





CARBON - MCA9

9mm carbon potentiometers with plastic enclosure and shaft.

Through-hole and SMD configurations are available. Terminals and collector are normally manufactured in tinned brass, although versions with steel terminals are also available under request. Terminals for through-hole models can be provided straight or crimped, which helps hold the component to the PCB during soldering.

Ingress Protection rating type IP 54 (high level of protection against dust and also against water splashing), according to IEC 60529. Plastic materials can be self-extinguishable according to UL 94 V-0 under request.

Tapers can be linear, log and antilog; special tapers can also be studied.

Potentiometers can be manufactured in a wide range of possibilities regarding:

- Resistance value.
- Tolerance.
- Tapers / variation laws.
- Pitch.
- Positioning of the wiper (standard is at 50% rotation).
- Housing and rotor color.
- Mechanical life.
- Click effect (up to 20 detents available).
- Self-extinguishable plastic parts, according to UL 94 V-0.

Applications

9mm potentiometers are mainly used in control applications, in different markets:

- Industrial: Timers and relays, dimmers, adjustment of output.
- Electronic appliances: volume regulation, temperature controls and function selection.
- Automotive: Lighting regulation (position adjustment and sensing for headlights), dimmers, seat heating controls.

CERMET - MCE9

9mm cermet potentiometers with plastic enclosure and shaft. Cermet potentiometers have better thermal stability, allow for higher thermal dissipation and withstand higher temperatures than carbon potentiometers.

Through-hole and SMD configurations are available. Terminals and collector are manufactured in tinned brass, although versions with steel terminals are also available under request. Terminals for through-hole models can be provided straight or crimped, which helps hold the component to the PCB during soldering.

Ingress Protection rating type IP 54 (high level of protection against dust and also against water splashing), according to IEC 60529. Plastic materials (housing and rotor) are self-extinguishable according to UL 94 V-0 for ACP's cermet potentiometers.

Tapers can be linear, log and antilog; special tapers can also be studied.

Potentiometers can be manufactured in a wide range of possibilities regarding:

- Resistance value.
- Tolerance.
- Tapers / variation laws.
- Pitch.
- Positioning of the wiper (the standard is at 50%).
- Housing and rotor color.
- Mechanical life.
- Click effect (up to 20 detents available).

Applications

9mm cermet potentiometers are used in applications where either the operating temperature is high or where the application requires product with excellent ohmic value stability:

- Electronic appliances: temperature controls.
- Automotive: climate controls, position sensors, seat heating controls.
- Industrial electronics: multimeters, oscilloscopes, time relays, measurement and test equipment.

