Sensores y Laboratorio 2019-I

Ing. Juan Ricardo Clavijo Mendoza MSc.

Capacitive sensors

Capacitive sensors

$$Z_C = \frac{1}{jwC(x)} = \frac{1}{SC(x)}$$

Capacitive sensors

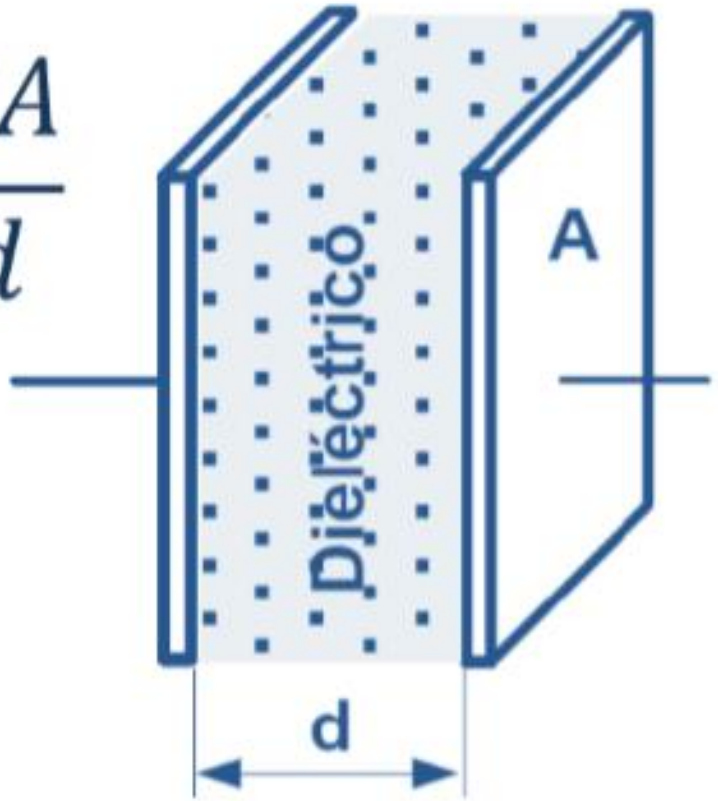
Capacitor

$$C = \frac{q}{V}.$$

$$C = \frac{\varepsilon_0 A}{d}.$$

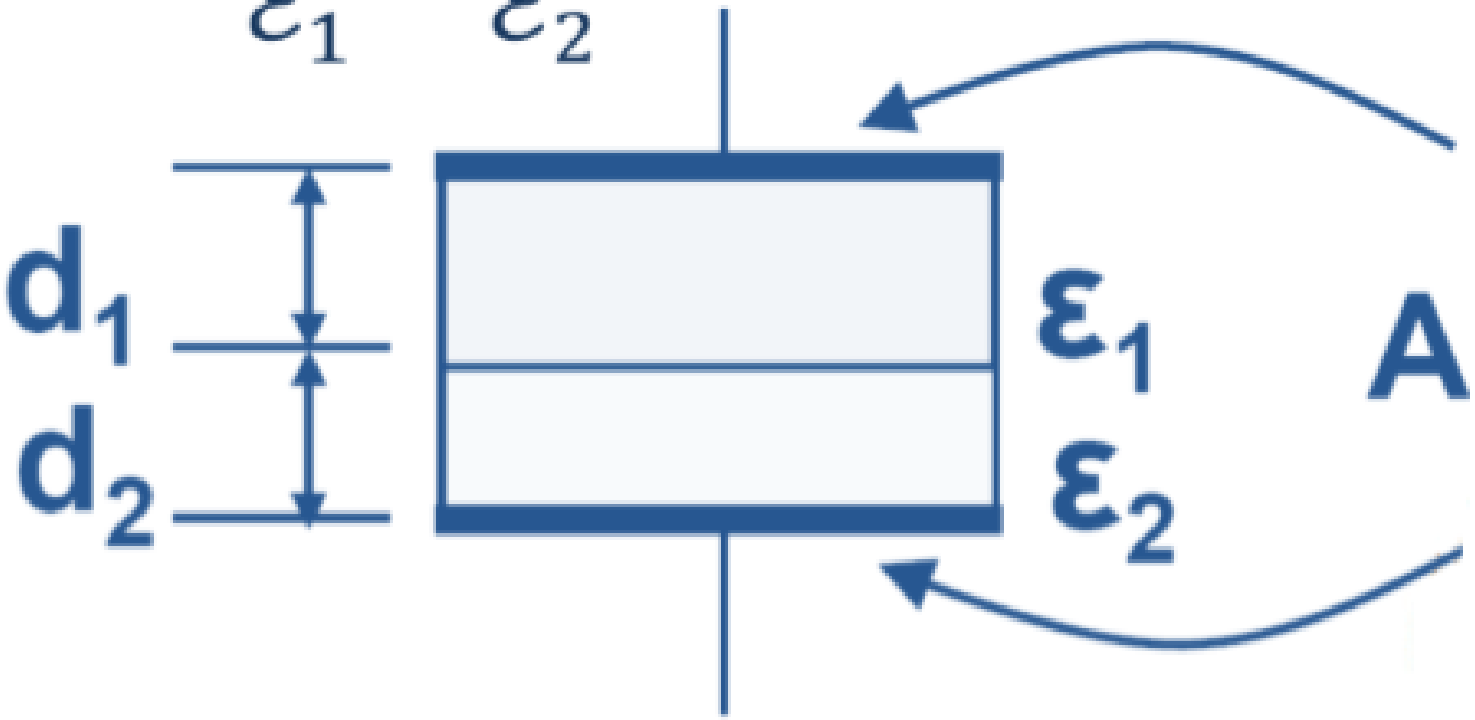
Capacitive sensors

$$C = \frac{\varepsilon A}{d}$$



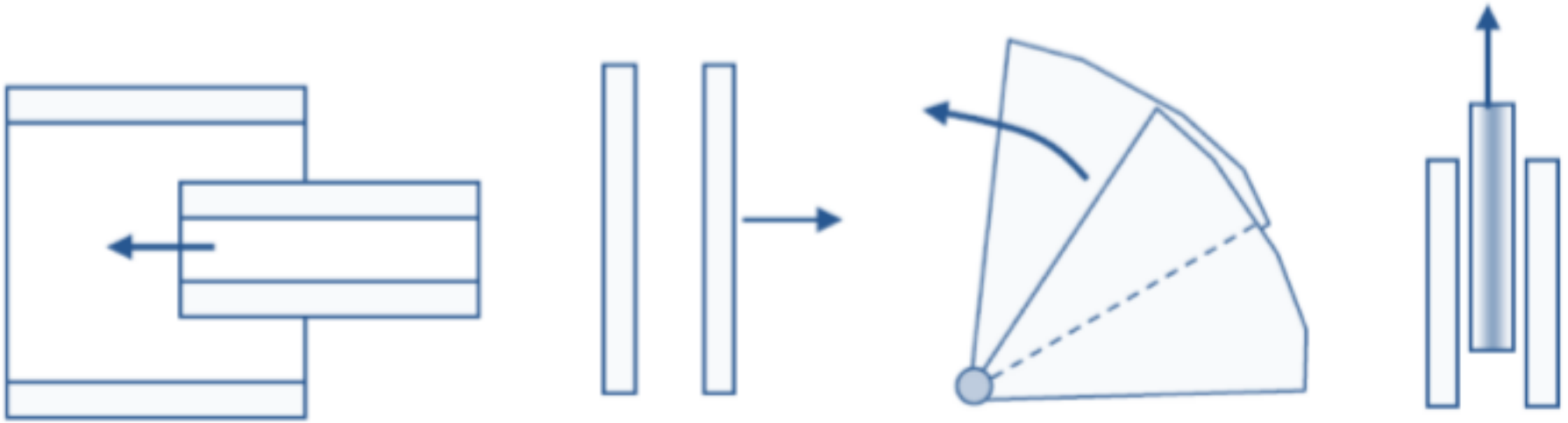
Capacitive sensors

$$C = \frac{A}{\frac{d_1}{\varepsilon_1} + \frac{d_2}{\varepsilon_2}}$$

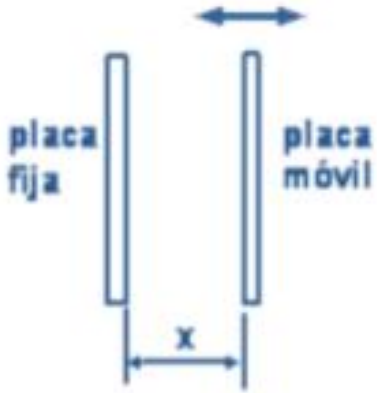


Capacitive sensors

x

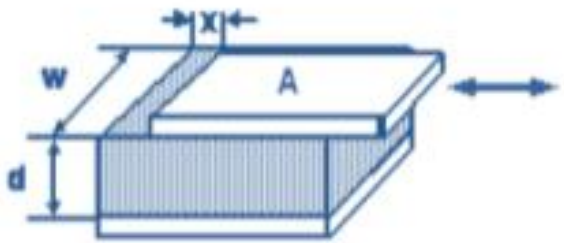


Capacitive sensors



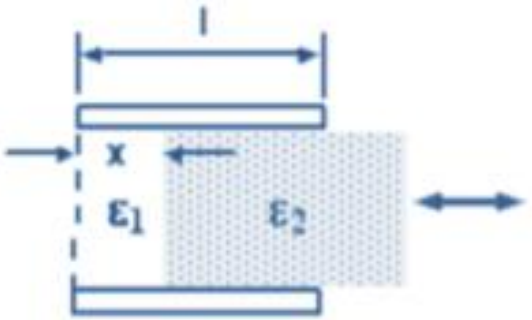
$$C_x = \frac{\varepsilon A}{x}$$

a)



$$C_x = \frac{\varepsilon}{d}(A - wx)$$

b)



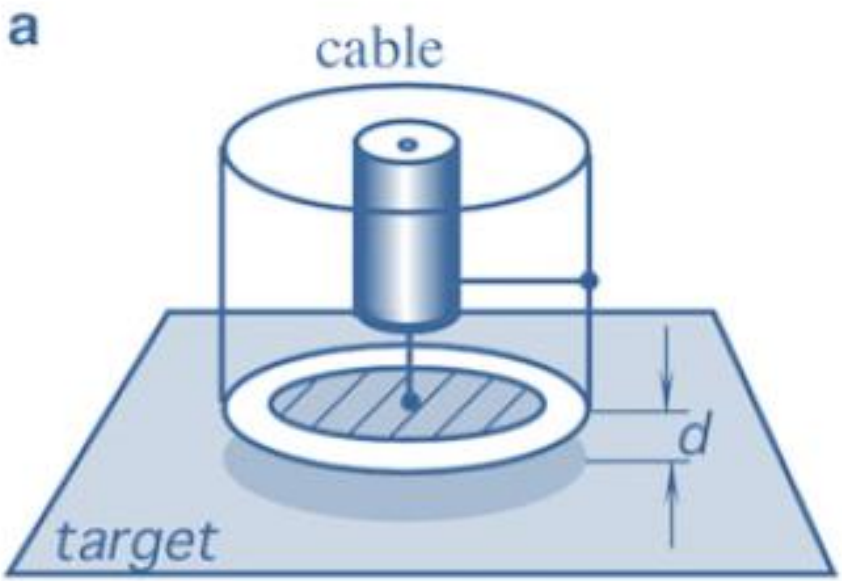
$$C_x = \frac{\varepsilon_0 w}{d}\left[\varepsilon_2 l - (\varepsilon_2 - \varepsilon_1)x\right]$$

c)

