

## CARBON – CA6

6mm carbon potentiometers with plastic housing and 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.

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.

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

ACP's potentiometers can be adjusted from either the front or the back, both in the horizontal and the vertical adjustment types. Thumbwheels and shafts can be ordered either separately or already inserted in the potentiometer.

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.
- Self-extinguishable plastic parts according to UL 94 V-0 under request.

### Applications

6mm potentiometers are mainly used in trimming applications, in different markets:

- Industrial: Timers and relays, dimmers, adjustment of output.
- Electronic appliances: volume regulation, temperature controls and function selection.
- Automotive: Lighting regulation, dimmers.
- Measurement and test equipment.
- Telecommunication equipment (antenna amplifiers and receivers, videocomm, intercomm).
- Alarm systems.

# CA6 HOW TO ORDER

EXAMPLE: CA6XV2,5-10KA2020 SNP PI WT-6030-BA

Standard features								Extra features					Assembled accessory			
Series	Rotor	Model	Packg.	Ohm value	Taper	Tol.	Life	Track	Snap in	Housing	Rotor	Wiper	Assembly	Ref #	Color	Flam.
1	2	3	4	5	6	7	8	9	10	11	12	13	14			
CA6	X	V2,5		- 10K	A	2020		SNP				PI	WT	-6030	-BA	

Standard configuration:	CA6 Through-hole	CA6 SMD
Dimensions:	6mm	
Protection:	IP 54 (dust-proof) On request: Self-extinguishable, to meet UL 94 V-0	
Substrate:	Carbon technology	Carbon technology, special for high temperature
Color:	Blue housing + white rotor	Brown housing + grey rotor
Packaging:	Bulk or Tape & Reel	
Wiper position:	at 50% ±15°	
Terminals:	Snap in P (except model CA6VS5)	
Marking:	Resistive value marked on housing. Others on request.	

**Customized products:** A drawing is requested when ordering a customized product. Series, rotor, model and total resistive value are indicated before the code that includes all special specifications. Example: CA6XH2,5-10K CODE C00120.

## 1 - Series

■ CA6

## 2 - Rotors

D M N **X**

## 3 - Model and pitch

H2,5 HSMD V2,5 V5 VS5 **VSMD** VESMD VSMO WT...  
(Under request, not readily available)

## 4 - Packaging

Trough-hole	SMD models
Bulk (blank)... <sup>(1)</sup>	(blank)... <sup>(1)</sup>
T&R (Tape and 13" reel) (N.A.) <sup>(2)</sup>	T&R
T&R (Tape and 15" reel) (N.A.) <sup>(2)</sup>	T&R15

(1) If blank, bulk packaging is implied. (2) N.A., Not Applicable: Tape and Reel packaging is only available for SMD terminals.

## 5 - Resistance value

100Ω 200Ω 220Ω 250Ω 470Ω 500Ω 1KΩ 2KΩ ... 500KΩ 1MΩ 2MΩ 2M2Ω 4M7Ω 5MΩ  
100 200 220 250 470 500 1K 2K 500K 1M 2M 2M2 4M7 5M

## 6 - Resistance law / taper

Lin - Linear	<b>A</b>
Log - Logarithmic	B
Antilog - Antilogarithmic	C
- Special tapers have codes assigned:	CODE YXXXXX

## 7 - Tolerance

±20%	±25%	±30%	+50%,-30%	±10%	±5%
2020	<b>2525</b>	3030	5030	1010	0505

## 8 - Operating Life (Cycles)

Standard (1.000 cycles)	(leave blank)
Long life: LV + the number of cycles. ex: LV06 for 6.000 cycles. (others on request)	LVXX: ex: LV06

## 9 - Cut Track - Open circuit.

Open circuit at beginning of track, fully CCW	PCI
Open circuit at end of track, fully CW	PCF

## 10 - Terminals

SNAP IN P	SNP
Shorter tip of terminal, TPXX, where XX is tip length (under request)	TPXX, ex: TP20

## 11 - Housing

**Color:** For colors other than standard: -See color chart below- CJ-color, ex., red: CJ-RO

## 12 - Rotor

**Color:** For colors other than standard: -See color chart below- RT-color; ex., blue: RT-AZ

### \* Self-extinguishable property, V0, for housing and rotor:

By default, carbon is non self-extinguishable, cermet is Self-extinguishable: (blank)  
For carbon: self-extinguishable property can be added. V0 means housing V0  
and rotor are V0. If only the housing needs to be V0, then CJ-V0. CJ-V0, RT-V0  
If only rotor: RT-V0

