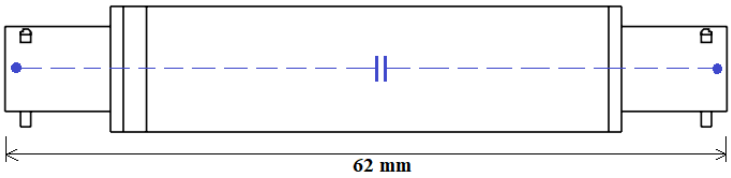
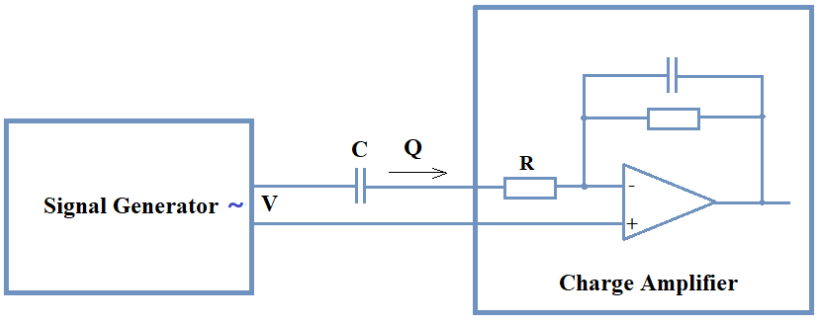
Calibration Capacitor

VT CAP is a precision capacitor epoxy-sealed inside a metal case with BNC connectors at both ends. It can be used in series with a voltage signal generator in order to simulate charge output during calibration or checking of a charge amplifier. The capacitor has a low dissipation factor, low dielectric absorption coefficient and very constant capacitance against temperature and humidity variation.



	VT CAP-10	VT CAP-100	VT CAP-1N	VT CAP-10N	VT CAP-100N
Nominal Capacitance	10 pF	100 pF	1 nF	10 nF	100 nF
Accuracy of Marked Capacitance	±5%	±1%	± 1pF	±10 pF	±0.1 nF
Max. Voltage	>50V	>50V	>50V	>50V	>50V
Temperature Coefficient (Typical)	±30 ppm/℃	±30 ppm/℃	±50 ppm/℃	±50 ppm/℃	±50 ppm/℃
Input Connector	BNC (F)	BNC (F)	BNC (F)	BNC (F)	BNC (F)
Output Connector	BNC (M)	BNC (M)	BNC (M)	BNC (M)	BNC (M)

The connection diagram for charge simulation is shown as follows. When R = 0 Ω, the simulated charge Q = CV, where C is the capacitance of the calibration capacitor and V the voltage output by the signal generator. The SI units of Q, C, V are C(coulomb), F(farad), and V(volt) respectively. Equivalently and often more conveniently, pC(picocoulomb), pF(picofarad) and V(volt) can be used instead. For example, if C = 1000 pF and V = 1V, then Q = 1000 pC.



Some charge amplifiers have a non-zero R in order to improve the stability and limit the input current due to accidental high input voltage. However, this non-zero R will reduce the simulated charge significantly as compared to the one calculated by the above formula, especially at high frequencies where the impedance of the capacitor C (=1/(2πfC)) drops to a comparable level as R. It is thus crucial to keep the frequency of the calibration signal sufficiently low such that 1/(2πfC)>>R. Similarly, 1/(2πfC) >> the output impedance of the signal generator should also be ensured.

It should be noted that the above simulated charge output should be fed into the sensor input of a charge amplifier rather than its calibration input (if any).

