



12RL ECG

Reconstructed 12-lead ECG Monitoring

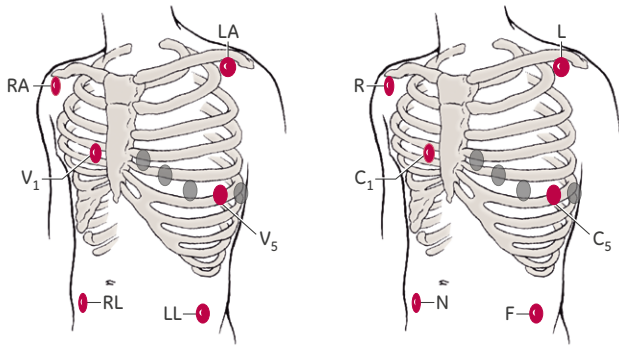


What is 12RL technology?

Continuous ECG monitoring requires a balance of patient comfort, monitoring information and clinician workload. More electrodes on the patient result in more information being available to the clinician. However, this may result in patient comfort and clinician workload being compromised. The value of 12-lead ECG monitoring, requiring 10 electrodes, is in its ability to detect arrhythmias and acute myocardial ischemia.¹

Placing 10 electrodes on a patient often requires too much work when compared with the benefit and extra maintenance required. Sometimes it can even be impossible due to treatment the patient has already received or is due to receive.

The 12RL™ technology provides 12-lead view, 12-lead ST monitoring and global QT/QTc interval measurement using a reduced leadset. It means **only six electrodes** in standard placement (RA, RL, LA, LL, V1 and V5) are required.



6 Lead Configuration AHA

6 Lead Configuration IEC

Precordial electrodes V2, V3, V4, and V6 are not needed. Instead, these waveforms are reconstructed using data derived from the other, directly recorded, ECG leads. The calculated waveforms are displayed as dV2, dV3, dV4, and dV6.



All 12 waveforms on the monitor screen. Leads dV2, dV3, dV4 and dV6 are not directly measured but reconstructed from the information recorded from the other ECG leads.

Accuracy in clinical practice

It has been shown that observations were identical between 12RL and standard 12-lead ECGs for the following: tachycardia, bundle branch and fascicular blocks, left atrial enlargement and the distinction of ventricular tachycardia from supraventricular tachycardia with aberrant conduction². The same study also found 99% agreement for prior anterior MI and 95-99% agreement for diagnosis of acute MI.

These results compare favorably with expected accuracy of standard 12-lead ECG, which means 12RL is appropriate for detecting cardiac abnormalities in hospitalized patients.

When to use 12RL

Using 12RL technology is a lot like using a standard 12-lead ECG. 12RL enables 12-lead ECG monitoring on patients when a conventional 12-lead ECG is not practical since some precordial leads may block the echocardiographic transducer location or be in the way for defibrillator pads. 12RL provides 12-lead ECG monitoring for a larger patient population.

Since 12RL technology uses the standard electrode positions, switching from 12RL ECG to conventional 12-lead ECG just requires adding four electrodes.

Where the current standard of care monitoring may be utilizing five electrodes, adding one more chest electrode would mean that clinicians could obtain the benefits of 12RL technology.

What you need

12RL technology requires a six leadwire set and a corresponding trunk cable in order to obtain the ECG signal.

Va and Vb must be identified as V1 and V5 in the monitor and properly placed in V1 and V5 electrode locations to enable the 12RL functionality. If this is not the case, the monitor will just show eight leads and not calculate or show V2, V3, V4 and V6 waveforms.

Why 12RL uses V1 and V5

Lead V1 is one of the best leads for identification of P-waves, is important for accurate rhythm analysis and provides critical information in distinguishing:

- Ventricular tachycardia (VT) from supraventricular tachycardia (SVT)^{1,2}
- SVT with aberrancy^{1,2}

Lead V5 is valuable in detecting MI² and helps to provide coverage of the anterior and lateral walls of the heart.

On the other hand, there are reasons for not using other precordial leads for 12RL:

- The location for lead V2 conflicts with the preferred location for an echocardiography transducer²
- Leads V3 and V4 may obstruct the placement of defibrillator pads²

Calculating the other four precordial leads from V1 and V5 can be done with very little error.²

ECG reports

The clinician can generate a standard 12-Lead ECG report with measurements calculated by the GE 12SL™ ECG analysis program, including:

- Ventricular rate
- PR interval
- QRS duration
- QT/QTc intervals
- Axis

Additionally, reports state “leads V2, V3, V4 and V6 are interpolated” to clarify that these leads are not directly acquired. 12RL reports do not contain interpretations of rhythm, morphology or classification.



A view of a 12RL report on the monitor screen

As with all patient monitoring, 12RL ECG needs to be used in conjunction with the patient's clinical history, symptoms and other diagnostic tests for clinical judgement. 12RL ECG is intended for use in the general adult patient population in a monitoring environment.

- ¹ Drew, B. J. Celebrating the 100th birthday of the electrocardiogram: Lessons learned from research in cardiac monitor. *American Journal of Critical Care* **11**, No. 4 (July 2002)
- ² Drew, B. J., et. al. Comparison of a new reduced lead set ECG with the standard ECG for diagnosing cardiac arrhythmias and myocardial ischemia. *Journal of Electrocardiology* **35**, (Supplement 2002)



Imagination at work

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