MCA9 ▲ MCE9 ▲ HOW TO ORDER

EXAMPLE: MCA9DH5-10KA2020 SNP PI WT-9020-NE

EXAMPLE: MCE9DH5-10KA2020 SNP PI WT-9020-NE-V0

							Extra f	eatures						Assem	bled ac	cessory	
Series Roto	r Model	Packg.	Ohm value	Taper	Tol.	Life	Track	Detents	Snap in	Housing	Rotor	Wiper	Lin.	Assembly	/ Ref#	Color	Flam.
1 2	3	4	5	6	7	8	9	10	11	12	13	14	15		16		
MCA9/MCE9 D	H5		- 10K	А	2020				SNP			PI		WT	-9020	-NE	-V0
andard config	uration:			М	CA9 Thr	ough-h	ole						MCE9	Through-	hole		
imensions:									9	mm							
rotection:									,	lust-proo	,	041/0					
ubstrate:					Carbon te	echnolo		request: S	eir-extingu	iisnabie, to	meet UL	. 94 V-U		Cermet			
olor:					housing							Br		sing + whi	te rotor		
ackaging:									E	Bulk				- 0			
/iper position:									at 50	1% ±15°							
erminals:								St	raight, wit	hout crim	nping.						
larking:							Resistiv	ve value n	narked on	housing	Others	on reque	st.				
special specification - Series MCA9 MCES		ımple: M	CA9DH2,	5-10K (CODE C	00111.			11 - Term SNAP IN	Р							SNP
- Rotors									SNAP IN								SNJ
- notors									Shorter tip	o of termi	nal, TPXX	〈, where 〉		ength (under	request)	TF	PXX, ex: TI
									Steel Terr	minals							SH
- Model and pit	ch								12 - Hou	ısina							
2,5 H3,8	Н	15	V7,5	V	10	VK10) V				ner than s	tandard: -	See colo	r chart belov	<i>N</i> - C	J-color, e	x., red: CJ-
			_						40 5 .								
- Packaging				ugh-ho	le				13 - Roto		nor than s	tandard:	See colo	r chart helo	ν- P	F-color: e	v hlug RT
- Packaging				ugh-ho (blank)	le				Color: For	colors ot				r chart below		F-color; e:	
- Resistance va 0Ω 200Ω 220Ω 2	50Ω 470Ω		(Ω 2ΚΩ	(blank)	1ΜΩ 2		2Ω 4Μ7Ω	5ΜΩ	Color: For * Self-ex By default, For carbor	tinguish carbon is self-extirare VO. If o	able pro non self- nguishable	perty, Vo extinguish e property	O, for ho able, cerr can be a	r chart below busing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou:	able:	(blank) V0
ılk - Resistance va	50Ω 470Ω		(Ω 2ΚΩ	(blank)	1ΜΩ 2		2Ω 4M7Ω 12 4M7	5MΩ 5M	Color: For * Self-ex By default, For carbon and rotor a If only roto	tinguish carbon is a: self-extinare VO. If o r: RT-VO	able pro non self- nguishable	perty, Vo extinguish e property	O, for ho able, cerr can be a	ousing and met is Self-e dded. V0 m	d rotor: xtinguisha eans hou:	able:	(blank) V0
- Resistance va 0Ω 200Ω 220Ω 2	50Ω 470Ω 50 470		(Ω 2ΚΩ	(blank)	1ΜΩ 2			5MΩ 5M	* Self-ex * Self-ex By default, For carbor and rotor a If only roto	tinguish carbon is carbon is self-extir are VO. If o r: RT-VO	able pro non self- nguishable nly the ho	perty, V(extinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-e dded. V0 m	d rotor: xtinguisha eans hou:	able: sing ((blank) V0 CJ-V0, RT-
- Resistance va 0Ω 200Ω 220Ω 24 00 200 220 2	50Ω 470Ω 50 470		(Ω 2ΚΩ	(blank)	1ΜΩ 2	2M 2N		5MΩ 5M	* Self-ex: By default, For carbor and rotor a If only roto 14 - Wip Wiper po	tinguish carbon is carbon is carbon is carbon is re self-extir are VO. If o r: RT-VO	able pro non self- nguishable nly the ho	perty, V(extinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-e dded. V0 m	d rotor: xtinguisha eans hou:	able: sing ((blank) V0 CJ-V0, RT- e blank)
- Resistance va Ω 200Ω 220Ω 24 Ω 200 220 24 - Resistance la	50Ω 470Ω 50 470		(Ω 2ΚΩ	(blank)	1MΩ 2 1M 2	2M 2M		5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper pc Initial or C	tinguish. carbon is n: self-extir are V0. If o r: RT-V0 er position (S	able pro non self- nguishable nly the ho	perty, V(extinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-e dded. V0 m	d rotor: xtinguisha eans hou:	able: sing ((leave	(blank) V0 CJ-V0, RT- e blank)
- Resistance va 0Ω 200Ω 220Ω 23 00 200 220 2 - Resistance la n - Linear	50Ω 470Ω 50 470 w / taper		(Ω 2ΚΩ	(blank)	1MΩ 2l 1M 2	2M 2M		5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a ff only roto 14 - Wip Wiper pc Initial or C	r colors oth tinguish: carbon is n: self-extir are V0. If o r: RT-V0 er er position (S	able pro non self- nguishable nly the ho	extinguish a property, Viextinguish a property uusing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-e dded. V0 m V0, then CJ	d rotor: xtinguisha eans hou:	able: sing ((leave	(blank) V0 CJ-V0, RT- e blank) PI
