Term Explanation

1. Electrode Plates (Rotor and Stator)

POLYVARICON is so constructed as to vary the capacitance by changing the opposing areas of the electrode plates composed of parallel planes.
The electrode plate that rotates in direct coupling with the rotary shaft of the variable capacitor is called the rotor which is connected to the grounding terminal of the variable capacitor. The opposing electrode plate is fixed and is known as stator. It is connected with the various stages of the variable capacitor.

2. Dielectric

The capacitance (C) between the parallel plane electrodes is indicated by the equation given below.

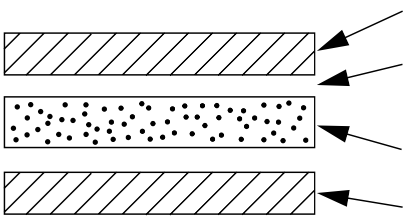
Capacitance $C=\frac{kS}{D}$

where k : Constant
S : Opposing areas of the electrode plates
D : Effective interelectrode distance

Higher capacitance can be obtained by narrowing down the effective interelectrode distance.

Effective interelctrode distance $D=Ga+\frac{t}{\varepsilon}$

where Ga : air gap
ε : dielectric constant
t : dielectric plate thickness



Using polyethylene film as dielectric for the purpose of shortening the effective interelectrode distance, Mitsumi POLYVARICON has realized miniature size but high capacitance.
Examples of good dielectric materials are given below.

Dielectric	Dielectric constant ε
Polyethylene film	2.2
Polystyrene film	2.4
Polycarbonate	2.9
Air	1

3. Rotational Index

While the variable capacitor shaft rotates about 180°, the rotational angle indicated in percentage value is known as the rotational index. Rotational index 100% is the maximum capacitance position, i.e., the minimum frequency position.

4. Maximum Variable Capacitance

It is the difference between the maximum and minimum capacitance of a variable capacitor.

5. Variation Factor

5-1. Taking the maximum variable capacitance as 100%, indication of the variable capacitance in percentage is the variation factor.
5-2. For the variation factor curve see 6 and 7 page.
5-3. The relationship between the variation factor and the receiving frequency is expressed in the equation below.

$$f=\sqrt{\frac{f\,max^2}{\left\{\left(\frac{f\,max^2}{f\,min^2}-1\right)\right\}Y+1}}$$

where f : Receiving frequency
f max. : Maximum receiving frequency
f min. : Minimum receiving frequency
Y : Variable factor

6. Reference Stage

It is stage used as the local oscillator circuit of the radio circuit and is used as reference in measuring the variable capacitance of a multi-stage variable capacitor.

7. Ganged Stages

These are stages used for the antenna and RF stages. If the reference stage and the ganged stage are used in ways other than the specified ways, scale drift and tracking error are likely to arise.

8. Variable Capacitance Tolerance

The capacitance tolerances of the various rotational indeces indicated as ± (1pF+1%) and ± (1pF+1.5%), and the ± (1pF+1%) at variable capacitance of 50pF can be shown as follows :
50pF± (1pF+1%) →50± (1pF+0.5pF) =50±1.5pF

9. Capacitance Measurement of the Ganged State (ANT side) of POLYVARICON

EI method (electrical index method)
This is a method used for measuring the capacitance of the trackingless variable capacitor. In this method, the capacitance of the reference stage is turned till it reaches the rated value, and the capacitance of the ganged stage at that time is measured. It is a method based on the capacitance value reference.

MI method (mechanical index method)
This is a method used for measuring the capacitance of equi-capacitance variable capacitors. Using the rotational angle as reference, the capacitance difference between the reference stage and the ganged stage is measured.