

# Measurement Range & Resolution

# Measurement Range

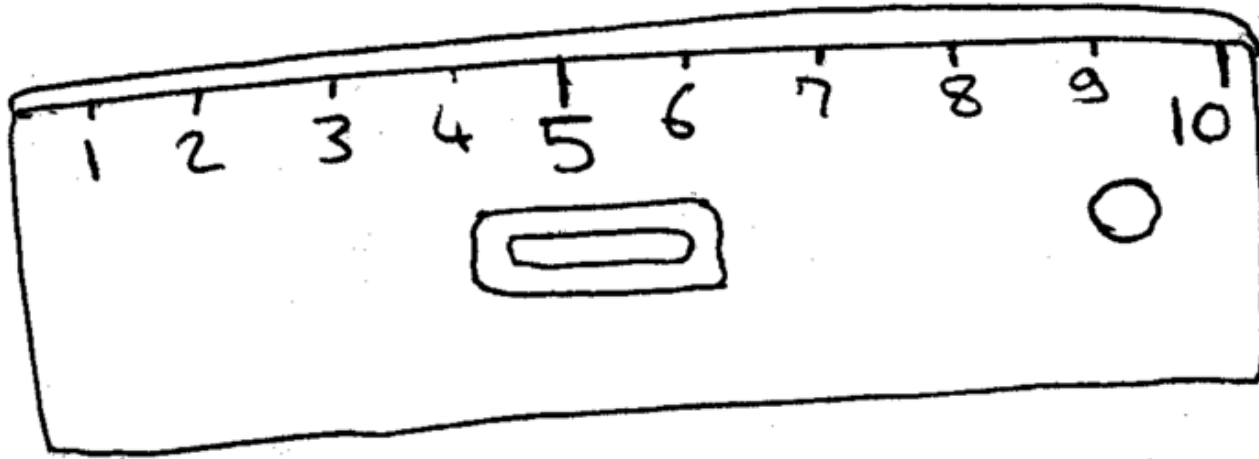


*measuring interval = working interval ~ measurement range*

Set of **values** of **quantities** of the same **kind** that can be measured by a given **measuring instrument** or **measuring system** with specified **instrumental uncertainty**, under defined conditions.

**The range of the interval [a;b] is b-a.**

# Measurement Range (example 1)



A ruler can measure lengths between 0 and 10cm so it has a range of 10cm.

# Measurement Range (example 2)



If set to the 200Ω range, one can measure input signals between 0 and 200Ω.

If set to the 20V DC range, one can measure input signals between ?? and ?? so the range is ??.

