Philips IntelliVue Patient Monitor
ST Segment Monitoring Quick Guide

With the development of continuous ST segment monitoring, ECG monitoring can be used to detect ST changes which may be ischemic episodes.

Indications for ST Segment Monitoring

According to Practice standards for electrocardiographic monitoring in hospital settings:

Class I
- Patients in early phase of acute coronary syndrome.
- Patients who present to the ED with chest pain or anginal equivalent symptoms.
- Patients who have undergone non-urgent percutaneous coronary intervention with suboptimal angiographic results.
- Patients with possible variant angina resulting from coronary vasospasm.

Class II
- Patients with post-acute MI.
- Patients who have undergone non-urgent uncomplicated percutaneous coronary intervention.
- Patients at high risk for ischemia after cardiac or noncardiac surgery.
- Evaluating intra- and post-operative ischemia for cardiac and high risk surgical procedures.

ECG Signal Quality

A clean signal is integral to accurate ST segment monitoring. It is important to minimize or eliminate factors that create electrical noise, baseline wander, muscle artifact, or 60 Hz interference.

To switch ST On or Off

1. In the Setup ECG menu, select ST Analysis to go to the Setup ST Analysis menu.
2. Select ST Analysis to toggle between On and Off.

ST Segment Measurement

The current standard of determining the ST segment measurement is by measuring the voltage difference between the value at a point 60 to 80 milliseconds after the J-point and the isoelectric baseline. The isoelectric baseline is either between the P- and Q-waves (P-R interval) or in front of the P-wave. ST segment changes of greater than one millimeter are generally considered significant.

![ST Segment Measurement Diagram]

1. In the Setup ECG menu, select ST Analysis to go to the Setup ST Analysis menu.
2. Scroll to Setup ST Leads - leads chosen for ST monitoring are listed here. There are two pop-up keys at the bottom of the screen: Add and Delete.
3. Select the Add key to open the lead Choices list. Any lead already selected will be greyed out. The Add key will be greyed out if all leads are already selected.

Adjusting ST Measurement Points

When starting continuous ST Segment monitoring, you should check and adjust ST Measurement points. The ISO-electric point, J-point and the ST measurement point are positioned in milliseconds relative to the R-wave and shown in milliseconds. Measurement points may need to be adjusted if QRS interval is prolonged, PR interval is shortened, ST Segment is shortened.

Depending on your monitor’s configuration, the ST point can be positioned either relative to the J-point or directly by selecting a numeric value for the ST point.

To adjust the ST measurement points

1. In the Setup ST Analysis menu, select Adjust ST Points to open the Adjust ST Points window.
2. Select a suitable ECG lead for ST measurement, with a visible J-point and a visible P wave.
3. Select the point you need to adjust by touching the appropriate point on the screen or use the Select Point popup key to highlight the point. The current choice is highlighted (ISO point -80 in the screen example).
4. Use the right or left arrow keys to move the measurement point. To adjust the ST-point use the arrow keys: left arrow for J+60, right arrow for J+80.
5. Select Apply Changes to activate the new measurement points.
Position the ISO-point in the middle of the flattest part of the baseline (between the P and Q waves or in front of the P wave).

Position the J-point at the end of the QRS complex and the beginning of the ST segment.

Position the ST-point at the midpoint of the ST segment.

**ST Measurement Values**

ST measurement values are reported in millimeters, because the standard diagnostic ECG strips are plotted at a scale of ten millimeters per millivolt. A positive value represents an ST elevation and a negative value represents an ST depression.

**ST MAP**

The monitor can derive a Multi-Axis-Portrait (MAP) from the ST analysis to help you detect changes in ST values. It displays two planes from a multi-lead ECG in a multi-axis diagram, where each axis represents a lead. Each ST value is assigned to either a limb lead or to a chest lead. The MAP shading is shown in the same color as the ECG measurement. The ST MAP can be embedded on the display screen and opened to a larger window.

**To change ST Alarm Limits**

ST alarms are yellow limit alarms. You can choose to alarm for an ST Lead or multiple ST leads.

1. Select ST Alarm Mode.
2. Select Single ST or Multi ST.
3. Select the lead alarm to be adjusted.
4. Select the appropriate high/low limit.

If auto limits are configured for ST, you can select narrow (+/- 1 mm) or wide (+/- 2 mm) limits to adjust all leads from the current values in the Alarm limits window.

**ST Reference Baseline**

The first baseline is stored automatically after ST monitoring is started and all the leads selected or when a new patient is admitted. Baseline information is stored only for leads available and without noise. If a lead is not available at the time of baseline storage there will be no baseline until a new baseline is saved. The ST baseline is stored as both numeric values and ST snippets and displayed in yellow.

**To update ST baselines**

1. Select an ST snippet to open the ST Baseline window or select ST values to open the Setup ST Analysis menu and then select ST Baseline.
2. In the ST Baseline window, select Update Baseline to store all current snippets and values as baselines. This deletes all previously-stored baselines.

An ST baseline copy is also stored in the MMS, for transport purposes.

**To display the ST MAP window**

1. Select ST MAP on the display or
2. Select ST MAP SmartKey if configured or
3. Select Setup ST Analysis menu and then select ST MAP.

The ST MAP can be viewed with the current values mapped or with the trended data mapped on the axis. The Trend View displays up to four trended ST MAPs, the current MAP and the baseline MAP if show baseline selected. The most current MAP is in the same color as the ECG. Past values change from white to dark gray. The time interval between the MAPs is between 12 seconds and 30 minutes.

In addition, you can display the ST reference baseline values on the ST MAP.

**To change the ST MAP view**

1. Open the ST MAP window.
2. Select Size Up to increase the size of the MAP and decrease the size of the scale (1 - 15 mm).
3. Select Size Down to decrease the size of the MAP and increase the scale.
4. Toggle between Show Baseline and Hide Baseline to display or not display the yellow baseline MAP.
5. Toggle between Current Trend and Trend View.
6. In Trend View you can select Select Interval.
7. Select an interval from the list: 12 sec, 1 min, 5 min, 15 min, or 30 min.