- Resistance va ΩΩ 200Ω 220Ω 24 ΩΩ 200 220 2 - Resistance la n - Linear ng - Logarithmic	50Ω 470Ω 50 470 w / taper	500 1	(Q 2KQ K 2K	(blank) . 500KΩ 500K	1MΩ 2 1M 2	2M 2M		5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Unitial or C Final or C Others: fc	r colors att tinguish. carbon is r: self-exti rare V0. If o r: RT-V0 er osition (S CCW	able pro non self- nguishablinly the ho	perty, Viextinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou:	(leave	(blank) V0 CJ-V0, RT: e blank) PI PF ex: P3H
- Resistance va 0Ω 200Ω 220Ω 20 00 200 220 2 - Resistance la n - Linear ug - Logarithmic ntilog - Antilogarit	50Ω 470Ω 50 470 w / taper	500 1	(Q 2KQ K 2K	(blank) . 500KΩ 500K	1MΩ 2 1M 2 A B	2M 2M		5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Unitial or C Final or C Others: fc	r colors att tinguish. carbon is r: self-exti rare V0. If o r: RT-V0 er osition (S CCW	able pro non self- nguishablinly the ho	perty, Viextinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-e dded. V0 m V0, then CJ	d rotor: xtinguisha eans hou:	elable: (leave	(blank) V0 CJ-V0, RT- e blank) PI PF ex: P3H e blank)
- Resistance va 0Ω 200Ω 220Ω 20 00 200 220 2 - Resistance la n - Linear ug - Logarithmic ntilog - Antilogarit	50Ω 470Ω 50 470 w / taper	500 1	(Q 2KQ K 2K	(blank) . 500KΩ 500K	1MΩ 2 1M 2 A B	2M 2M		5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Unitial or C Final or C Others: fc	r colors ot tinguish carbon is carbon is n: self-extir are V0. If o r: RT-V0 er position (S CCW W Solution (Starburge)	able pro non self- nguishable nly the ho standard:	perty, Viextinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou:	elable: (leave	(blank) V0 CJ-V0, RT- e blank) PI PF ex: P3H
- Resistance va Ω 200Ω 220Ω 24 Ω 200Ω 220 24 - Resistance la n - Linear ng - Logarithmic ntilog - Antilogarit Special tapers ha	50Ω 470Ω 50 470 w / taper	500 1	(Q 2KQ K 2K	(blank) . 500KΩ 500K	1MΩ 2 1M 2 A B	2M 2M		5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a for only roto 14 - Wip Wiper pc Initial or C Others: for Wiper to Low torqu	r colors oti tinguish carbon is carbon is self-extir are V0. If o r: RT-V0 er position (S CCW W ollowing c rque (Sta ue, < 1.5	able pro non self- nguishable nly the ho standard:	perty, Viextinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou:	elable: (leave	(blank) V0 CJ-V0, RT- e blank) PI PF ex: P3H e blank)
- Resistance va Ω 200Ω 220Ω 24 Ω 200Ω 220 24 - Resistance la n - Linear ng - Logarithmic ntilog - Antilogarit Special tapers ha	50Ω 470Ω 50 470 w/taper hmic ve codes a	500 1	(Ω 2KΩ K 2K	(blank) . 500KΩ 500K	1MΩ 2 1M 2 A B C	2M 2M	12 4M7	5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper pc Initial or C Others: fc Wiper to	tinguish carbon is in self-extinguish carbon is in self-extinare VO. If or: RT-VO er position (SCCW) W bollowing or rque (Statue, < 1.51)	able pro non self- nguishable nly the ho standard:	perty, Viextinguish e property busing nee	D, for ho able, cerr can be a ds to be	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou:	PXH, (leave	V0 CJ-V0, RT- e blank) PI PF ex: P3H e blank)
- Resistance va ΩΩ 200Ω 220Ω 28 ΩΩ 200Ω 220Ω 28 - Resistance la n - Linear ng - Logarithmic ntilog - Antilogarit Special tapers ha - Tolerance	50Ω 470Ω 50 470 w/taper hmic ve codes a	500 1	(Ω 2KΩ K 2K i:	(blank) . 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y:	2M 2M	12 4M7	5MΩ 5M	Color: For * Self-ex * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Initial or C Cothers: fc Wiper to Low torqu 15 - Line Not contr	r colors at tinguish. carbon is in: self-extirare v0. If a r: RT-V0 er costion (SCCW) www. colors at the cost of t	able pronon and self-nguishable nily the horizontal standard:	pperty, View triple of the property of the pro	3 hours	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou: -VO.	PXH, (leave	(blank) V0 CJ-V0, RT- e blank) PF ex: P3H e blank)
- Resistance va ΩΩ 200Ω 220Ω 28 ΩΩ 200Ω 220Ω 28 - Resistance la n - Linear ng - Logarithmic ntilog - Antilogarit Special tapers ha - Tolerance	50Ω 470Ω 50 470 w / taper hmic ve codes a ±30%	500 1 assigned	(Ω 2KΩ K 2K i:	(blank) . 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y:	2M 2M	±5% 050:	5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper pc Initial or C Others: fc Wiper to Low torqu 15 - Line Not contr Independe	r colors oti tinguish carbon is r: self-extin are V0. If o r: RT-V0 er position (S CCW W ollowing c rque (Sta ue, < 1.51 parity olled ont linearity	able pronon self- non self- nguishable nly the horistandard: standard: standard: « Nom	pperty, Wextinguish e property in susing need to be sustained	3 hours for dete	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou: -VO.	PXH, (leave	(blank) V0 CJ-V0, RT- e blank) PF ex: P3H e blank) PGB
