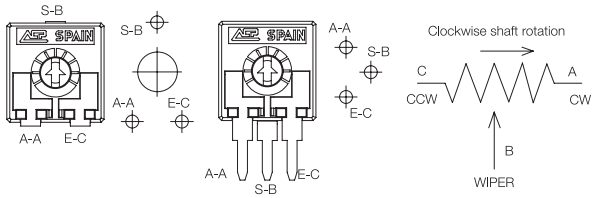
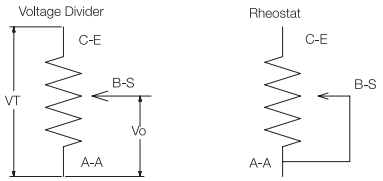
General concepts

Potentiometer configuration:



Electric use:



Resistance

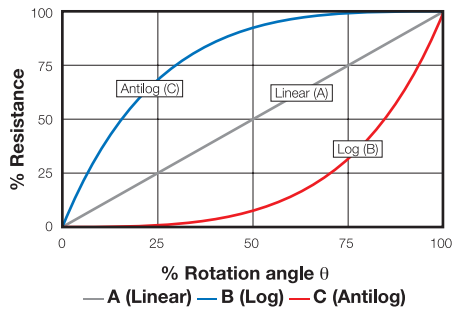
Total Resistance: RT
The DC resistance between the input terminal and the wiper when the latter is positioned so as to give a maximum resistance value.

Electric Noise (Contact Resistance)
Noise is any variation in the output signal that does not correspond to a similar variation in the input signal. It appears in the contact point between the resistive element and the wiper and it is measured in Ohms.
This noise can also be measured as "Contact Resistance Variation" (CRV); it does not depend on the position of the wiper on the resistive element and it is expressed in percentage of change between the initial resistance and the value of the resistance after the test. It is measured statically and dynamically.
ACP's potentiometers have less than 5% CRV.

ACP's standard resistance values:

100 Ω	**100**
200 Ω	**200**
220 Ω	**220**
250 Ω	**250**
470 Ω	**470**
500 Ω	**500**
1KΩ	**1K**
2 KΩ	**2K**
2,2KΩ	**2K2**
2,5 KΩ	**2K5**
4,7KΩ	**4K7**
5KΩ	**5K**
10 KΩ	**10K**
20 KΩ	**20 K**
22 KΩ	**22 K**
25 KΩ	**25 K**
47 KΩ	**47 K**
50 KΩ	**50 K**
100 KΩ	**100 K**
200 KΩ	**200 K**
…	**…**
1 MΩ	**1M**
2MΩ	**2M**
2,5MΩ	**2M5**
4,7MΩ	**4M7**
5MΩ	**5M**

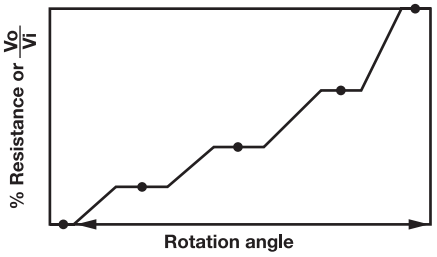
Variation Laws -Tapers-



A potentiometer follows a linear variation law (A) when a certain movement of the wiper results in a certain change of the value of the resistance, no matter the position of the wiper relative to the resistive element. The resistance of the element is evenly distributed along the mechanical travel.
In case the movement of the wiper over the resistive element produces a change in the resistive value as B on the figure, we say the potentiometer follows a logarithmic law -Log-; the resistive value changes along the travel so that in the last section the value approaches the total resistance faster.

If the curve is like C on the figure, then we say it is an Antilogarithmic -antilog- law.

Special Tapers



We can provide with tapers with different slopes, areas with constant value or jumps, etc. Tolerances can be very low thanks to our laser trimming capability.

Special tapers can be combined with physical detents to match the areas where the customer wants to guarantee a constant value (the flat areas in the example). This is particularly suitable in applications which can benefit from a feeling of control over the position: automotive or household electronics. These detents can also be customized to match a customer's design.

Recommended soldering process:

Manual soldering
Soldering tools of 20W max.
Maximum temperature of soldering tools: 280ºC
Time: 3 s. max.

Reflow soldering SMD (lead-free)
Solder temperature: 240ºC for 5 ± 1 s.
Over 220ºC: <40 s.
Preheating temperature: Max 150ºC; 60- 90 s
Temperature Ramp-up: 2-3ºC / s.

Flow
Solder temperature: max. 245 ºC; 4 s
Preheating temperature: Max 100 ºC; 30-60s

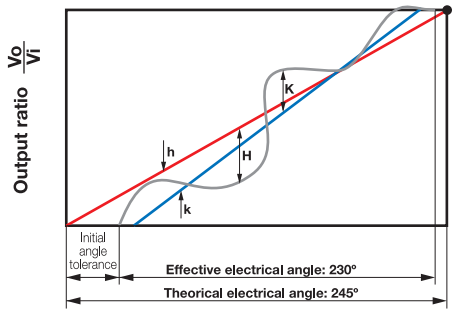
Linearity

It is the specified maximum deviation of the actual variation law compared to a straight reference line.

Independent Linearity (LN)
It is the maximum vertical deviation of the actual law from a straight reference line with the slope and position chosen to minimize deviation over the effective electrical travel or any specified portion thereof. It is expressed as a percentage of the total voltage applied. This is the definition used in ACP by default.

Absolute Linearity (LA)
It is the maximum vertical deviation of the actual law from the straight reference line, "Theoretical Law", that runs through the specified minimum and maximum output ratios along the theoretical angle of electrical travel. Unless otherwise specified, the minimum and maximum output ratios are respectively zero and 100% of the total applied voltage.

The main difference between the two definitions is the reference line chosen to measure the deviations:
• Independent linearity takes the line that best minimizes the deviation between the real law and this line.
• Absolute linearity uses a straight line that runs through the points of minimum and maximum output ratios considered over the theoretical electrical travel. As a result, the angular tolerance of the theoretical electrical travel has a direct influence in absolute linearity.



H: absolute linearity. theoretical line: line h is the reference for absolute linearity
K: independent linearity. Line k is chosen to minimize deviation
Real law