# Resolution

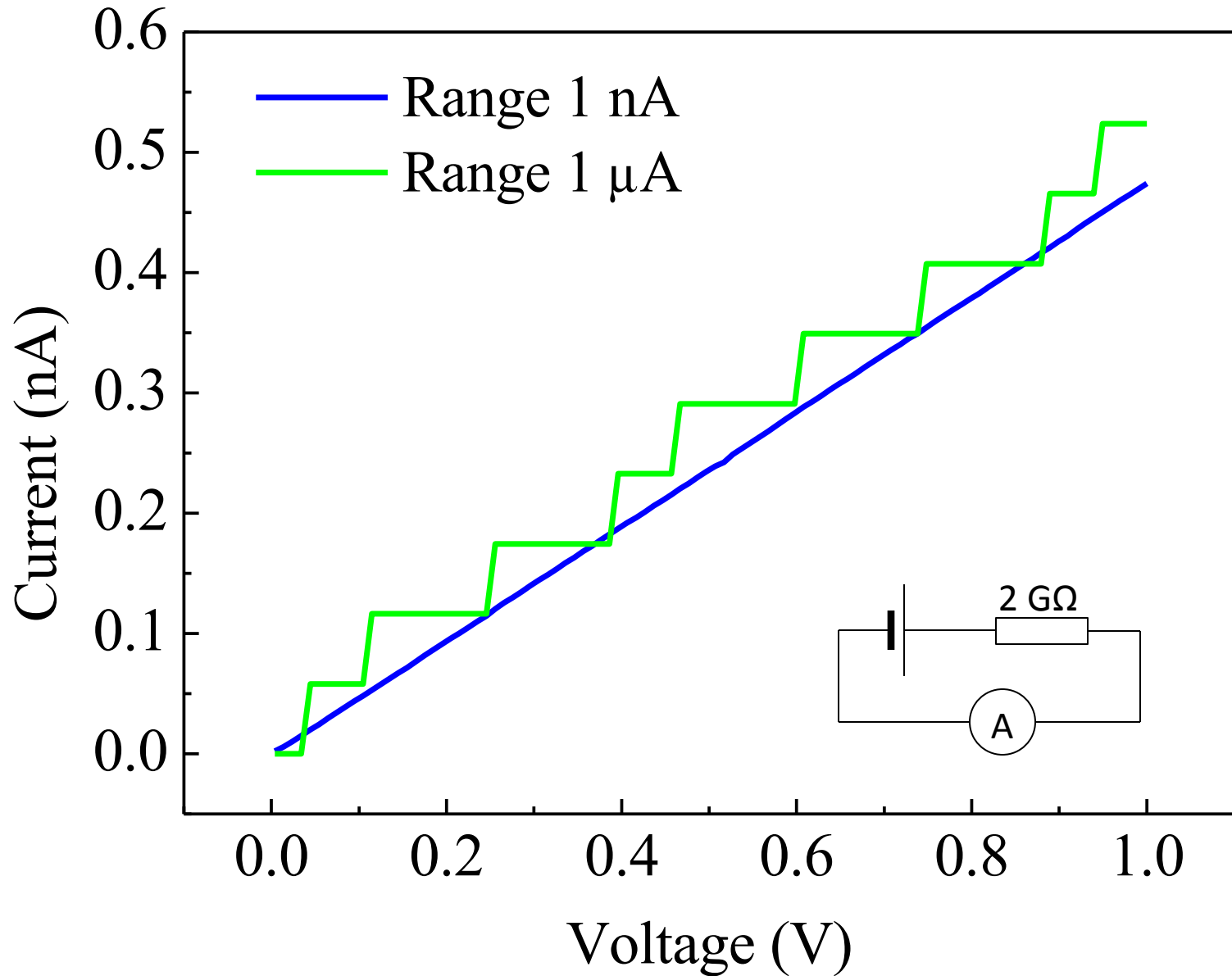


Smallest change in a **quantity** being measured that causes a **perceptible** change in the corresponding **indication**.

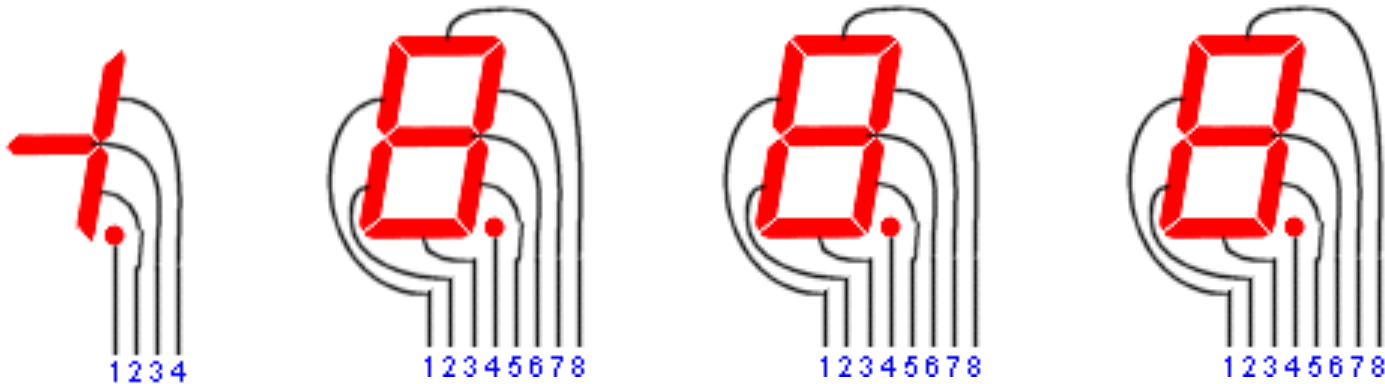
NOTE It may also depend on the **value** of a quantity being measured.

**The smallest change in measured signal  
that **can** be observed**

# Resolution (example 1)



# Resolution (example 2)



Display: 3 ½ digits  
from 0 to 1999 → 2000 counts

Resolution in %: inverse of number of counts,  $1/2000 = 0.05 \%$ .

Resolution in output value: ratio of highest value of measurement interval to the number of counts.

If 200  $\Omega$  range,  $200 \Omega / 2000 = 200 \Omega * 0.05 \% = 0.1 \Omega$