

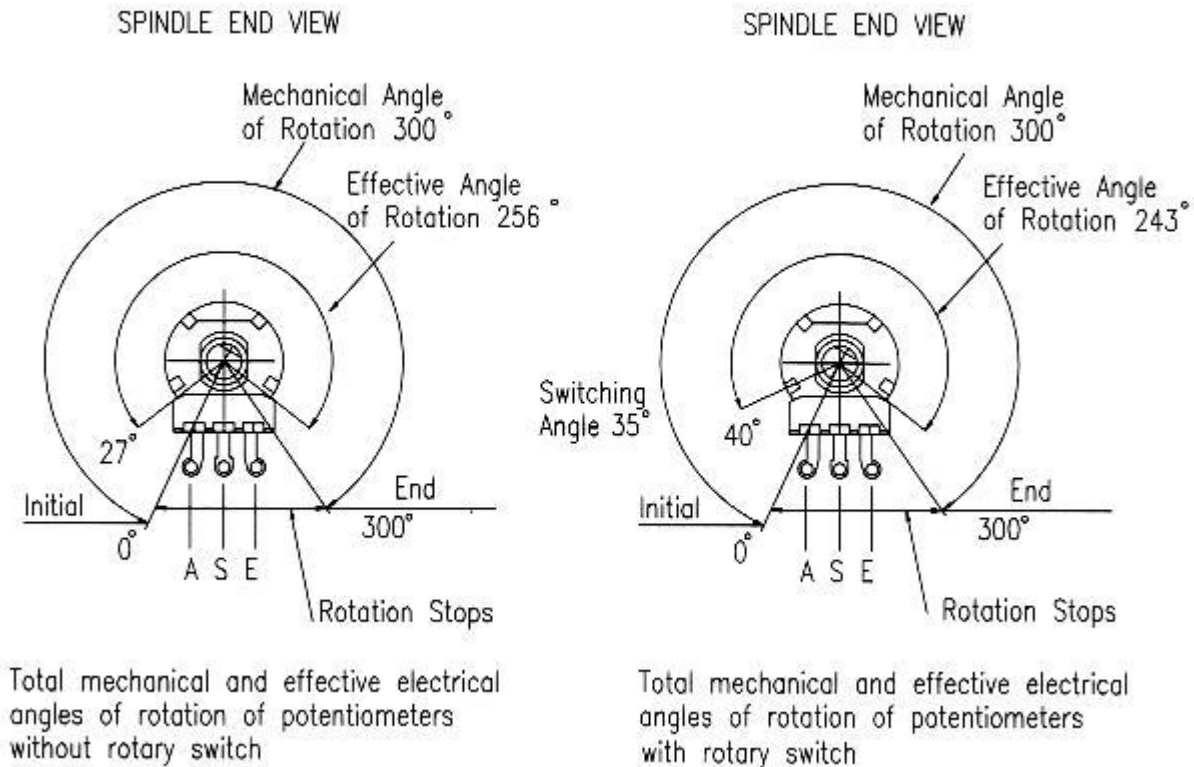
P20 MECHANICAL SPECIFICATION

- Operating Torque: 0.4 - 1.5 cN.m
- Permissible Axial Spindle Load: 100 N (5 Sec. maximum)
- Permissible Torque at End Stop: 80 cN.m
- Rotation angle: $300^\circ \pm 5^\circ$

The following two options are also available on [certain models](#):-

- Click stop (indents) for rotational tactile feedback
- Rotational torque of spindle can be made high or low

P20 angle of rotation - without and with a rotary switch



In the diagrams above **WITHOUT** switch is on the LEFT; **WITH** switch is on the RIGHT; and the potentiometer terminals are marked A, S and E.

- A = Initial termination
- S = Wiper (or moving contact) termination
- E = End termination