## 13 - Wiper

<b>Wiper position</b> (Standard: 50% ± 15°)	(leave blank)
Initial or CCW	PI
Final or CW	PF
Others: following clock positions; at 3 hours: P3H	PXH, ex: P3H
<b>Wiper torque</b> (Standard: <2Ncm)	(leave blank)
Low torque, < 1.5Ncm	PGB

## 14 - Potentiometers with assembled accessories

Assembled from terminal side	WT
Assembled from collector side	WTI
Accessory Reference	-XXXX
See list of shafts and thumbwheels available	Example: 6030
Color of shaft or thumbwheel	-YY Example, white: BA (leave blank) -V0
Non self-extinguishable.	
Self-extinguishable according to standard UL 94	
(-V0 in box 17 modifies only the accessory, please, note.)	

### For ordering spare accessories:

Accessory reference - color- flammability. XXXX-YY-V0  
Ex. 6030-AZ-V0 is a blue self-extinguishable 6030 thumbwheel

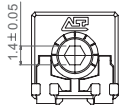
### Color chart for rotor, housing and accessories

Black <sup>(1)</sup>	White	Neutral	Transp.	Red	Green	Yellow	Blue	Grey	Brown
NE	BA	IN	TA	RO	VE	AM	AZ	GS	MR

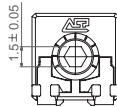
(1) black is not an option for housings.

Rotors are drawn in their standard positioning, 50% of rotation. Alternative delivery positioning can be requested. Accessories in this catalogue are designed for the X rotor, unless otherwise stated.

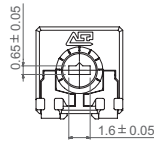
**D**



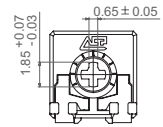
**M**



**N**



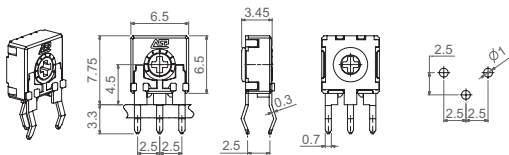
**X**



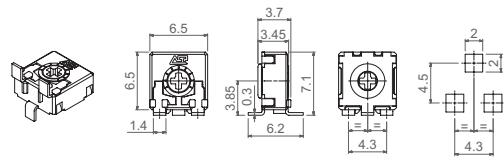
**Models**

All models shown here have the most common rotor for 6mm potentiometers: the X rotor, which can be paired with any shaft or thumbwheel from this catalogue. Different rotors are available from the menu above.

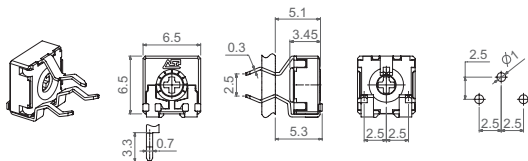
**H2,5**



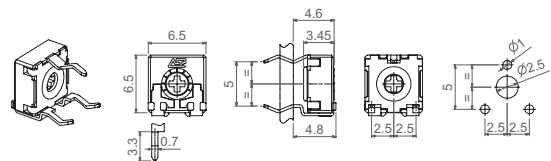
**HSMD**



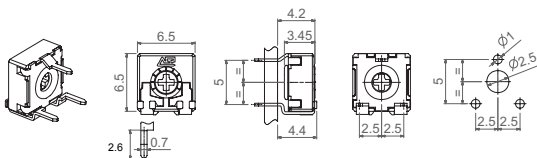
**V2,5**



**V5**

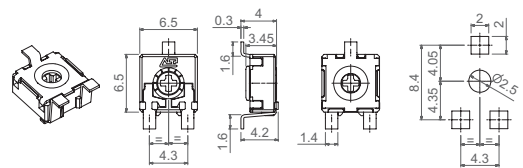


**VS5**

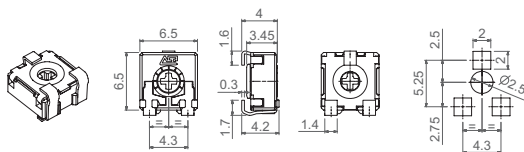


SNP not possible with VS5 model

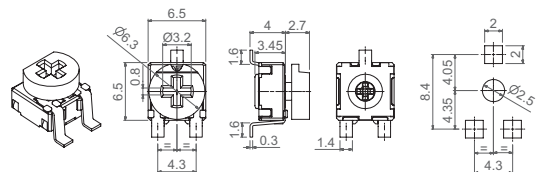
**VSMD**



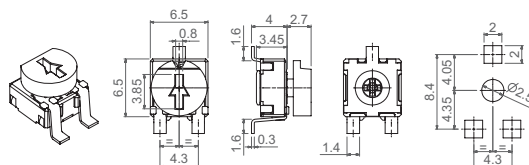
**VESMD (Under request, not readily available)**