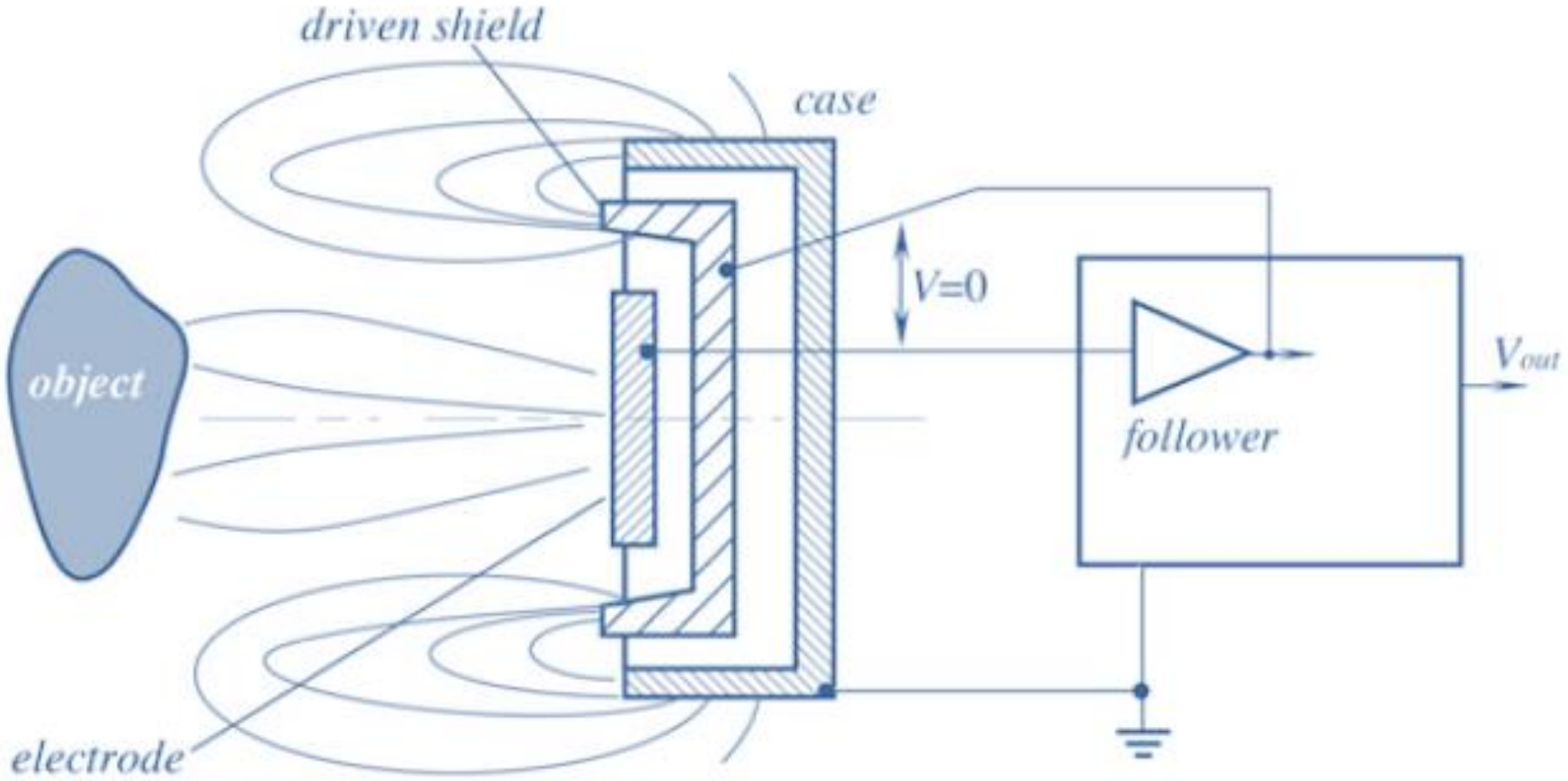
Capacitive sensors

Substancia	Constante dieléctrica	Substancia	Constante dieléctrica
Aire y gases	1,0	Ebonita	2,8
Aceite de ricino	4,6	Flint	6,6-9,9
Aceite mineral	2,7	Goma laca	3,1
Agua destilada	80,0	Ipertrolitul	2,5
Alcohol	15-30	Mármol	8;0
Bakelita	5,0	Mica	5,7-8,0
Calán	6,6	Micalex	8,0
Calit	6,5	Papel	1,5
Caucho	2,1-2,9	Papel parafinado	3,7
Celuloide	4,1	Parafina	2,1
Cera	1,8	Porcelana	5,7-6,8
Condensa	40-50	Resina	2,5
Cristal	5,8-7,6	Vaselina	2,2
Cuarzo	4,5	Vidrio	5,4-10,0