- Resistance va Ω 20ΩΩ 22ΩΩ 28 - Resistance la 1 - Linear 2 - Antilogarithmic 3 - Antilogarithmic 4 - Tolerance 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2	50Ω 470Ω 50 470 w / taper hmic ve codes a ±30% 3030	500 1 assigned	(Ω 2KΩ K 2K i:	(blank) . 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y:	2M 2M	12 4M7	5MΩ 5M	Color: For * Self-ex * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Initial or C Cothers: fc Wiper to Low torqu 15 - Line Not contr	r colors oti tinguish carbon is r: self-extin are V0. If o r: RT-V0 er position (S CCW W ollowing c rque (Sta ue, < 1.51 parity olled ont linearity	able pronon self- non self- nguishable nly the horistandard: standard: standard: « Nom	pperty, Wextinguish e property in susing need to be sustained	3 hours for dete	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou: -VO.	PXH, (leave	(blank) V0 CJ-V0, RT- e blank) PF ex: P3H e blank)
- Resistance va Ω 20ΩΩ 22ΩΩ 24 - Resistance la n - Linear ng - Logarithmic ntilog - Antilogarit Special tapers ha - Tolerance Ω% Ω20 - Operating Life	50Ω 470Ω 50 470 w / taper hmic ve codes a ±30% 3030 e (Cycles)	assigned +5	(Ω 2KΩ K 2K d: 5030	. 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y: ±10%	2M 2M 2M	±5% 050:	5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Initial or C Cothers: fc Wiper to Low torqu 15 - Line Not contr Independe Absolute	tinguish carbon is in self-extinate V0. If or r: RT-V0 er sosition (SCCW) W bollowing of carety of the carety	able pronon self- nguishable nly the ho Standard: lock pos andard: Nom	pperty, View titions; at 4.2.5Ncm, d & below	3 hours for dete	ousing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou: -VO.	PXH, (leave	(blank) V0 CJ-V0, RT- e blank) PI ex: P3H e blank) PGB
- Resistance va Ω 20ΩΩ 22ΩΩ 28 - Resistance la 1 - Linear 1 - Linear 1 - Logarithmic 1 - Tolerance 20% 200 - Operating Life 20 and ard (1.000 cy 1 - Ing life: LV + the nur	50Ω 470Ω 50 470 w / taper hmic ve codes a ±30% 3030 e (Cycles) coles)	assigned +5	(Ω 2KΩ K 2K d: 5030	. 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y: ±10%	2M 2M 2M	±5% 050s	5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Initial or C Cothers: fc Wiper to Low torqu 15 - Line Not contr Independe Absolute	tinguish. carbon isn. carbon isn. rself-extinare V0. If o r: RT-V0 er sosition (S CCW W Sollowing o rque (Sta ue, < 1.51 earity olled ent linearity o	able pronon and a controlled controlled cers with	pperty, View triple of the control o	3 hours for dete	busing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou: -VO.	PXH, (leave	(blank) V0 CJ-V0, RT- e blank) PI ex: P3H e blank) PGB
- Resistance va Ω 20ΩΩ 22ΩΩ 28 - Resistance la n - Linear g - Logarithmic ntilog - Antilogarit Special tapers ha - Tolerance 20% 220 - Operating Life andard (1.000 cy ng life: LV + the nu - Cut Track - O	50Ω 470Ω 50 470 50 470 w / taper hmic ve codes a 3030 e (Cycles) cles) mber of cyc	assigned +5	(Ω 2KΩ K 2K I: 1: 500%, -30%	. 500KΩ 500K	1MΩ 2 1M 2 A B C CODE Y ±10% 1010	2M 2M	±5% 050s	5MΩ 5M	Color: For * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Initial or C Cothers: fc Wiper to Low torqu 15 - Line Not contr Independe Absolute	tinguish. carbon is: self-extir are V0. If o r: RT-V0 er esition (S CCW W bllowing c rque (Staue, < 1.5I earity olled ant linearity o entiomet ed from te	able promon self-nguishable non self-nguishable not self-nguishabl	pperty, View triple of the control o	3 hours for dete	busing and met is Self-edded. V0 m V0, then CJ	d rotor: xtinguisha eans hou: -VO.	PXH, (leave	(blank) V0 CJ-V0, RT: e blank) PF ex: P3H e blank) PGB