**VSMD WT-6030**



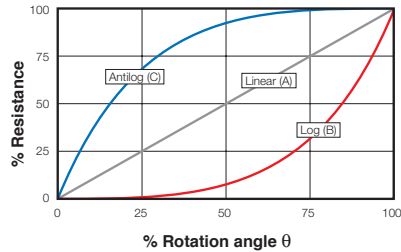
**VSMD WT-6037**



## 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.

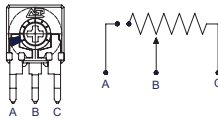
### REGULAR TAPERS



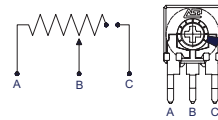
## Potentiometers with cut track

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



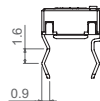
### PCF



## Terminals

By default, terminals are always crimped (with snap in, "SNP") to better hold the component to the PCB during the soldering operation, except for VS5, with short terminals that do not allow for SNP. ACP can provide straight terminals if needed.

### SNP

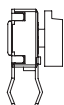


Also, there is an option of having shorter terminal tips.

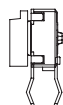
## Possibilities for insertion of accessories

Accessories can be mounted on potentiometers through either the front side (WT) or the collector side (WTI). For the specific angular position of shafts with planes, a drawing with the exact position is requested.

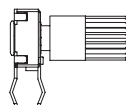
### WT Front side



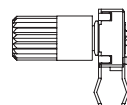
### WTI Collector side



### WT Front side



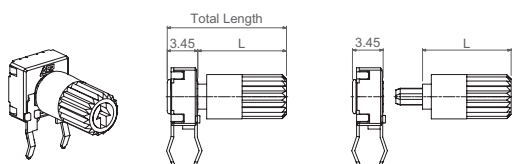
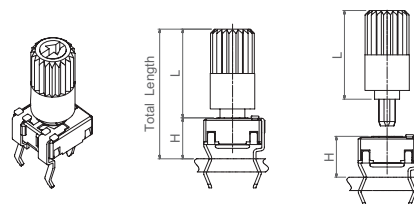
### WTI Collector side



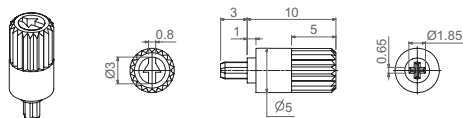
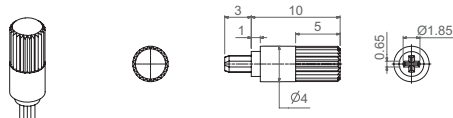
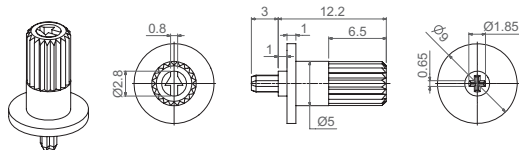
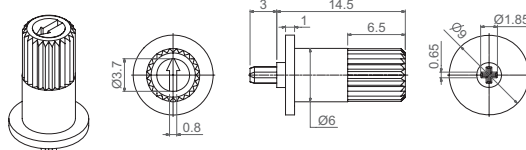
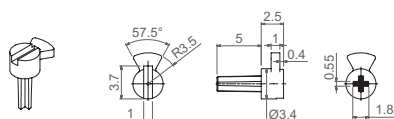
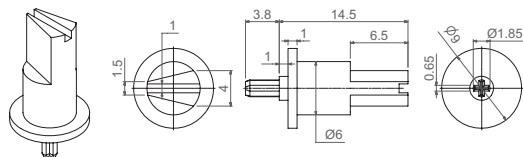
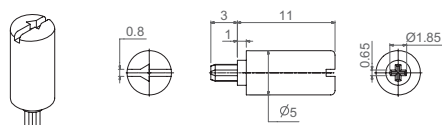
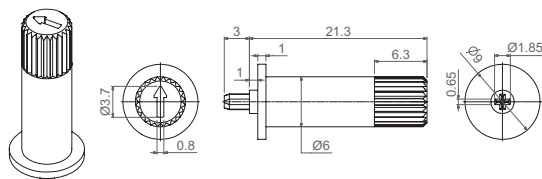
Shafts are available in different colors (color chart in “how to order” section) and with self-extinguishable property, according to UL 94 V-0, under request. ACP can study special shaft designs.