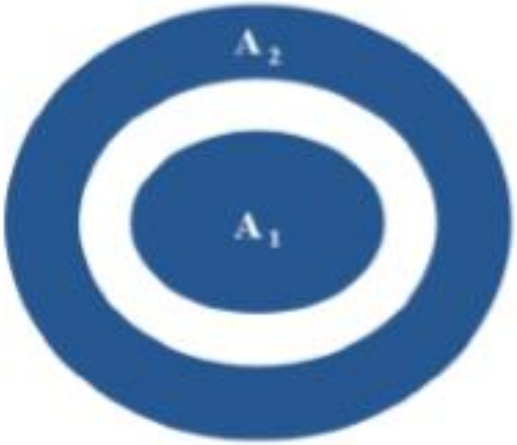
Capacitive sensors

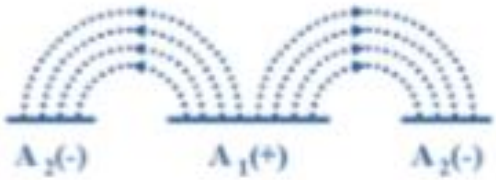


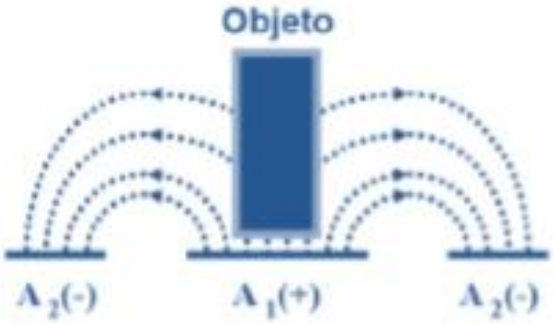
Capacitive sensors

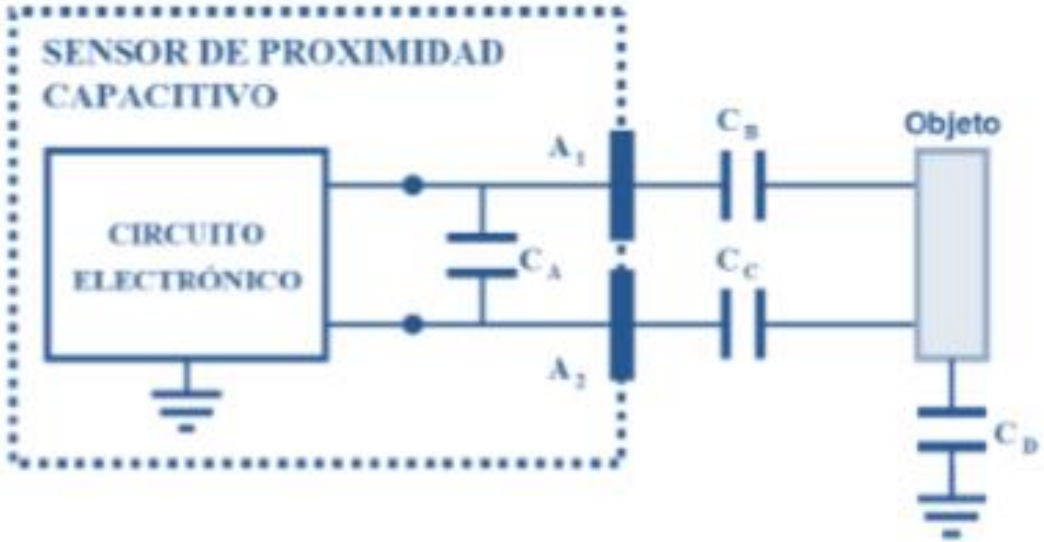


Capacitive sensors









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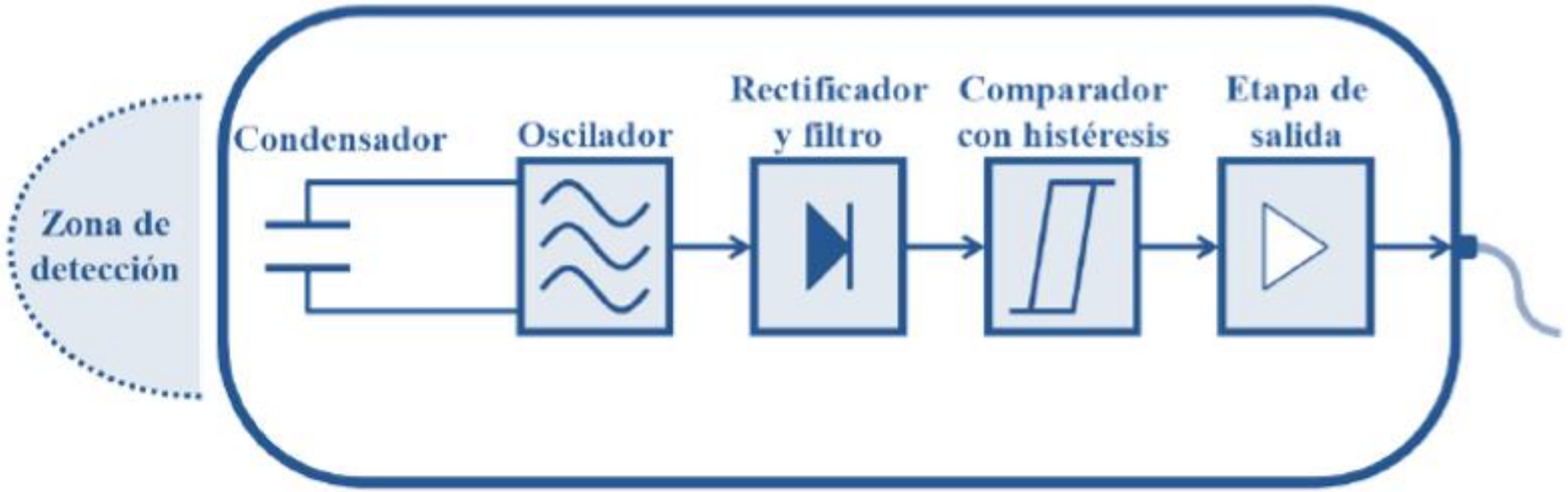
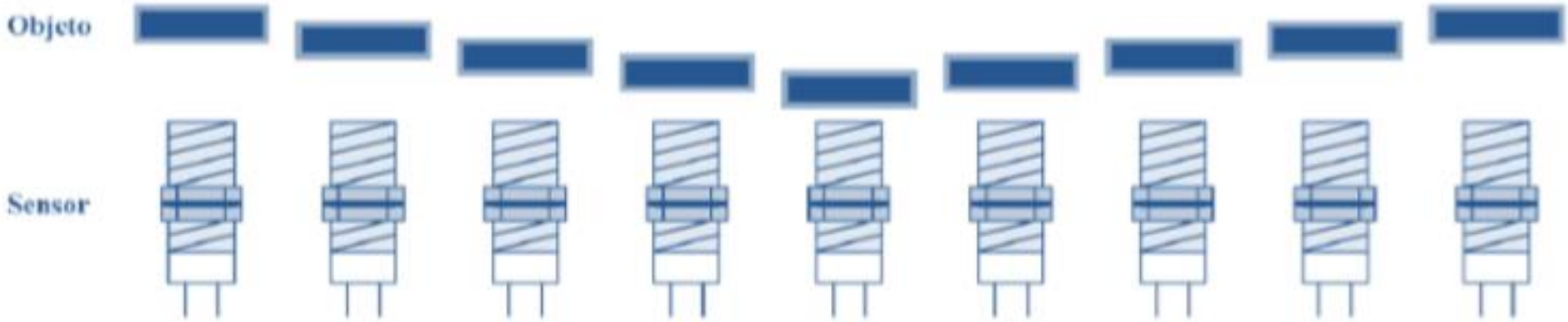
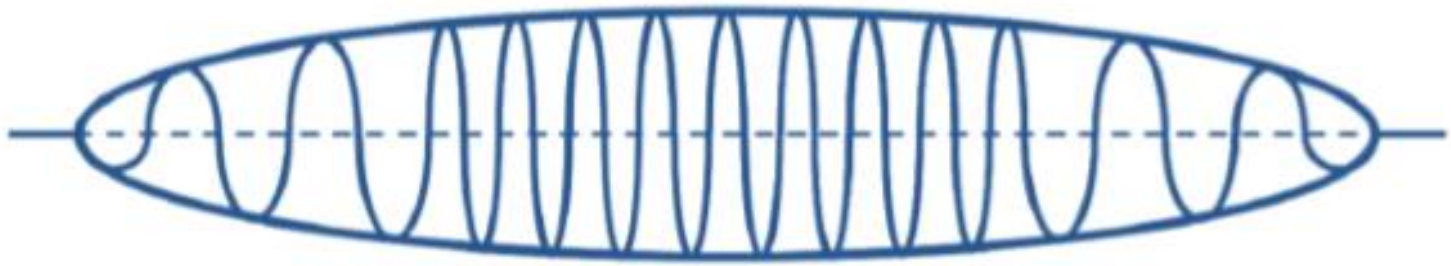
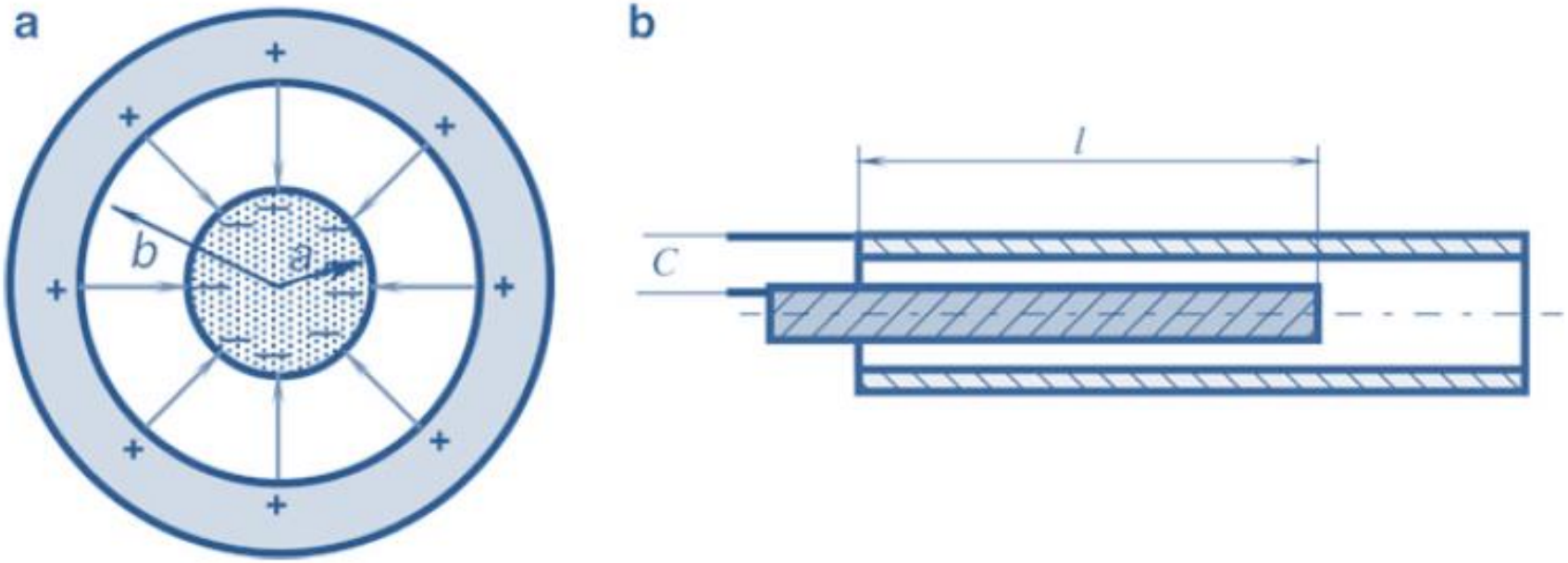


