose and cuff for leaks.
	NIBP Fault. Kinked hose. Check hose.	The monitor could not properly inflate the cuff. Check for a hose kink between the monitor and the patient.
	NIBP Fault. Overpressure condition.	The pressure in the cuff exceeded the acceptable limits for the current patient mode. Check the hose and retry the measurement.
	NIBP Fault. Weak Pulses. Can't find Sys/Dia.	Not enough pulses to determine the systolic or diastolic pressures, but a mean pressure is available. Squeeze all air from the cuff and reapply it.
	NIBP Fault. Artifact. Can't find Sys/Dia.	The systolic or diastolic pressures are unreliable due to artifact, but a mean pressure is available. Usually caused by patient motion.
	NIBP Fault. No pulses detected.	The cuff might not be properly applied to the patient, or the patient might not have detectable pulses due to shock or arrhythmias. ⚠ **WARNING** The monitor cannot determine whether this alert has a physiologic cause or a cuff application cause. Always evaluate the patient for presence of life-threatening conditions when this message occurs.
	NIBP Fault. Connect ECG to reduce NIBP artifact.	NIBP artifact prevents a valid reading. Connect ECG electrodes to improve NIBP measurements. (See "Improving NIBP Accuracy with Smartcuf" on page 71.)

Table 9. Alert Messages and Status Messages (continued)

Alert Type	Message	Possible Cause and Suggested Response
	NIBP Fault. No valid blood pressure found.	The patient mode setting is incorrect or the wrong hose or cuff is being used for the current patient mode.
	NIBP Fault. Calibrating. Please wait.	The monitor periodically calibrates (zeroes) the NIBP channel to make sure it can properly make NIBP measurements. No NIBP monitoring can be done until the calibration is completed. Other normal monitor operation continues during NIBP calibration.
	NIBP Fault. Calibrating. Minimize motion.	Motion is detected during a periodic NIBP calibration. Minimize patient motion or motion on the cuff, or disconnect the cuff. Motion-generated noise on the pressure transducer can cause the calibration to continue indefinitely.
	NIBP Fault. Low battery. NIBP disabled.	The battery is too far discharged to operate the NIBP channel. Insert the monitor into a powered cradle.
	NIBP Fault. Service required. NIBP disabled.	Have the monitor serviced.
	NIBP Fault. Kinked or neonate hose.	A hose is kinked or a neonate hose is detected in the adult patient mode. Check the hose and the patient mode selection.
	NIBP Fault. Artifact present. Minimize motion.	The monitor has detected too much artifact to allow accurate readings. Take steps to reduce artifact. Position the patient's limb away from the body so the applied cuff is not in contact with the patient's body or any other object such as a bed rail.
Network Communication	Comms Fault. Check Acuity/network connection.	The monitor detects a network communication problem.
	Comms Fault. Check USB connection.	The monitor detects a problem in communication with the cradle. Detach and reattach the USB cable.
	Not on Network. Patient info entry not allowed.	You attempted to select the Name, ID, or Rm field on an Acuity-enabled monitor that is not connected to the network.
Battery	Low Battery. Charge battery soon.	The monitor battery charge is low, and the monitor will shut down in 30 minutes or less. Insert the monitor into the cradle. If no cradle is available, find an alternative method of monitoring the patient before the monitor shuts down.
	Very Low Battery. Charge battery now.	The monitor battery charge is very low; the monitor will shut down in 5 minutes or less. Insert the monitor into a cradle or find another way to monitor the patient before the monitor shuts down.
	Battery Too Low. Shutting down.	The monitor battery charge is too low to support monitor function. Monitor operation can continue only after the battery is recharged or replaced or until the monitor is inserted in a powered cradle.

Table 9. Alert Messages and Status Messages (continued)

Alert Type	Message	Possible Cause and Suggested Response
Charger	Charger Fault. Service charger.	Service required.
	Charger Disabled. Battery temperature too high or low.	The battery is too cold or too hot to charge. Normalize the battery temperature before attempting to charge it.
	Battery Fault. Replace battery.	The battery is missing; the battery is discharged too far to be charged; the charger has timed out; a cell in the battery pack is overcharged due to cell imbalance; the fuse is blown. Service required.
SpO$_2$	SpO$_2$ Fault. No sensor detected.	An SpO$_2$ sensor has been disconnected from the monitor after being connected for more than a few seconds.
	SpO$_2$ Fault. Defective SpO$_2$ sensor.	Replace the sensor.
Resp	Resp Fault. Lead fail.	One or more electrodes have very poor or no contact. Check for proper connection; replace electrodes if needed.
	Resp Fault. Noisy signal. Check electrodes.	Electrodes have poor contact and might be dried out. Replace electrodes.
	Resp Fault. Inappropriate ECG cable.	The ECG cable does not contain 1 kΩ current-limiting resistors, which are required for Resp operation and to protect the monitor from damage during defibrillation. Replace the cable with one of the proper type.
General	Multiple Faults.	Multiple equipment alerts have been triggered simultaneously. ⚠ **WARNING** If you acknowledge this alert message before determining which alerts are triggered, you cannot identify individual alerts.