- Resistance va Ω 20ΩΩ 22ΩΩ 28 - Resistance la n - Linear g - Logarithmic attilog - Antilogarit Special tapers ha - Tolerance 20% - Operating Life andard (1.000 cy ng life: LV + the nu - Cut Track - Open circuit at beg	50Ω 470Ω 50 470 w/taper hmic ve codes a 3030 e (Cycles) cles) mber of cyc	assigned +5	(Ω 2KΩ K 2K I: 1: 500%, -30%	. 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y. ±10% 1010 PC	2M 2M XXXXX n request)	±5% 050s	5MΩ 5M	Color: For * Self-ex * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper pc Initial or C Others: fc Wiper to Low torqu Independe Absolute Assemble Accessor Color of s	tinguish. carbon is: self-extir are V0. If o r: RT-V0 er position (SCW) W billowing o rque (Sta ue, < 1.51 earity olled ant linearity o linearity o gentiomet de from te y Referer shaft	able pronon self-nguishable non self-nguishable not self-nguishabl	pperty, View triple of the control o	3 hours for dete	busing and met is Self-edded. V0 m V0, then CJ	a rotor: xtinguisha eans house -VO.	PXH, (leave	(blank) V0 CJ-V0, RT: e blank) PI ex: P3H e blank) PGB e blank) VT- kample: 90 ole, black:
- Resistance va Ω 20ΩΩ 22ΩΩ 28 - Resistance la n - Linear g - Logarithmic ntilog - Antilogarit Special tapers ha - Tolerance 20% 220 - Operating Life andard (1.000 cy ng life: LV + the nu - Cut Track - O	50Ω 470Ω 50Ω 470Ω 50 470 w / taper hmic ve codes a 3030 e (Cycles) cles) mber of cyc	assigned +5	(Ω 2KΩ K 2K I: 1: 500%, -30%	. 500KΩ 500K	1MΩ 2 1M 2 A B C CODE Y ±10% 1010	2M 2M XXXXX n request)	±5% 050s	5MΩ 5M	Color: For * Self-ex * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Initial or C Others: fo Wiper to Low torqu 15 - Line Not contr Independe Absolute 16 - Pote Accessor Color of s Non self-ex	tinguish. carbon is in: self-extire vo. If o r: RT-V0 er esition (SCW) W ollowing C rque (Staue, < 1.5I earity olled int linearity of the control of th	able pro- non self- nguishable nly the ho Standard: clock pos- andard: <- Norm controlle cont	pperty, View triple of the control o	3 hours for dete	busing and met is Self-edded. V0 m V0, then CJ	a rotor: xtinguisha eans house -VO.	PXH, (leave (leave LNx%; L) V CXXX, Examp (leave) (leave)	(blank) V0 CJ-V0, RT: e blank) PI ex: P3H e blank) PGB eblank) VGB VT- kample: 90
- Resistance va 0Ω 200Ω 220Ω 28 - Resistance la 1 - Linear 10 - Logarithmic 11 - Linear 12 - Antilogarit 13 - Antilogarit 14 - Tolerance 15 - Operating Life 16 and (1.000 cy 17 - Cut Track - Open circuit at beg	50Ω 470Ω 50Ω 470Ω 50 470 w / taper hmic ve codes a 3030 e (Cycles) cles) mber of cyc	assigned +5	(Ω 2KΩ K 2K I: 1: 500%, -30%	. 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y. ±10% 1010 PC	2M 2M XXXXX n request)	±5% 050s	5MΩ 5M	Color: For * Self-ex * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper pc Initial or C Others: fc Wiper to Low torqu Independe Absolute Assemble Accessor Color of s	tinguish. carbon is in: self-extire re v0. If or: RT-V0 er esition (SCW W ollowing C rque (Statue, < 1.50 entimet to the carbon te control to the carbon te carbon te control to the carbon te carbo	able pro- non self- nguishable nly the ho Standard: Controlle controllect ers with erminal since (901s) ble. ccording	pperty, View to standard to st	3 hours for dete	ousing and met is Self-edded. V0 m V0, then CJ v0, the	a rotor: xtinguisha eans house -VO.	PXH, (leave (leave LNx%; L) V CXXX, Examp (leave) (leave)	(blank) V0 CJ-V0, RT e blank) PI ex: P3H e blank) PGB ex: LN3% Ax% VT- kample: 90 ble, black: e blank)
- Resistance va Ω 20ΩΩ 22ΩΩ 28 - Resistance la n - Linear g - Logarithmic attilog - Antilogarit Special tapers ha - Tolerance 20% - Operating Life andard (1.000 cy ng life: LV + the nu - Cut Track - Open circuit at beg	50Ω 470Ω 50 470 w / taper hmic ve codes a ±30% 3030 e (Cycles) mber of cyc pen circu inning of t of track, f	assigned +5	(Ω 2KΩ K 2K I: 1: 500%, -30%	. 500KΩ 500K	1MΩ 2l 1M 2 A B C CODE Y. ±10% 1010 PC	2M 2M XXXXX n request)	±5% 050s	5MΩ 5M	Color: For * Self-ex * Self-ex By default, For carbor and rotor a If only roto 14 - Wip Wiper po Initial or C Others: fc Wiper to Low torqu 15 - Line Not contr Independe Absolute 16 - Pote Accessor Color of s Non self-ex Self-exting	tinguish. carbon is: self-extirare v0. If o r: RT-V0 er esition (SCW) W ollowing o rque (State, < 1.5I) earity olled ant linearity o entiomet ed from to y Referer chaft xtinguisha a vi 17 modifi	able pro- non self- nguishable nly the ho Standard: Standard: Controlle C	pperty, View transport of the standard of the	3 hours for dete	evusing and met is Self-edded. V0 m V0, then CJ v0, th	a rotor: xtinguisha eans house -VO.	PXH, (leave (leave LNx%; L) V CXXX, Examp (leave) (leave)	(blank) VO CJ-VO, RT e blank) PI PF ex: P3H e blank) PGB ex: LN3% Ax% VT- kample: 9 ble, black: e blank)