Capacitive sensors



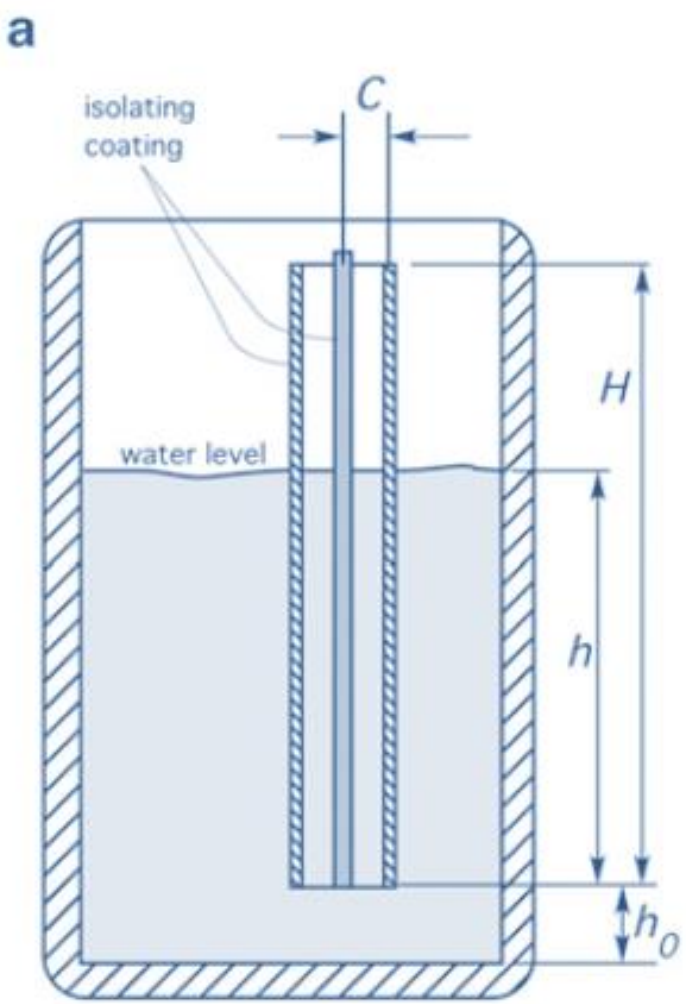


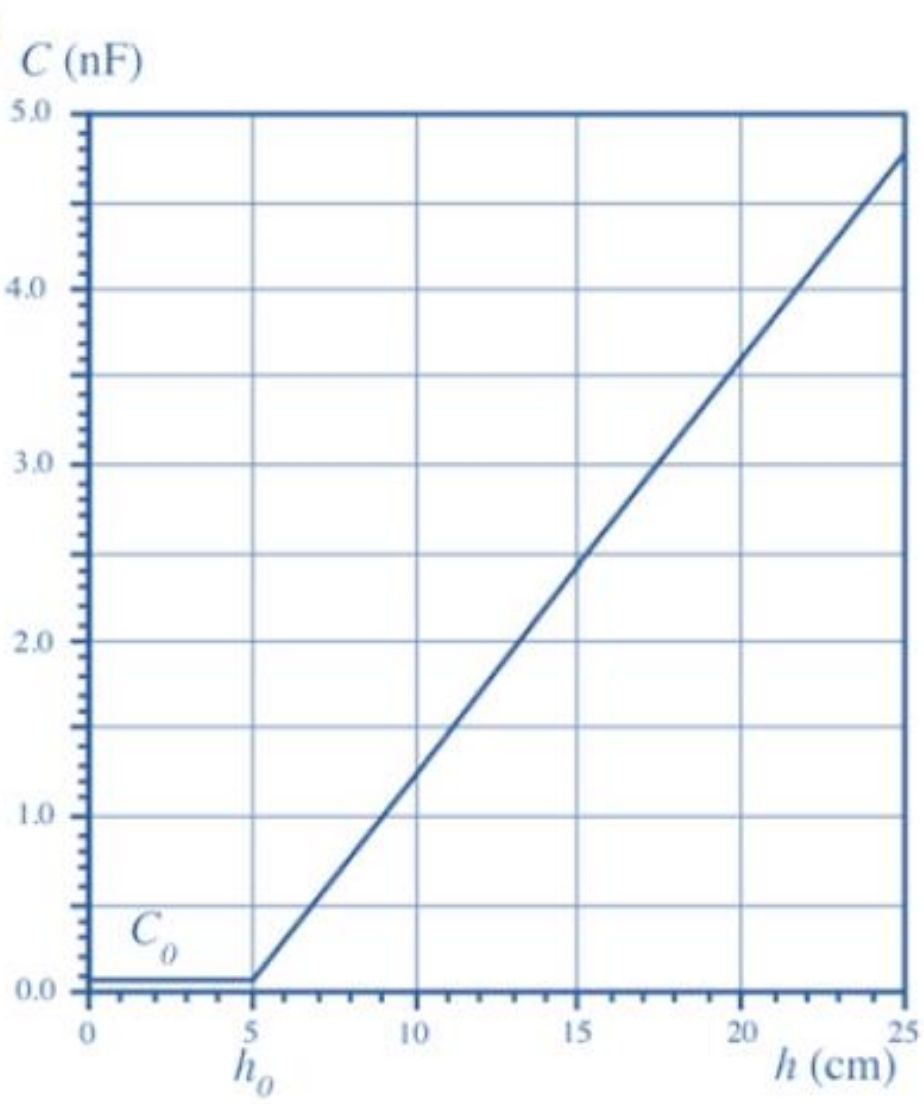
Capacitive sensors



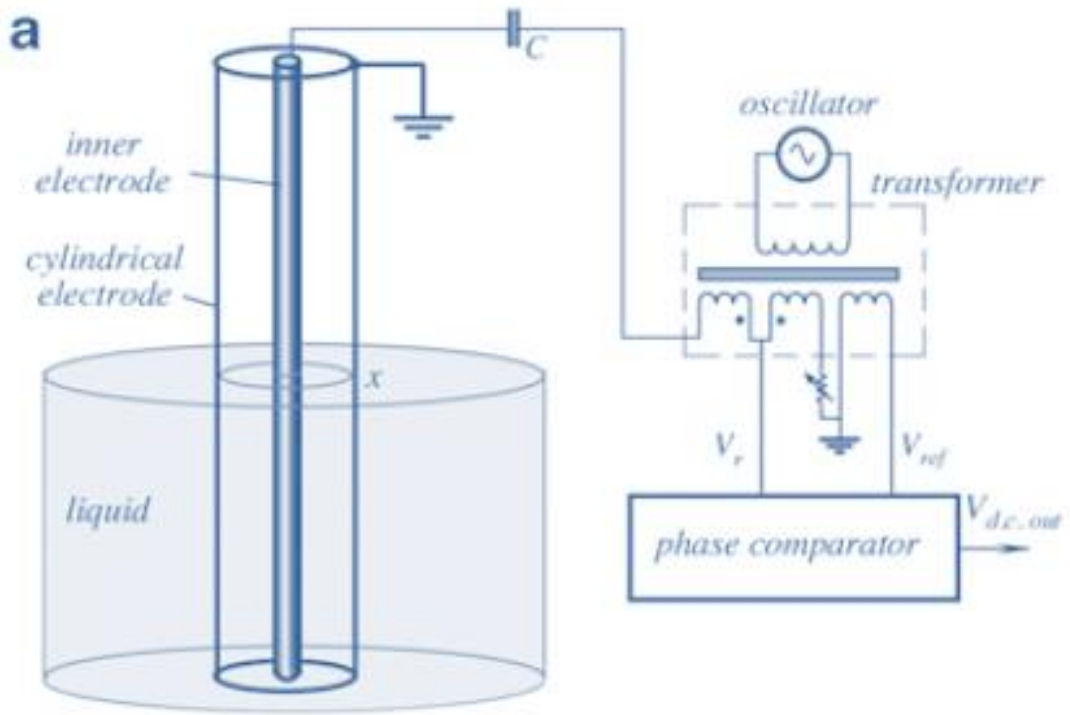
$$C = \frac{2\pi\varepsilon_0 l}{\ln\frac{b}{a}}$$

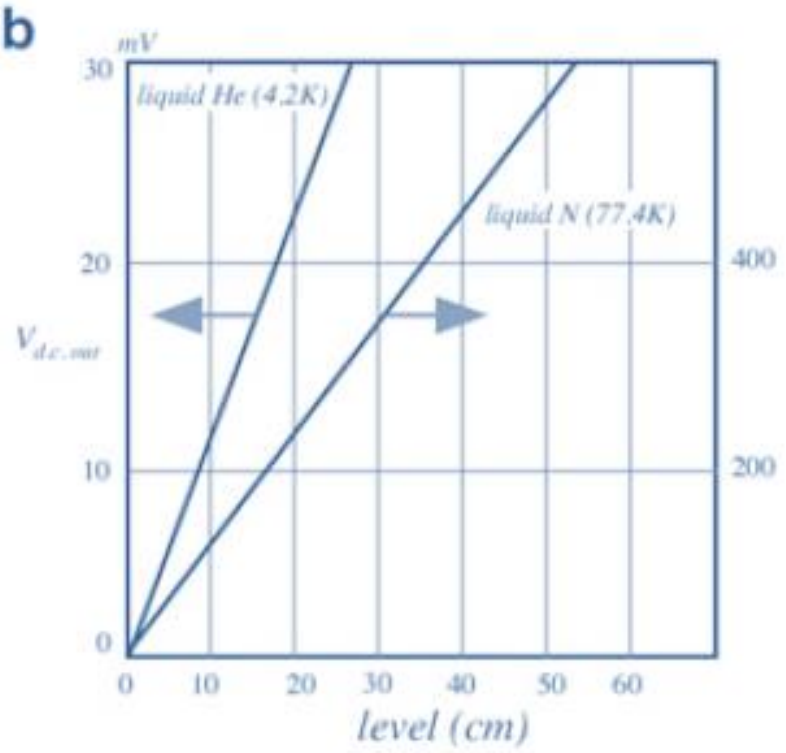
Capacitive sensors





Capacitive sensors





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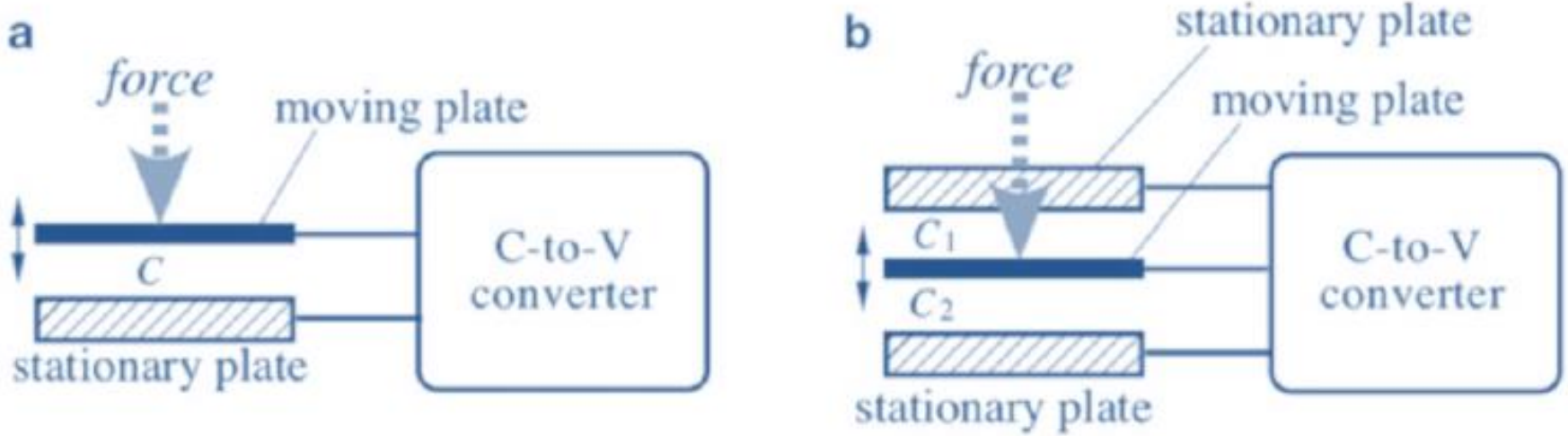

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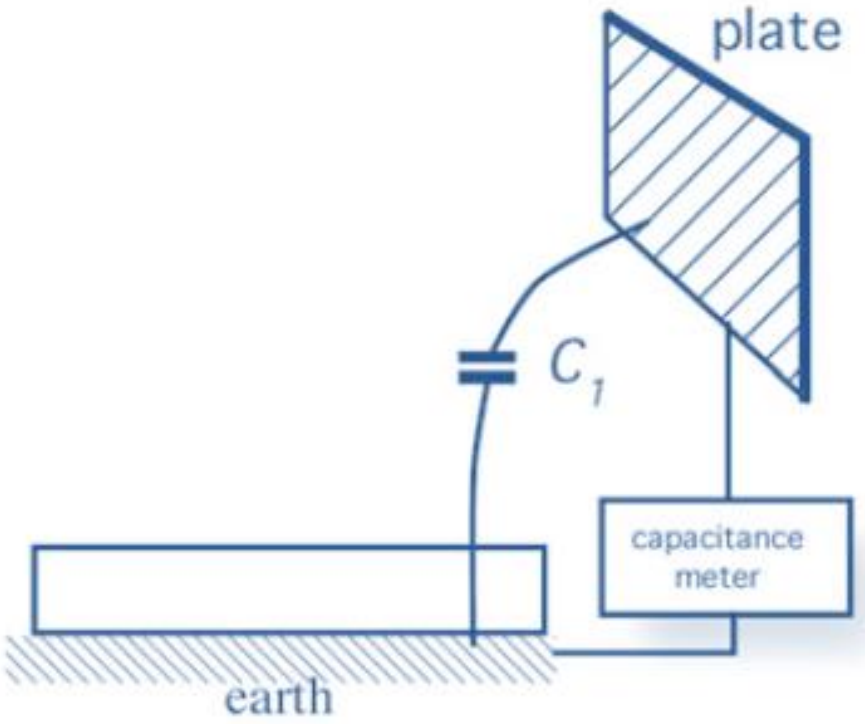