Shafts can be sold separately or delivered already mounted on the potentiometer at ACP.

When a shaft is mounted on a potentiometer, the distance from the top of the potentiometer to the top of the shaft is marked with “L” in the table below, as shown in the drawings:

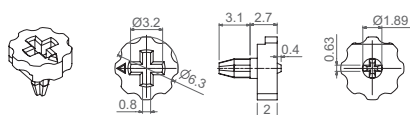
**H potentiometer + shaft**

**V potentiometer + shaft**


Shaft	6026	6022	6023	6031	6024	6025	6028	6040
L Dimension	2.5	10	10	11	12.2	14.5	14.5	21.3

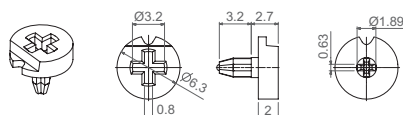
**6022**

**6023**

**6024**

**6025**

**6026**

**6028**

**6031**

**6040**


Thumbwheels 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.  
Thumbwheels can be mounted on the potentiometers at ACP (see models with WT-6030 or WT-6037) or sold separately. ACP can study special thumbwheel designs.

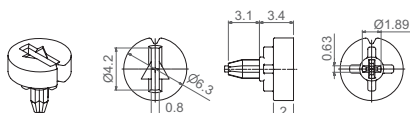
## 6001



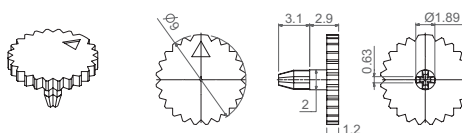
## 6030



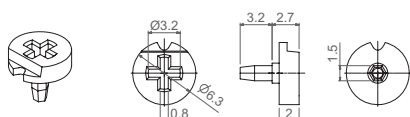
## 6032



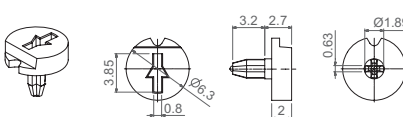
## 6034



## 6035



## 6037



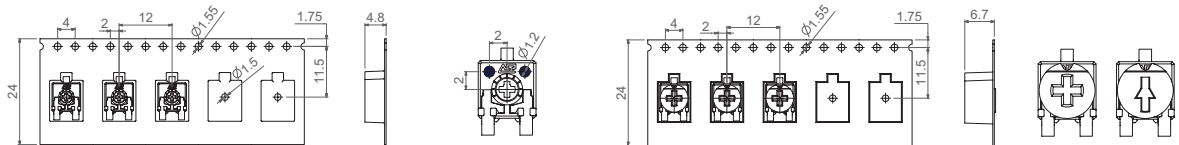
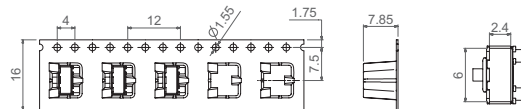
**Bulk packaging:**

Potentiometer model	With shaft or thumbwheel inserted?	Pieces per small box (150 x 100 x 70)	Pieces per bigger box (250 x 150 x 70, CG on description)
H2,5 - V2,5 - V5 VS5 - HSMD - VSMD	None, only potentiometers.	1.000	4.000
	6001, 6030, 6032, 6037	1.000	3.000
	6024, 6025, 6028	300	To be determined.
	6022, 6023, 6031	500	To be determined.

**Tape & Reel packaging:**

	With thumbwheel inserted?	13" Reel (Standard), with 24mm width tape	15" Reel, with 24mm width tape
VSMD	None, only potentiometers.	1.200 pcs per reel, 12mm step between cavities.	1.700 pcs per reel, 12mm step between cavities.
	6030 or 6037	750 pcs per reel, 12mm step between cavities.	1.100 pcs per reel, 12mm step between cavities.
HSMD	None, only potentiometers.	750 pcs per reel, 12mm step between cavities.	1.000 pcs per reel, 12mm step between cavities.
	With specific thumbwheel.	Under request.	Under request.

The 13" reel is the standard. For the 15" reel, T&R15 is added to the description.