ΝE

(1) black is not an option for housings.

X number of detents, evenly distributed.

Special detents are available on request: If you also need to assign a voltage value to each detent, please inquire.

XDT: 10DT

RO

VΕ

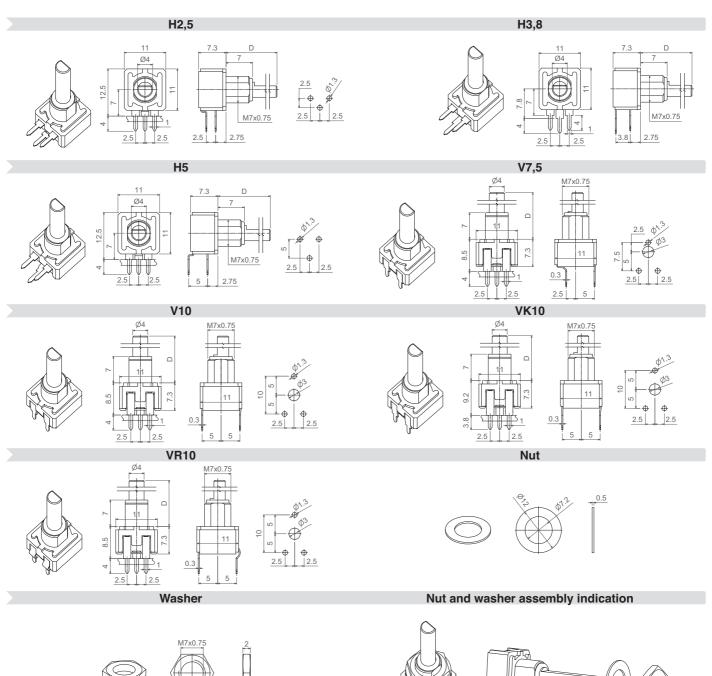
ΑM

ΑZ

GS

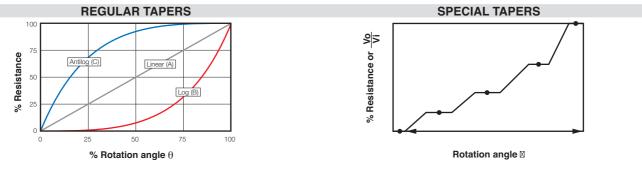
MR

All models shown here have shaft 9020, but other shafts can be chosen from the list below (Page 71). The D dimension indicated on the drawings refers to the possible length of the shaft, to be chosen at "shafts" section. Potentiometers are sold separately from the nuts and washers.