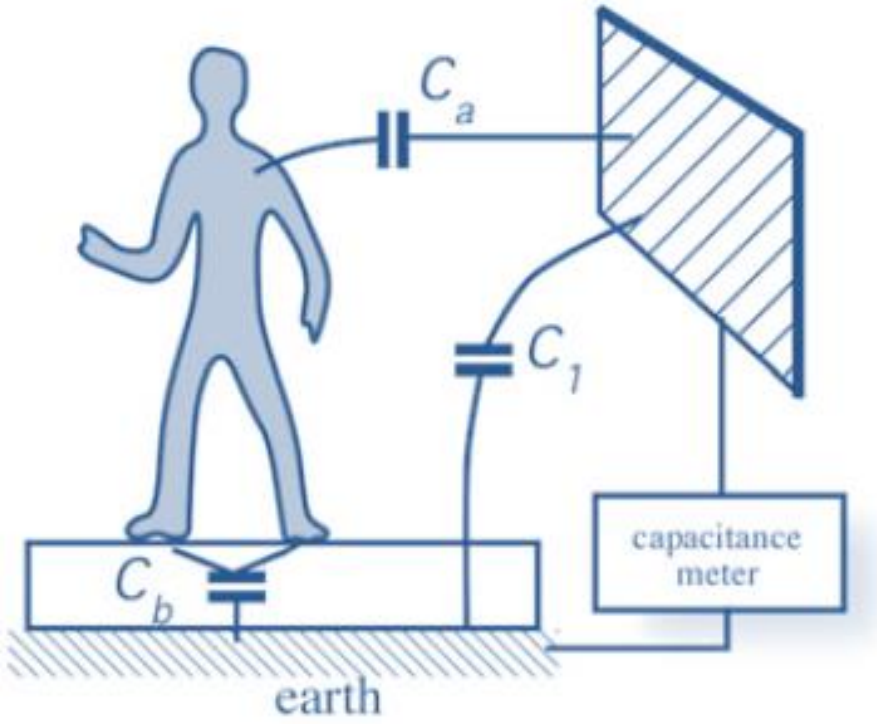

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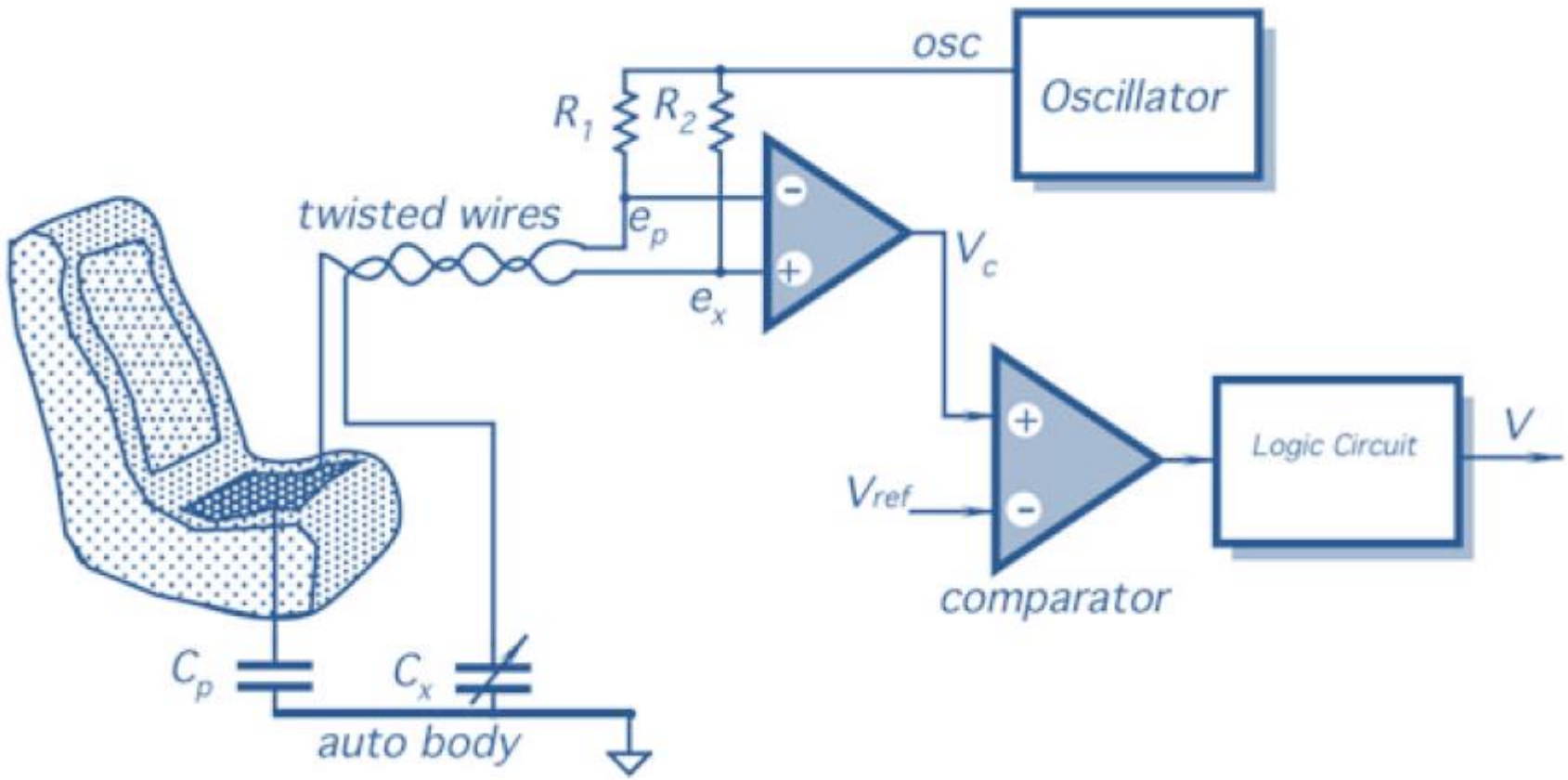

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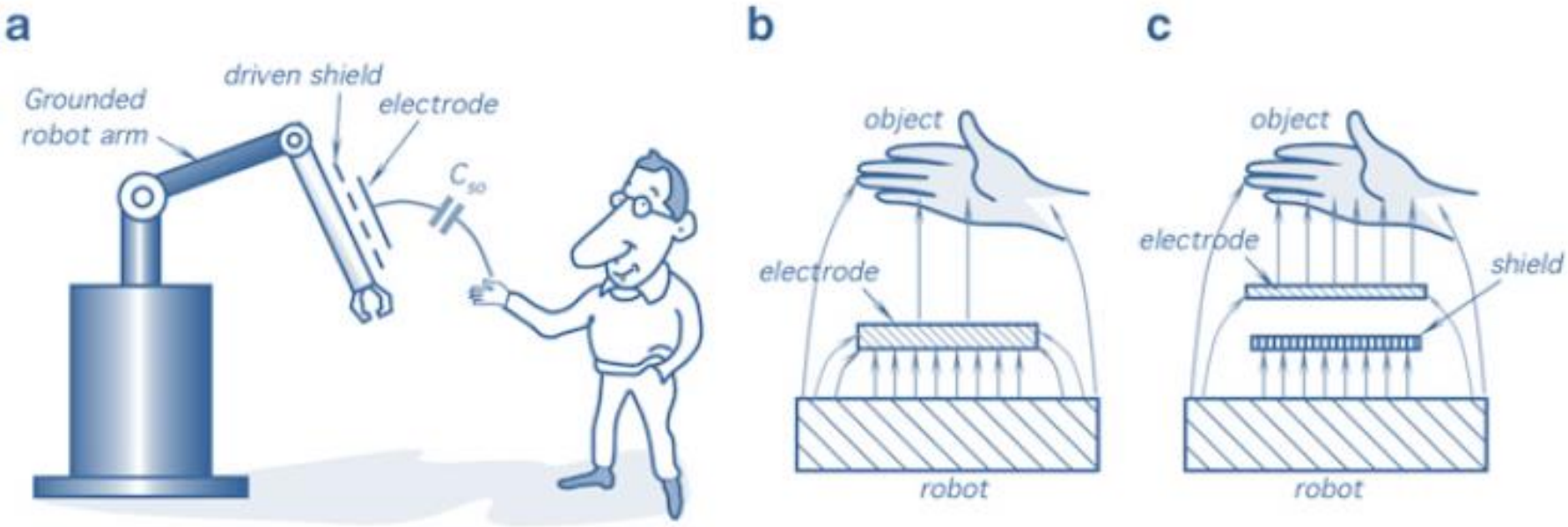

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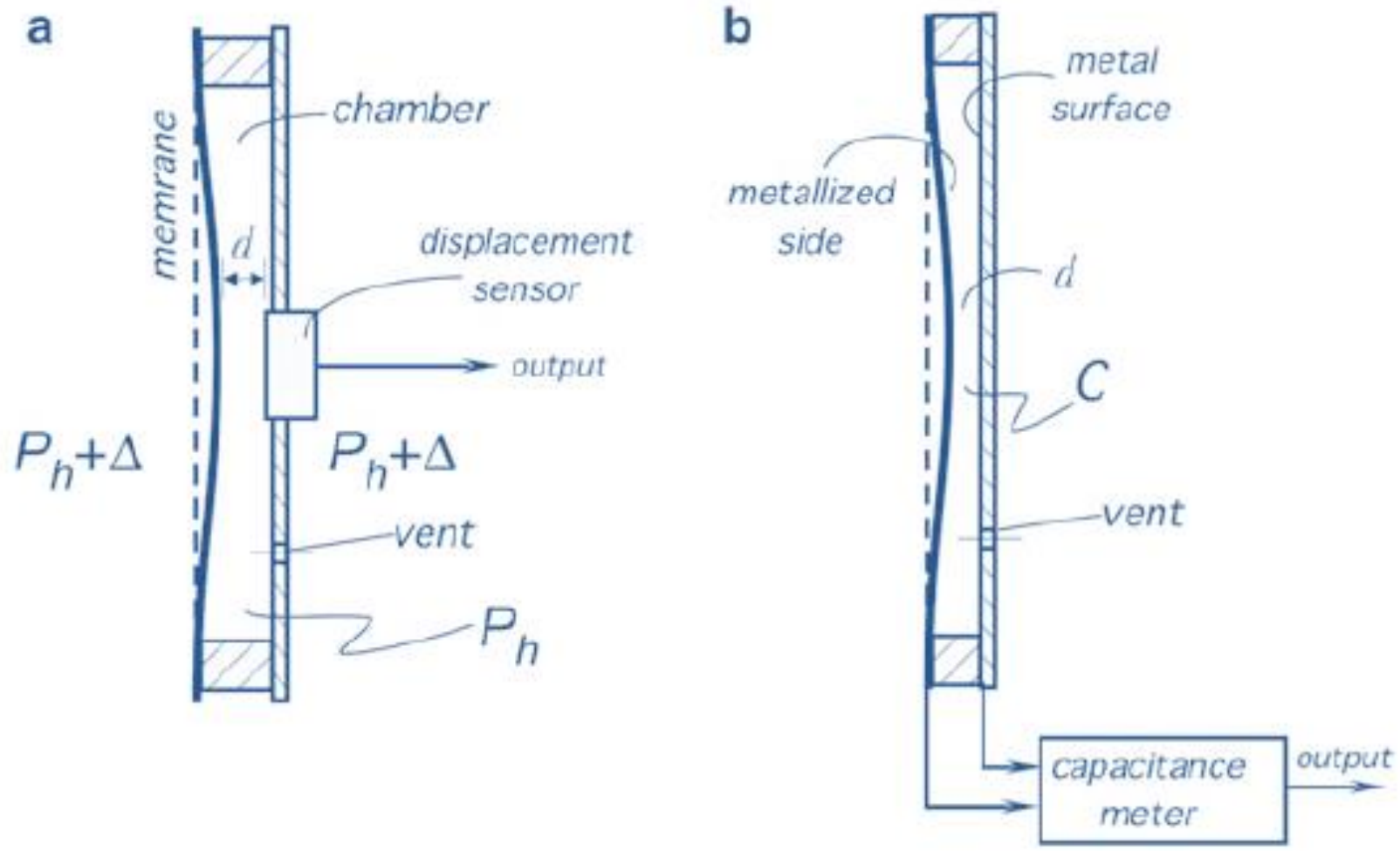