ELECTRICAL SPECIFICATION - UNIQUE TO P20 POTENTIOMETERS

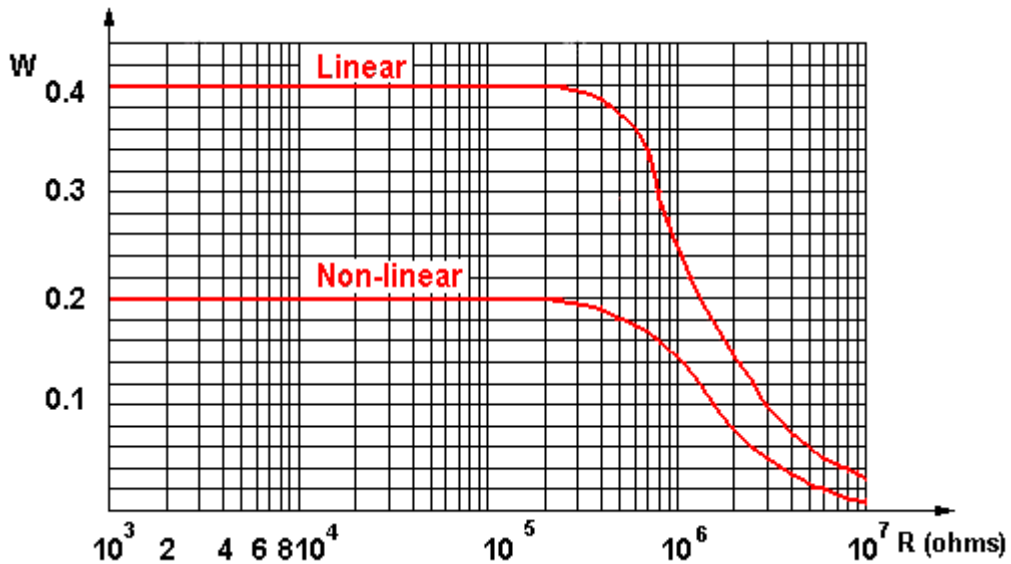
Effective rotation:

- Without a switch: 256° nominal
- With rotary switch: 243° nominal

Rated Power Dissipation @ 40°C for P20 potentiometers:

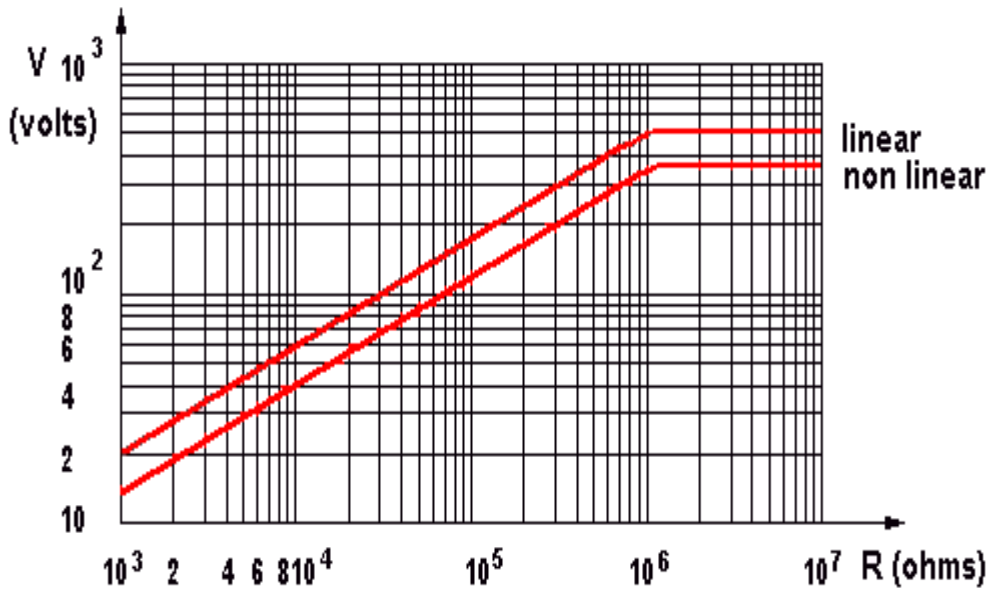
- 0.4W linear law
- 0.2W non linear law

P20 Power dissipating curve



Limiting Element Voltage: 500 V DC for P20 potentiometers

P20 Maximum working voltage curve



Insulating Voltage: 1000 V AC for 20mm potentiometers

ELECTRICAL SPECIFICATION - COMMON TO ECO, P16 AND P20 POTENTIOMETERS

Conductive polymer (plastic) track (over twice the life of carbon tracks)

Life Expectancy of >20,000 cycles (tested at 30 times per minute)

