

Leads and placement

Lead	Electrodes	Lead	Between
I	RA and LA	aVR	RA and the midpoint of LA/LL
II	RA and LL	aVL	LA and the midpoint of RA/LL
III	LA and LL	aVF	LL and the midpoint of LA/RA

Joining the positive ends of I, II and III makes the **Einthoven triangle**. Ten electrodes produce twelve leads; **the right leg is the ground**.

Lead	Placement	Color
V1	4th intercostal space, right sternal edge	Red
V2	4th intercostal space, left sternal edge	Yellow
V3	Midway between V2 and V4	Green
V4	5th intercostal space, midclavicular line	Blue
V5	Level with V4, anterior axillary line	Orange
V6	Level with V4, midaxillary line	Purple

Reversed leads: arms reversed makes P, QRS and T all negative in Lead I. Left arm and left leg reversed inverts Lead III and makes P larger in Lead I than Lead II.

Artifacts

Artifact	Looks like	Cause	Fix
Wandering baseline	Baseline drifts up and down	Oily skin or lotion, dried-out electrodes, bony placement, breathing	Alcohol and dry, abrade, replace electrodes, baseline filter
Somatic tremor	Jagged peaks, uneven heights	Shivering, Parkinson disease, talking, unsupported limbs	Warm and relax the patient, larger table, tremor filter
AC (60-cycle) interference	Row of small spikes, thick tracing	Nearby electronics, bundled lead wires, cord under the table, a phone in a pocket	Unplug the machine, remove devices, separate the lead wires
Interrupted baseline	Normal, then gone or erratic	Loose or broken cable or lead wire	Check every attachment; have a spare cable