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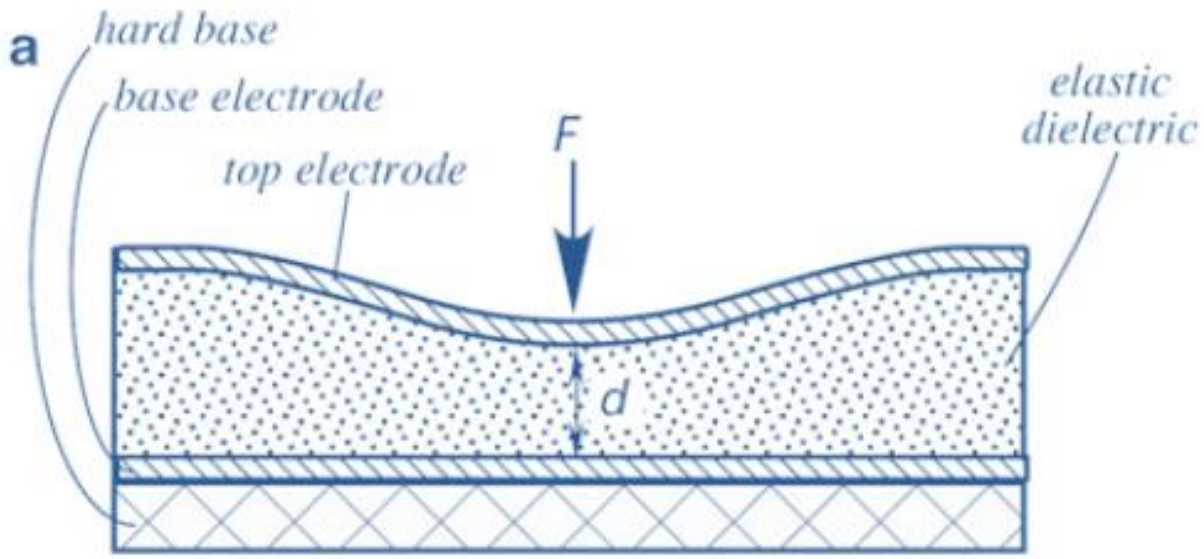

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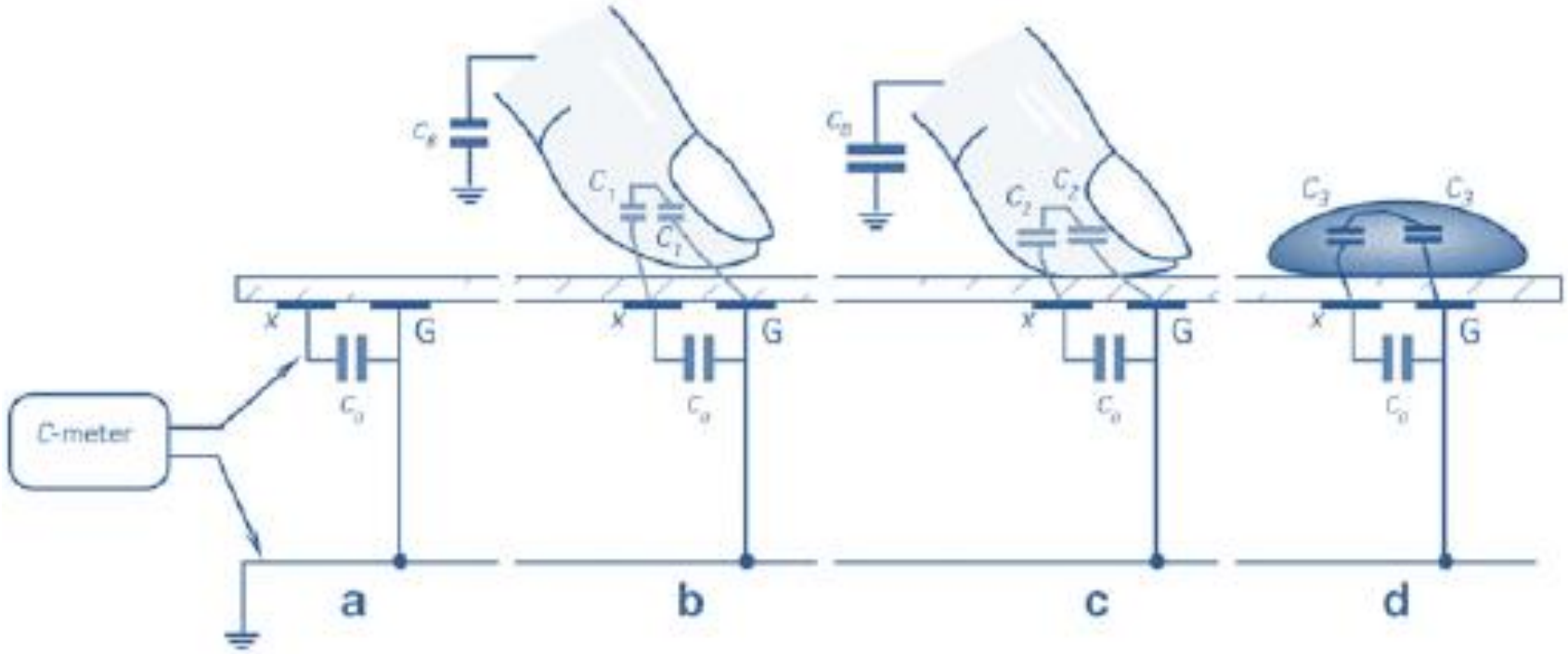

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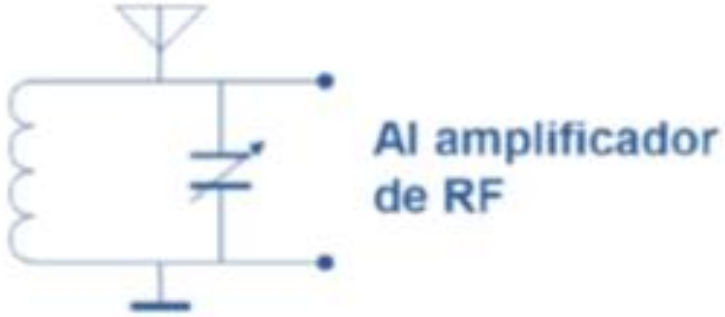
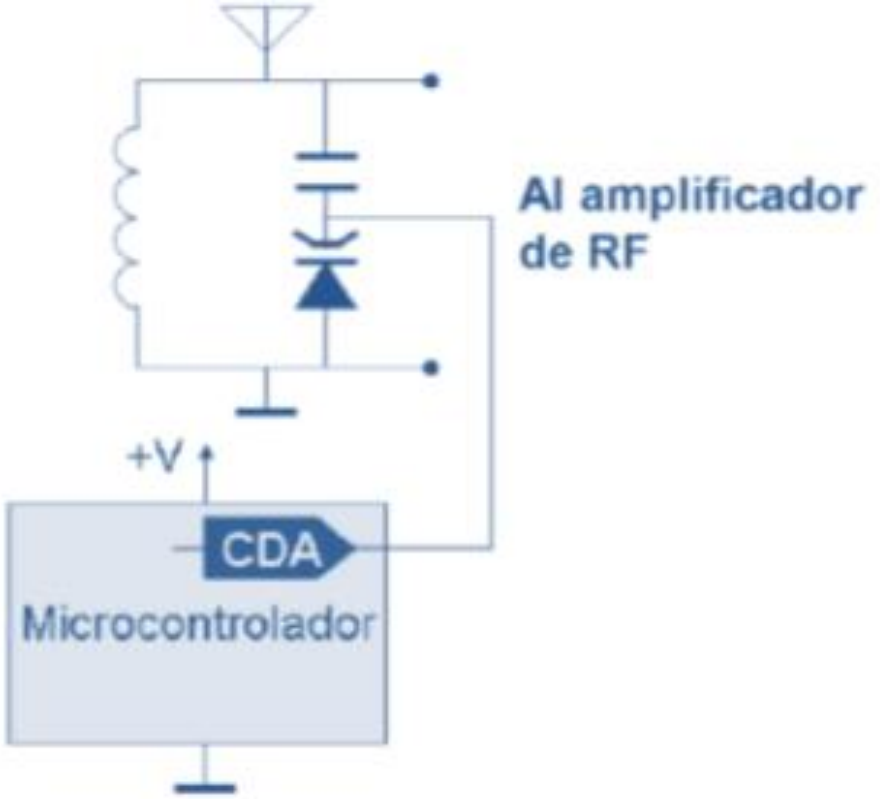
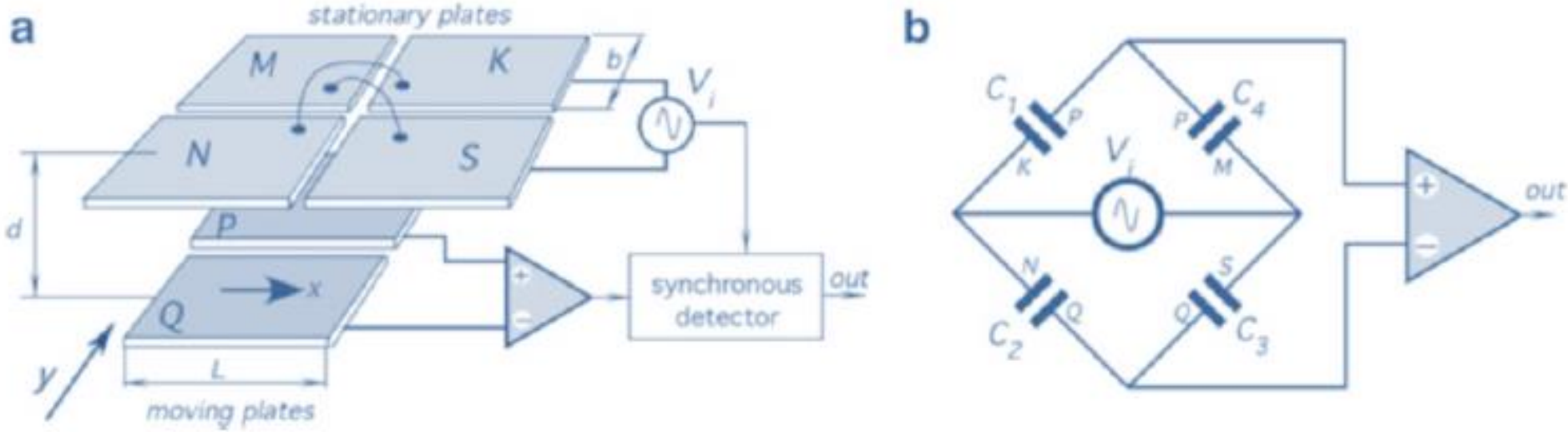