Insulation Resistance: >= 4 Gohms

Rated Resistance: E3 Series

- Optional: E6 Series
- Linear Law: 1K - 1M
- Non linear Law: 4K7 - 470K

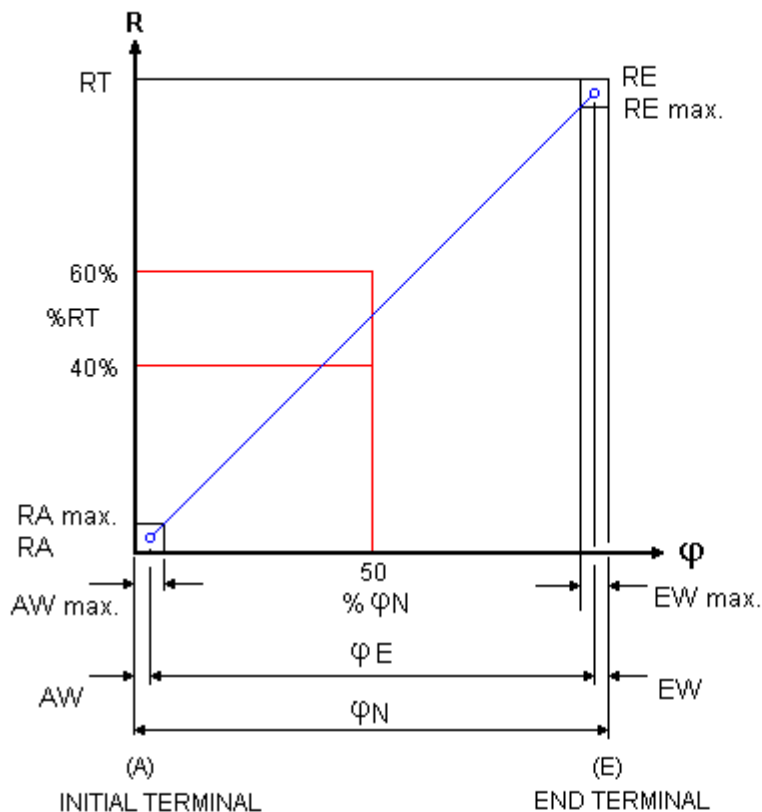
Tolerance on Rated Resistance: $\pm 20\%$

- Optional Tolerance on 1K - 1M: $\pm 10\%$

Resistance Laws (Taper):

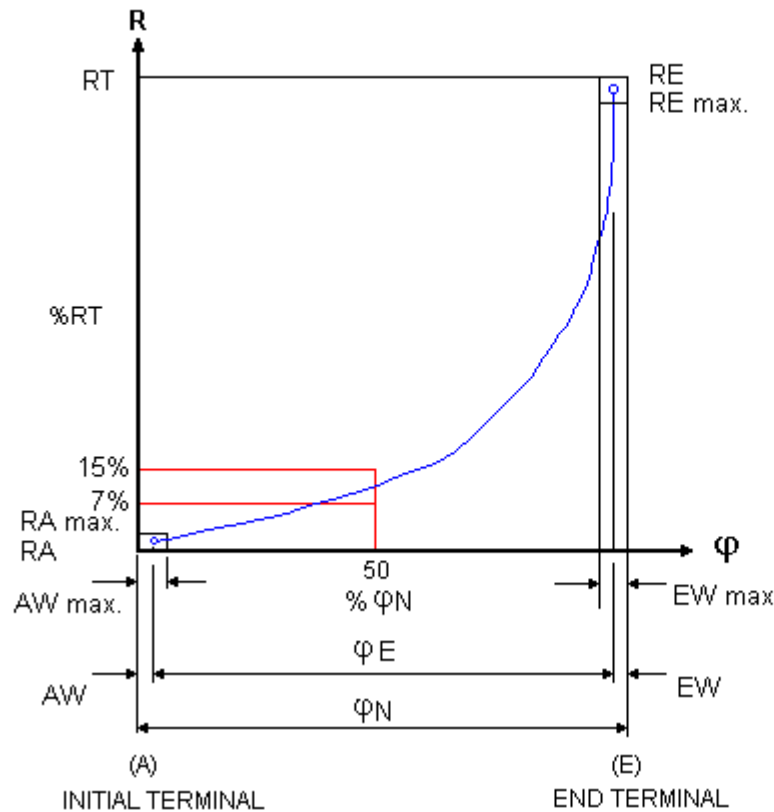
- Linear: A
- Non linear: B - Log (Audio) or C - Antilog (Reverse Audio)
- Other laws: Please refer to Sales office

Resistance law A - Linear



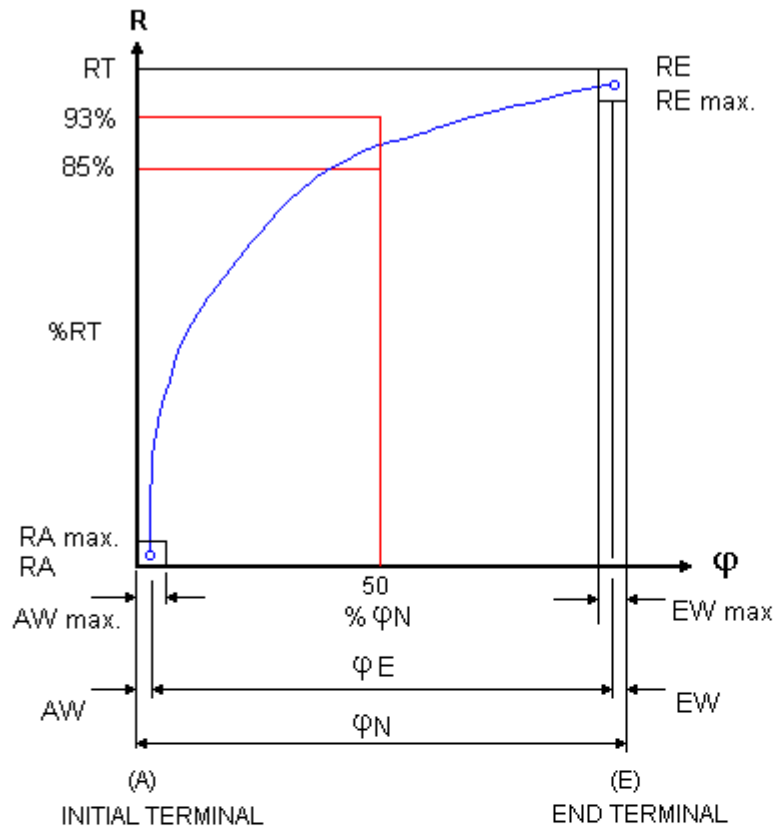
AW	Initial Path	AW max. 12% ϕN
EW	Final Path	EW max. 12% ϕN
Ra	Initial Stop Value	$\leq 1 \cdot 10^{-3} RN$ (Minimum 2 ohms)
RA	Hop-on Resistance	$\leq 1\% RN$
Re	End Stop Value	$\leq 1 \cdot 10^{-3} RN$ (Minimum 2 ohms)
RE	Hop-off Resistance	$\leq 1\% RN$
RN	Rated Resistance	
RT	Effective Resistance	
ϕ	Rotation Angle	
ϕE	Effective Electrical Angle of Rotation	
ϕN	Effective Mechanical Angle of Rotation	

Resistance law B - Log (Audio)



AW	Initial Path	AW max. 10% φN
EW	Final Path	EW max. 10% φN
Ra	Initial Stop Value	$RN \leq 10K \leq 1.10^{-3} RN$ (Minimum 2 ohms) $RN > 10K \leq 2.10^{-4} RN$ (Minimum 10 ohms)
RA	Hop-on Resistance	$RN \leq 10K$ 5% RN $RN > 10K$ 0.15% RN
Re	End Stop Value	$RN \leq 100K \leq 2.10^{-2} RN$ $RN > 100K \leq 1.10^{-2} RN$
RE	Hop-off Resistance	$RN \leq 10K < 1\% RN$ $RN > 10K$ 0.5% RN
RN	Rated Resistance	
RT	Effective Resistance	
φ	Rotation Angle	
φE	Effective Electrical Angle of Rotation	
φN	Effective Mechanical Angle of Rotation	

Resistance law C - Antilog (Reverse Audio)



AW	Initial Path	AW max. 10% ϕ_N
EW	Final Path	EW max. 10% ϕ_N
Ra	Initial Stop Value	$R_N \leq 100K \leq 2.10^{-2} R_N$ $R_N > 100K \leq 1.10^{-2} R_N$
RA	Hop-on Resistance	$R_N \leq 10K < 1\% R_N$ $R_N > 10K 0.5\% R_N$
Re	End Stop Value	$R_N \leq 10K \leq 1.10^{-3} R_N$ (Minimum 2 ohms) $R_N > 10K \leq 2.10^{-4} R_N$ (Minimum 10 ohms)
RE	Hop-off Resistance	$R_N \leq 10K 5\% R_N$ $R_N > 10K 0.15\% R_N$
RN	Rated Resistance	
RT	Effective Resistance	
ϕ	Rotation Angle	
ϕE	Effective Electrical Angle of Rotation	
ϕN	Effective Mechanical Angle of Rotation	