**VSMD-T&R**
**VSMD-T&R...WT-6030 (or 6037)**

**HSMD-T&R**

**13" Reel**
**15" Reel**




## Electric Specifications

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

	CA6 Through-hole	CA6 SMD
Range of resistance values* Lin (A) Log (B) Antilog (C)	$100\Omega \leq R_n \leq 5M\Omega$ $1K\Omega \leq R_n \leq 2M2\Omega$	$100\Omega \leq R_n \leq 1M\Omega$ $1K\Omega \leq R_n \leq 1M\Omega$
Tolerance* Rn < 100Ω: 100Ω ≤ Rn ≤ 100KΩ: 100K < Rn ≤ 1MΩ: 1MΩ < Rn ≤ 5MΩ: Rn > 5MΩ:	+50%, -30% (out of range) ±20% ±20% ±30% +50%, -30% (out of range)	- ±25% ±25% ±50% -
Variation laws	Lin (A), Log (B), Antilog (C). Other tapers available on request	
Residual resistance	Lin (A), Log (B), Antilog (C) ≤ 5*10 <sup>-3</sup> *Rn. Minimum value 2Ω	
CRV - Contact Resistance Variation (dynamic)	≤3%Rn	
CRV - Contact Resistance Variation (static)	≤5%Rn	
Maximum power dissipation** Lin (A) Log (B), Antilog (C)	at 50°C 0.10W 0.06W	
Maximum voltage Lin (A) Log (B), Antilog (C)	100VDC 60VDC	
Operating temperature	-25°C ... +70°C (+85°C on request)	
Temperature coefficient 100Ω ≤ Rn ≤ 10KΩ 10KΩ < Rn ≤ 5MΩ	+200/ -300 ppm +200/ -500 ppm	+200/ -500 ppm +200/ -1000 ppm

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

\*\* Dissipation of special tapers will vary, please, inquire.

## Mechanical Specifications

	CA6 Through-hole	CA6 SMD
Resistive element	Carbon technology	Carbon technology
Angle of rotation (mechanical)	235° ± 10°	
Angle of rotation (electrical)	215° ± 20°	
Wiper standard delivery position	50% ± 15°	
Max. stop torque	4 Ncm	
Max. push/pull on rotor	9.8 N	
Wiper torque*	<2 Ncm	
Mechanical life	1.000 cycles (others available on request)	

\* Stronger or softer torque feeling is available on request.

## Test results

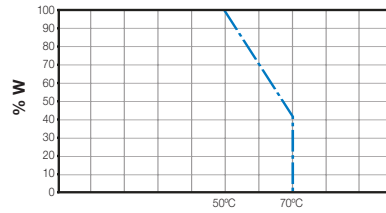
The following typical test results are given at 23°C ±2°C and 50% ±25% RH.

### CA6 Through-hole and SMD

	Test conditions	Typical variation of nominal resistance
Damp heat	500 h. at 40°C and 95% RH	+5%, -2%
Thermal cycles	16 h at 85°C, plus 2 h at -25°C	±2.5%
Load life	1.000 h. at 50°C	+0%; -6%
Mechanical life	1.000 cycles at 10 c.p.m. and at 23°C ± 2°C	±4%
Soldering effect	2 seconds at 350°C	±1%
Storage (3 years)	3 years at 23°C ± 2°C	±3%

## CA6 Through-hole and SMD

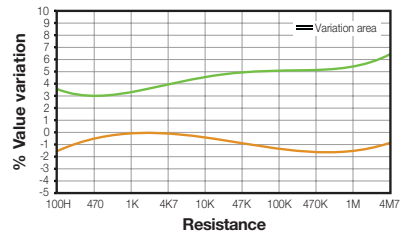
Power derating curve:



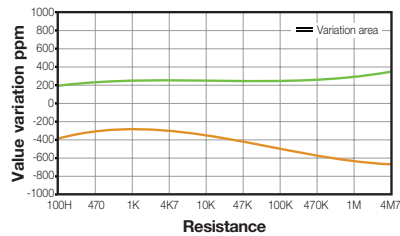
Representation of the typical variation of nominal resistance (with 95% confidence) throughout the ohm value range:

## CA6 Through-hole and SMD

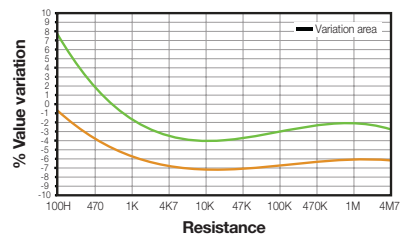
Damp heat



Temperature Coefficient



Load life



Mechanical life