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 "detents" section.-





The cut track is an area with very high resistive value, resulting in an open circuit. It is widely used in lighting applications.

Mechanical life with cut track needs to be confirmed.

PCI = Cut at initial position, when the potentiometer is turned fully counter clockwise.

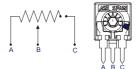
PCF = Cut at final position, when the potentiometer is turned fully clockwise.

Other positions are available on request.

PCI PCF





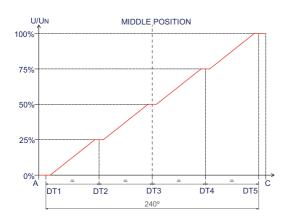




ACP's patented detent (DT) feature is especially suitable for control applications where the end user will turn a knob inserted in the potentiometer. Detents can be used to add a click feeling to the turning of the potentiometer or to control the position in which the wiper is placed, assuring a particular output value with a narrow tolerance.

Detents can be light or strong, or even a combination of different feelings. They can be evenly distributed along the angle (standard) or tailored to match customers' request. They can also be combined with special tapers: constant value areas, open circuit zone, different slopes, etc. One common example is a potentiometer with detents and matching non-overlapping voltage values in specific angular positions, used to feed in a voltage value to a microprocessor:

Example of 5DT with control of value in each DT.











Other examples of potentiometers with detents:

10DT **20DT**

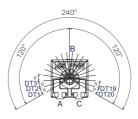












Number of standard detents (evenly distributed) already available.	1 (initial or final), 2 DT (initial and final), 3, 4, 5, 6, 7, 8,10, 20.
Maximum number of detents for feeling only	20
Maximum number of detents when the voltage value in each detent is controlled and non-overlapping.	10

Our patented design with two wipers has improved the performance of these potentiometers, giving them more stable electrical parameters, improved reliability and Contact Resistance Variation (CRV) as well as narrower tolerances for detent positioning.

For potentiometers with detents, mechanical life is also 1.000 cycles, if no additional cycles are mentioned. Please, indicate the number of cycles needed with LV (number of cycles), for example: LV07, for 7.000 cycles.

When needing a special number of detents or matching taper, a drawing is kindly requested.

Terminals

By default, terminals are always straight, as shown on the "models" section. ACP can provide crimped terminals (with snap in, "SNP" or "SNJ"), to better hold the component to the PCB during the soldering operation.

SNP SNJ





Also, there is an option of having shorter terminal tips:

Standard Terminal

Shorter terminal, for H5 TP25

Shorter terminal, TPXX (under request)







Possibilities for insertion of accessories

Should the shaft need to be positioned differently than shown on the "models" section on this catalogue, a drawing with the exact position is kindly requested.

Shafts

Shafts are available in different colors (color chart in "how to order" section) and with self-extinguishable property, according to UL 94 V-0, under request. ACP can study special shaft designs.

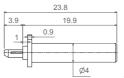
D dimension is the distance from the housing to the top of the shaft, as shown in the different models.

Shaft	9019	9020
D Dimension	17.5	23.5

9019 9020

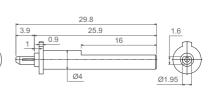












Packaging

Potentiometer model	With shaft or thumbwheel inserted?	Pieces per bigger box (250 x 150 x 70, CG on description)
H2,5 - H3,8 - H5 V7,5 - V10 - VK10 - VR10	9019, 9020	500



These are standard features; other specifications and out of range values can be studied on request.