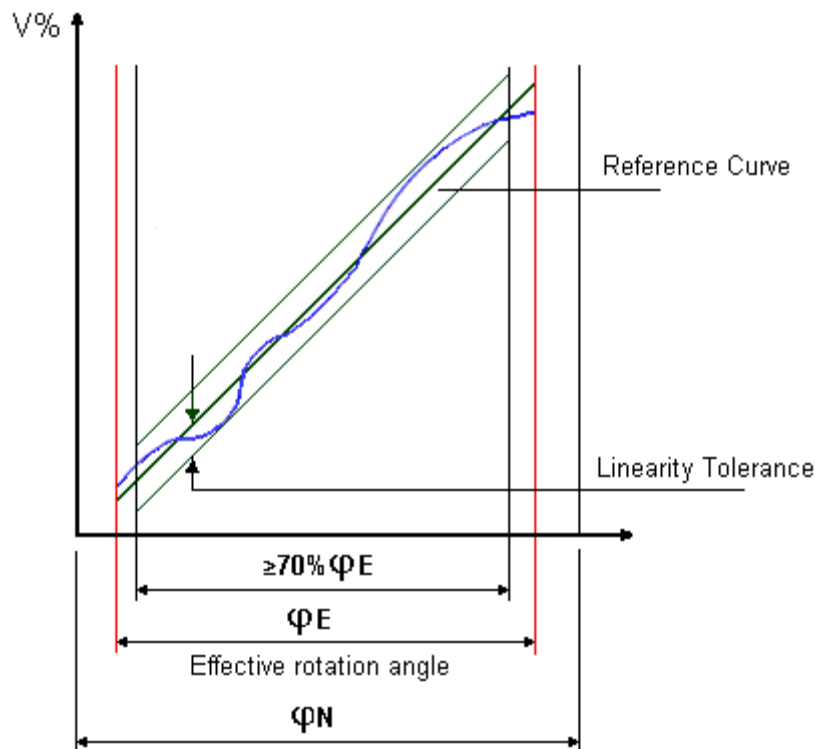
Linearity

As a basis of assessing Linearity Tolerance the independent method is the most practical, permitting as it does, the reference curve to be aligned as near as possible to the actual output curve. This avoids the use of the theoretical starting and finishing points, it is normal for the customer to realign the achieved curve with series trimmers at each end of the device if required.

Linearity Tolerance is 4% over the Nominal Resistance range of 1K0 to 1M0. The Linearity Tolerance is measured on at least 70% of the effective rotation range.

Note. In the case of Terminal and Zero-based linearity, both present constraints which increase the manufacturing difficulty and in consequence have an adverse effect on the product's price and availability.

Potentiometer linearity

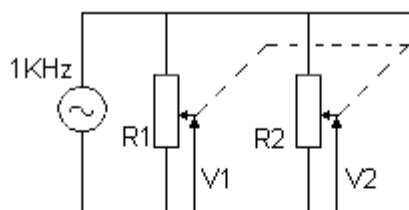


Matching Tolerance (For Tandem Stereo Potentiometers)

Tandem Potentiometers have two identical resistor units with the same variation law. The mismatching of the two resistor units, expressed in dB, is measured by the difference between the attenuations introduced by each resistor unit at various points of travel.

- Law A: 4 dB at Attenuation range 0 - 20 dB
- Law B and C: 3 dB at Attenuation range 0 - 20 dB

Matching tolerance for stereo

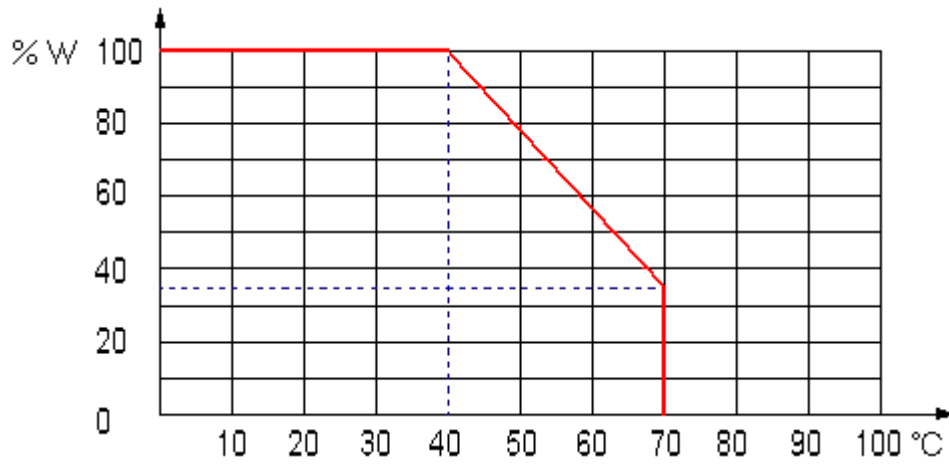


LAW	ATTENUATION RANGE	MATCHING TOLERANCE *
A	0 - 20dB	4dB
B & C	0 - 20dB	3dB

$$\text{*Matching Tolerance} = 20 \log \frac{V_1}{V_2}$$

Operating Temperature: -25°C to +70°C

Temperature derating curve



Temperature Coefficient of Resistance: +300 -500 ppm