Sintonía manual con condensador variable

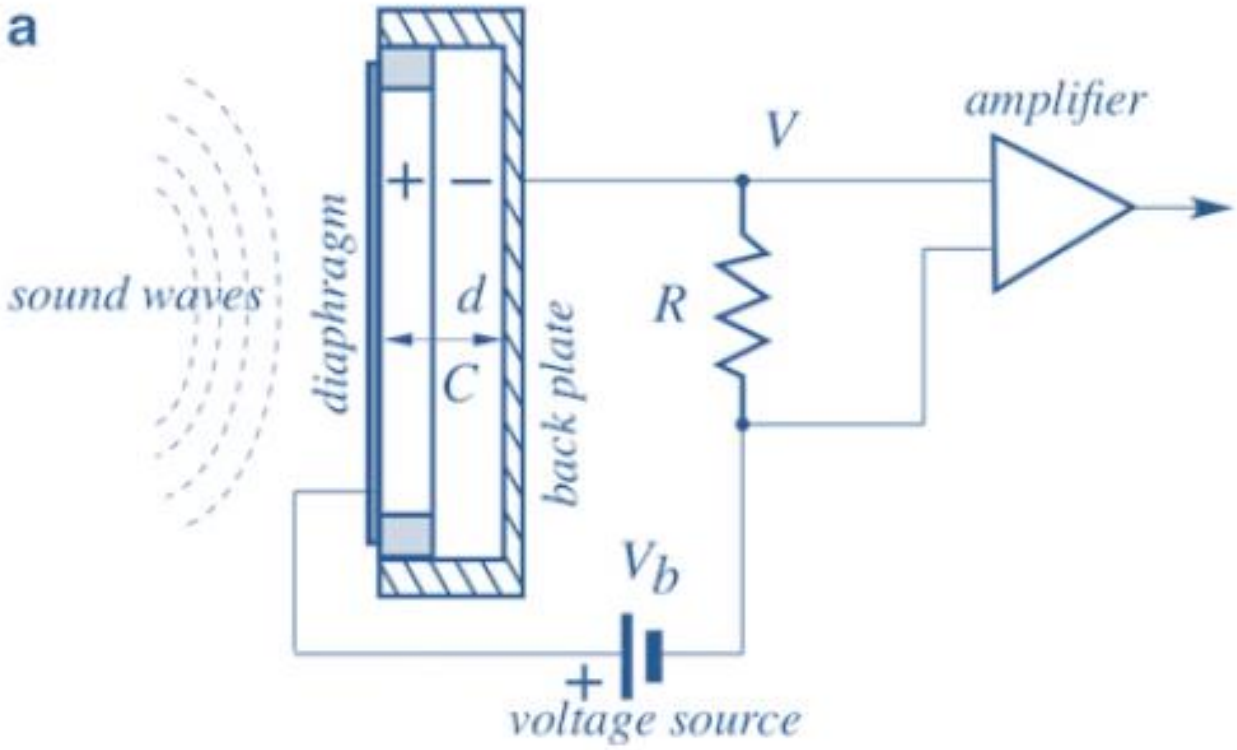


Sintonía automática mediante un diodo varicap y un microcontrolador

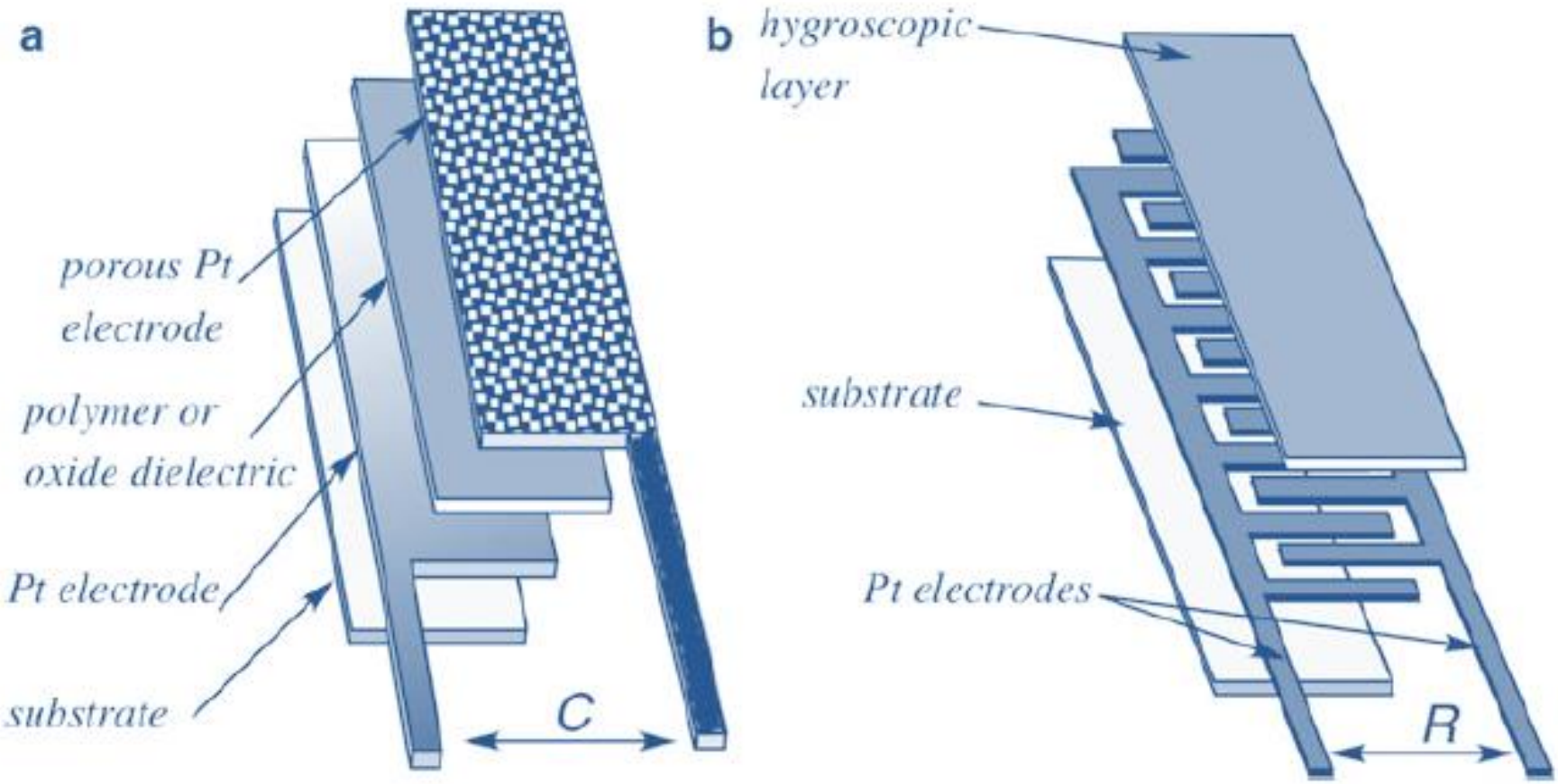
Capacitive sensors



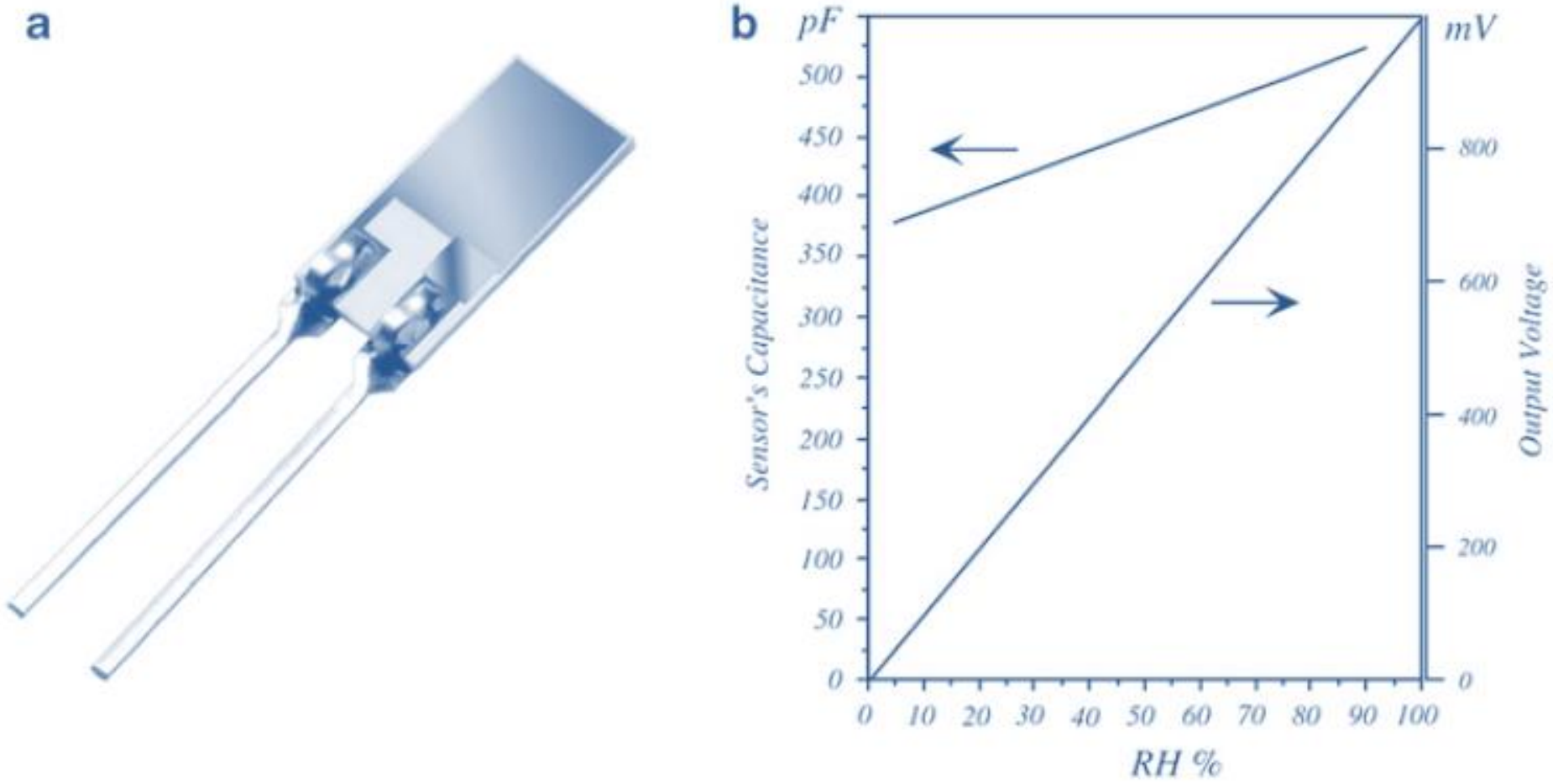
Capacitive sensors



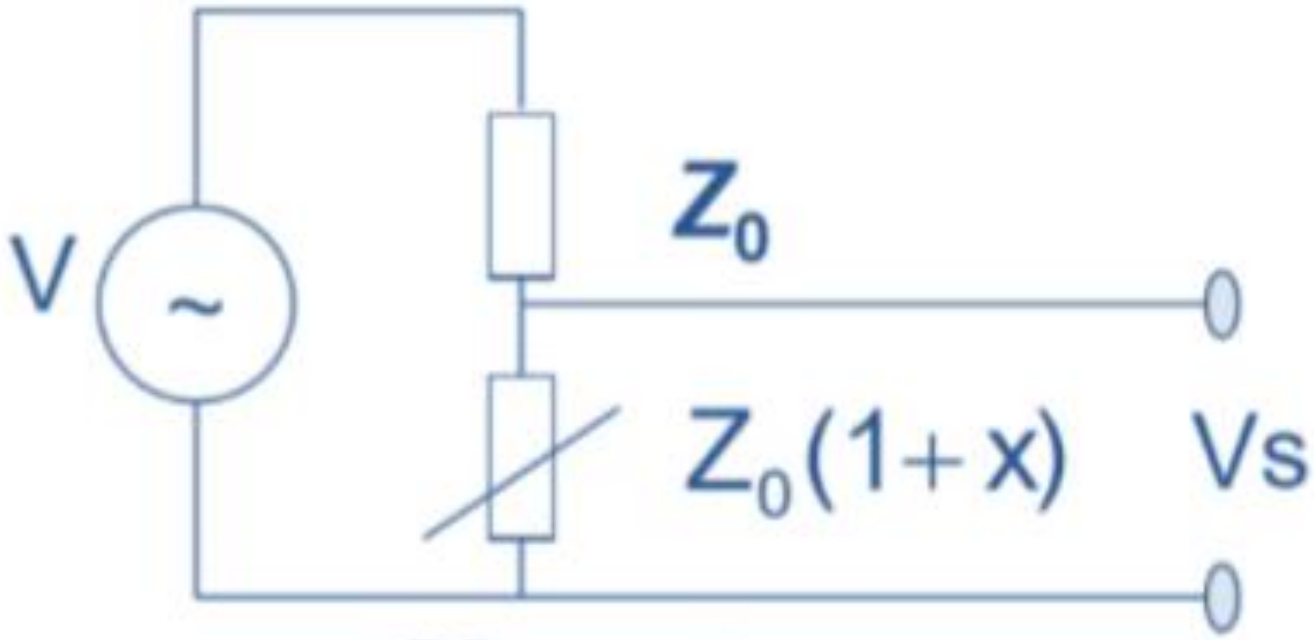
Capacitive sensors



Capacitive sensors

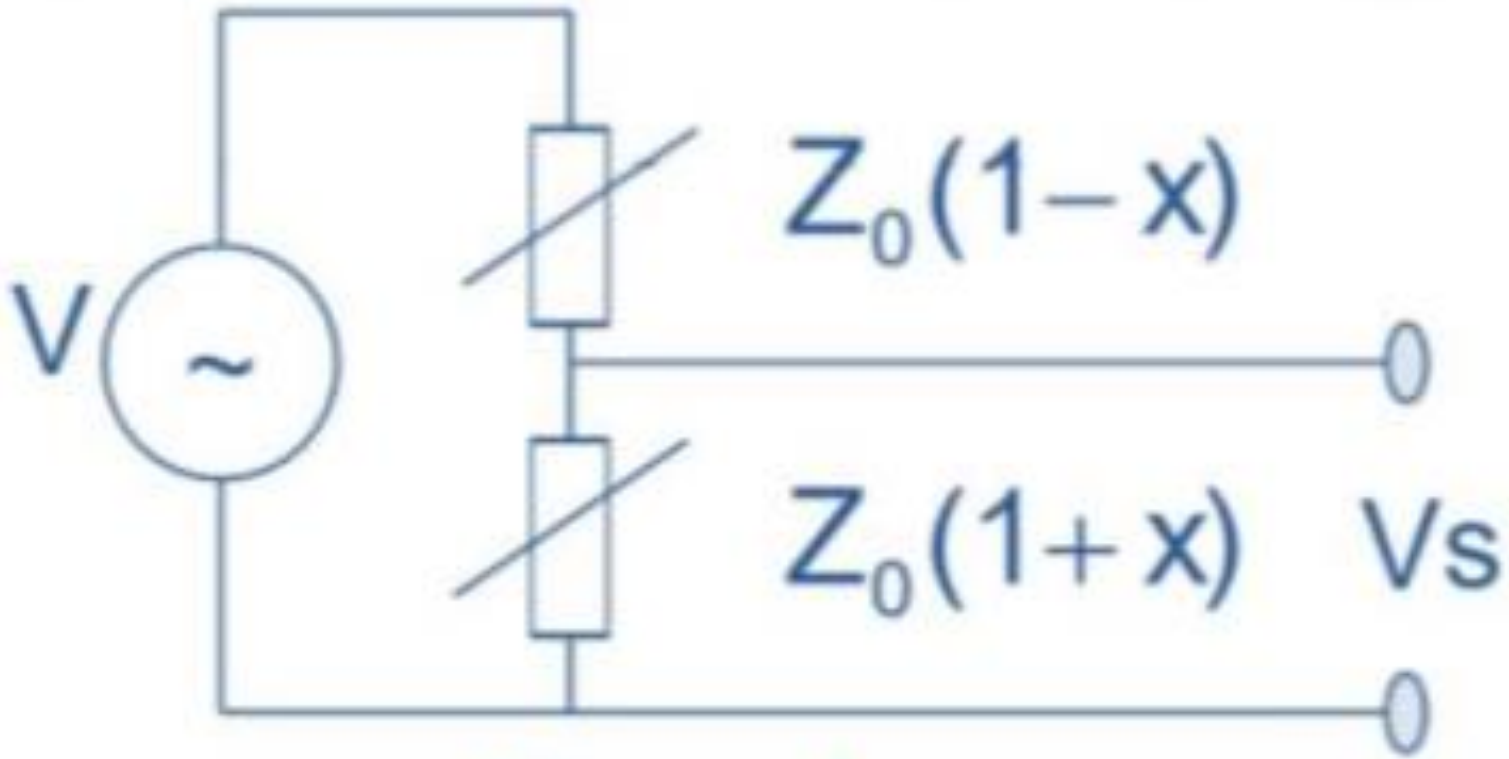