MCA9 Through-hole

MCE9 Through-hole

Range of resistance values* Lin (A) Log (B) Antilog (C)	100Ω ≤ Rn ≤ 5MΩ 1 KΩ ≤ Rn ≤ 2M2Ω	100Ω ≤ Rn ≤ 5MΩ 1 KΩ ≤ Rn ≤ 2M2Ω			
Tolerance* $ \begin{array}{l} \text{Rn} < 100\Omega \text{:} \\ 100\Omega \leq \text{Rn} \leq 100 \text{K}\Omega \\ 100 \text{K} < \text{Rn} \leq 1 \text{M}\Omega \text{:} \\ 1 \text{M}\Omega < \text{Rn} \leq 5 \text{M}\Omega \text{:} \\ \text{Rn} > 5 \text{M}\Omega \text{:} \\ \end{array} $	+50%, -30% (out of range) ±20% ±20% ±30% +50%, -30% (out of range)	±20% ±20% ±30% -			
Variation laws	Lin (A), Log (B), Antilog (C). Of	ther tapers available on request			
Residual resistance	Lin (A), Log (B), Antilog (C) \leq 5*10-3*Rn. Minimum value 2Ω	≤2Ω			
CRV - Contact Resistance Variation (dynamic)	Lin (A) Electrical Angle 220°±20° ≤ 3%Rn. Other tapers, please inquire				
CRV - Contact Resistance Variation (static)	Lin (A) Electrical Angle 220°±20° ≤ 5%Rn. Other tapers, please inquire				
Maximum power dissipation** Lin (A) Log (B), Antilog (C)	at 50°C 0.15W 0.10W	at 70° C. 0.5W 0.20W			
Maximum voltage Lin (A) Log (B), Antilog (C)	150VDC 200VDC	200VDC			
Operating temperature	-25°C +70°C (+85°C on request)	-40°C +90°C (+125°C on request)			
Temperature coefficient $100\Omega \leq Rn \leq 10K\Omega$ $10K\Omega < Rn \leq 5M\Omega$	+200/ -300 ppm +200/ -500 ppm	±100 ppm ±100 ppm			

^{*} Out of range ohm values and tolerances are available on request, please, inquire.

Mechanical Specifications

	MCA9 Through-hole	MCE9 Through-hole				
Resistive element	Carbon technology	Cermet				
Angle of rotation (mechanical)	240	0° ± 5°				
Angle of rotation (electrical)	220° ± 20°					
Wiper standard delivery position	50%	50% ± 15°				
Max. stop torque	5 Ncm					
Max. push/pull on rotor	40 N					
Wiper torque*		<2 Ncm Potentiometers with detents: <2.5 Ncm				
Mechanical life	1.000 cycles (many more available on request, please, inquire)					

^{*} Stronger or softer torque feeling is available on request.



The following typical test results are given at 23°C \pm 2°C and 50% \pm 25% RH.

MCA9 Through-hole

MCE9 Through-hole

	Test conditions	Typical variation of nominal resistance	Test conditions	Typical variation of nominal resistance	
Damp heat	500 h. at 40°C and 95% RH	+5%, -2%	500 h. at 40°C and 95% RH	±2%	
Thermal cycles	16 h at 85°C, plus 2 h at -25°C	±2.5%	16 h at 90°C, plus 2 h at -40°C	±2%	
Load life	1.000 h. at 50°C	+0%; -6%	1.000 h. at 70°C	±2%	
Mechanical life	1.000 cycles at 10 c.p.m. and at 23°C ± 2°C	±3%	1.000 cycles at 10 c.p.m. and at 23°C ± 2°C	±3%	
Soldering effect	2 seconds at 350°C	±1%	2 seconds at 350°C	±1%	
Storage (3 years)	3 years at 23°C ± 2°C	±3%	3 years at 23°C ± 2°C	±1%	

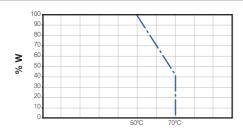
^{**} Dissipation of special tapers will vary, please, inquire.

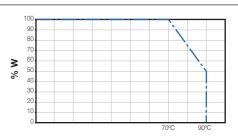
Test results



MCE9 Through-hole

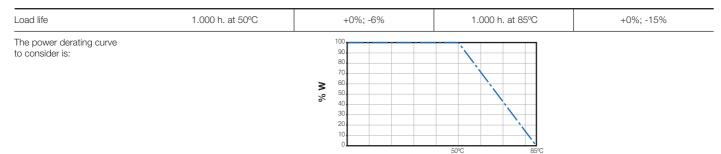
Power derating curve:





For temperatures out of range

The normal operation temperature for a carbon ACP potentiometer is -25° C to $+70^{\circ}$ C. When the temperature goes up to 85° C, the following variations should be observed:



Representation of the typical variation of nominal resistance (with 95% confidence) throughout the ohm value range:

