

The world we have
is the result of our way of thinking.

Albert Einstein





Aragonesa de Componentes Pasivos, S. A. (ACP), based in Tarazona (Zaragoza) Spain, is a World recognized specialist in thick-film technology and its application in the field of variable resistance since 1988. Our products include angular position sensors, potentiometers and trimmers which can be found in the following markets: appliances, automotive and industrial.

ACP's expertise lays in the development, characterization and manufacturing of polymeric pastes (resistive, conductive and dielectric) and its deposition in a wide range of substrates. We are vertically integrated, we also design and manufacture the plastic and the metal components that make part of our final products, being experts in materials and manufacturing processes. Finally, we put together all these components in our automated assembly lines that feature the control of the electrical parameters of each and every finished product.

This expertise allows us to adapt our products for customers with special and demanding requirements, providing electromechanical tailor made solutions.

Our products are RoHS and Reach compliant, and we are certified by IQNet under ISO 9001, ISO 14001 and IATF 16949.

ACP has a strong R&D department that includes mechanical, chemical, materials, electronics and electrical engineers and also holds collaborations with universities and research institutes. We count with a professional team that makes our flexibility and high service level a key part of our value proposition. Our Prototype Building Team is able to prepare samples in very short lead time.

Equipment:

- In-house designed fully automated assembly lines, with integrated automated control systems.
- Type C clean room (class 10.000), with screen-printing equipment.
- On line drying, curing and sintering furnaces.
- Convection curing furnaces.
- Laser trimmer.
- Reel to reel electroplating.
- Dies and presses for metal strip stamping.
- Plastic injection machines.
- Quality testing laboratory: climate chambers, profile projectors, mechanical life equipment, shakers...



Company certificates:

ISO 9001

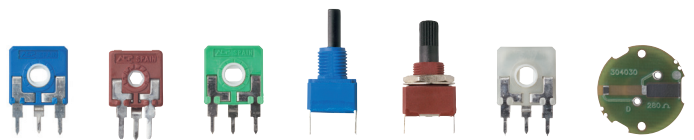
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ISO 14001

(GA-2023/0231)

IATF 16949



















(IATF: 0290599, RA02-0006/2005)



Sometimes we have ideas that seem to clash with the world, as we know it. But if we are willing to take a different approach and look at things from a different point of view; they might become a reality. This way of thinking confirms what we understood at ACP some time ago: to be innovative we need to look at things from a different perspective, we need to challenge the established standards. Facing this situation, we have reversed the first rule of industrial production: instead of designing to manufacturing, we manufacture for design. It is the only way to make ideas and the reality compatible and to come up with advanced concepts... We do know that there is no more powerful tool than imagination.

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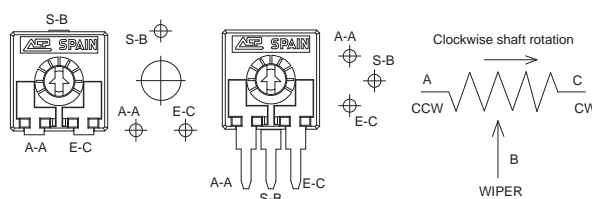
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1 General concepts

GENERAL CONCEPTS

Potentiometer configuration

The pin that corresponds to the reading of the wiper is pin B.
A and C are connected to the ends of the resistor, being pin A the initial position and C the final position.



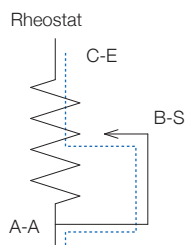
Electric use

Variable resistor

When pins A and B or C and B are connected, the current goes through the wiper (blue line).

Depending on where in the resistor the wiper is placed, it indicates a lower resistive value than the whole resistor would (we say it is used as variable resistor or rheostat).

The output is measured in ohms.

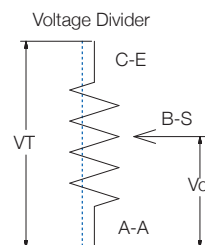


Voltage divider

When a voltage is applied between the ends of the resistor (A and C), the current goes through the resistor, not the wiper.

The wiper sees a proportional share of the voltage applied between the ends (we say this is a Voltage Divider).

The output is a voltage, measured in V.



Resistance

Total resistance (R_T):

It is the resistance found between the input terminal and the wiper when the latter is positioned to give the maximum value.

Electric noise or contact resistance (R_c):

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. It is measured in Ohms.

This noise can also be measured as "contact resistance variation" (CRV), which is expressed in the percentage of change between the initial resistance and the value of the resistance after a test. It is measured statically and dynamically. ACP's potentiometers have less than 5% CRV.

ACP's standard resistive values

The standard values are as follows, although values out of range can also be studied.