Capacitive sensors



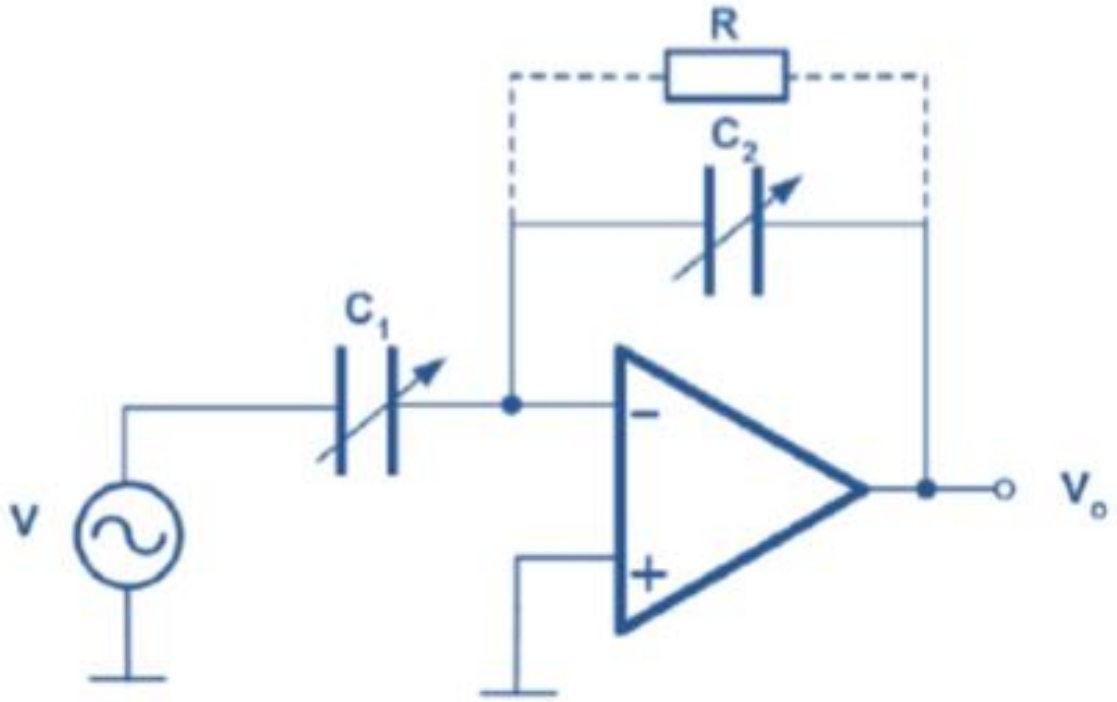
$$\frac{Vs}{V} = \frac{1+x}{2+x}$$

Capacitive sensors



$$\frac{Vs}{V} = \frac{1+x}{2}$$

Capacitive sensors



$$V_o = -V\frac{C_1}{C_2}$$

$$C_2 = \frac{\varepsilon A}{x}$$

$$V_o = -\frac{VC_1}{\varepsilon A}x$$

Capacitive sensors

Honeywell

HIH-1000-001 HIH-1000-002

HCH-1000 Series

Capacitive Humidity Sensors