

SETTING THE NEUTRAL

TECHNICAL NOTE ■ STA BE 16-18 GB

AT REST

There are various methods to determine the neutral line of a machine.

This is the line where the tension between collector bars is theoretically equal to zero and on which brushes should be set.

The method which seems to be preferred by most users, because of its precision and relative simplicity, is the millivoltmeter one. It's applicable to all uni-directional machines and from which the armature does not have any dead section.

Here is the principle:

GRAPHICAL METHOD

Machine at rest, armature disconnected and locked and all the brushes raised:

Determine the number of bars between poles by dividing the total number of bars of the commutator by the number of poles of the machine.

Two cases are possible:

- a) When the number of bars between poles is a whole number N .
 - Number the commutator bars from any point situated to the left of a brush on one arm (beginning by zero), to a symmetric point on the right of the brush of the following arm.



- The main poles are now fed with direct current* regulated to a low value.
- When briskly breaking the main pole current, measure with a millivoltmeter of appropriate sensitivity, the voltage between the bars numbered 0 and N , 1 and $N + 1$, 2 and $N + 2$, etc.

* Or an alternating current sufficient to deflect an AC millivoltmeter with appropriate capacity and sensitivity. The method gains in precision and in simplicity because the interruption necessary with DC is avoided when using alternating current.

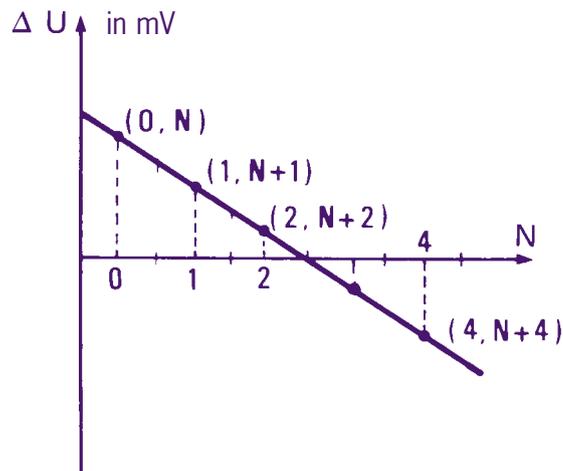
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- The voltages thus measured are plotted on a graph against the numbers of the corresponding bars and the neutral point is at the intersection of the curve with the horizontal abscissa.

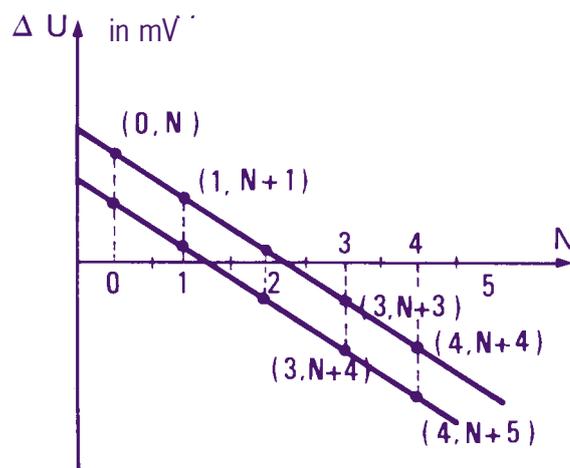


- b) When the number of bars between poles is fractional.

- The bars are numbered and the main poles are fed with direct current (or AC) as in the preceding case.
- By interrupting the main pole current, the voltage is measured between the groups of bars:

0 and N	0 and N + 1
1 and N + 1	1 and N + 2
2 and N + 2	2 and N + 3, etc.

then the graph $\Delta U = f(N)$ is drawn.



The neutral point is determined by interpolation between the intersection of the two voltage drop curves with the horizontal abscissa.

SIMPLIFIED METHOD

The following modifications render a result a little less accurate but much quicker:

– **Machine at rest, armature disconnected and locked.**

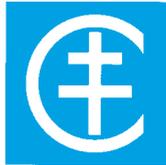
- The poles are fed with low voltage alternating current rendering unnecessary the switching required when using D.C.
- The brushes are left in place on the commutator.
- The millivoltmeter is connected to the terminals of the armature. Rotate the brush holder ring until the millivoltmeter set to its most sensitive scale shows a minimum reading.

In each instance it is advisable to repeat the operation for two or three different positions of the armature. It is useful in practice to mark the yoke indicating the best brush rocker position for each measurement.

This will result in a series of marks surrounding the true neutral position or they may coincide.

Repeating the process by moving the rocker in the opposite direction will produce a point coincident with the first series. This will be the neutral.





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