100Ω	200Ω	220Ω	250Ω	470Ω	500Ω	1KΩ	2KΩ	2.2KΩ	2.5KΩ	4.7KΩ	5KΩ	10KΩ	20KΩ	22KΩ
100	200	220	250	470	500	1K	2K	2K2	2K5	4K7	5K	10K	20K	22K
25KΩ	47KΩ	50KΩ	100KΩ	200KΩ	220KΩ	250KΩ	470KΩ	500KΩ	1MΩ	2MΩ	2.5MΩ	4.7MΩ	5MΩ	
25K	47K	50K	100K	200K	220K	250K	470K	500K	1M	2M	2M5	4M7	5M	

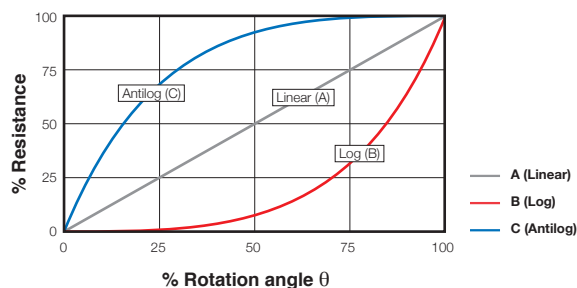
Variation laws - Tapers -

The standard taper is linear (A). Log (B) and Antilog (C) tapers are also available, as well as special tapers according to customer's specifications. For example, a special taper can be matched with a potentiometer with detents (click effect), to guarantee a value in a specific position – see below.-

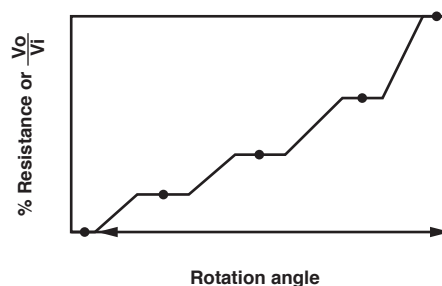
ACP can also provide with tapers with different slopes, with areas with constant value or jumps, according to customer's specifications.

Special tapers can be combined with physical detents to match the areas where the customer wants to guarantee a constant value with a particular angular position. This is particularly suitable in applications which can benefit from a feeling of maintained control over the position, for example, regulation of temperature or speed.

REGULAR TAPERS



SPECIAL TAPERS



Linearity

The term “linearity” implies that the real law obtained from plotting angular position vs voltage output is compared with a straight line.

Independent Linearity (LN)

It is the maximum vertical deviation of the real law from the straight reference line chosen to best minimize the distance from the real line in any position.

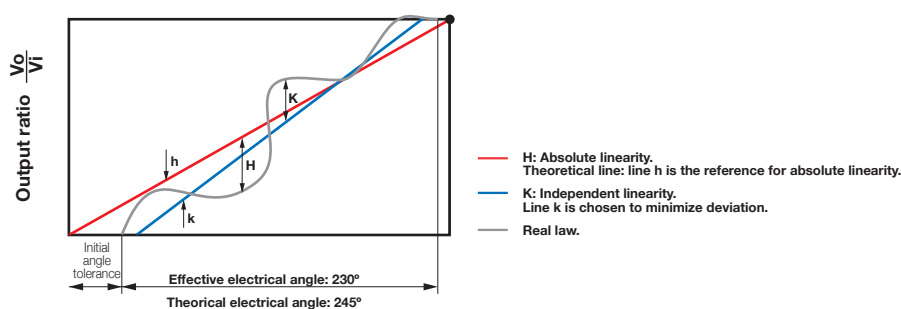
It is expressed as a percentage of the total voltage applied.

In the graph below, “K” would be the maximum independent linearity and “k” the line with which the real law is compared.

Absolute Linearity (LA)

It is the maximum vertical deviation of the real law from the straight reference line that runs through specified minimum and maximum points. These points would be zero and 100% of the maximum applied voltage.

In the graph below, “H” would be the maximum absolute linearity of the real law and “h” the theoretical line with which the real line is compared. When some customers are looking for correspondence of angle and value, this is the concept to consider.



Recommended soldering conditions

Soldering conditions (Lead free, RoHS compliant)*

Manual soldering	CA Reflow soldering SMD	CE Reflow soldering SMD	Flow (wave) soldering
Soldering tools of 20W max.	Preheating: 140-160°C 60-90s	Preheating: 150-180°C 60-120s	Recommended Alloy: SnAgCu
Maximum T ^a of soldering tools: 280°C	Ramp-up: 2-3°C / s.	Ramp-up: 2-3°C / s.	Preheating: Max 100°C; 30-60 s.
Time: 3 s. max.	Over 220°C: <40 s.	Over 220°C: <60 s.	Ramp-up: 1.2-2.5°C/s.
	Solder: 240°C for 5 ± 1s.	Solder: 250°C for 10 ± 1s.	Max. wave conditions: 260°C for 4s., (245°C recommended)
	Besides recommended conditions, ACP SMD potentiometers have successfully passed IEC 60068-2-58 tests.		Time within +0°-10°C of peak: 10s.
			Cooling rate: 5°C/s.

(*) For other information on soldering conditions, please, contact us.

(For reflow soldering SMD) The conditions above are valid for one reflow pass only. For multiple passes, please, enquire.

Specifications on this catalog are for reference only, as they are subject to change without notice.

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