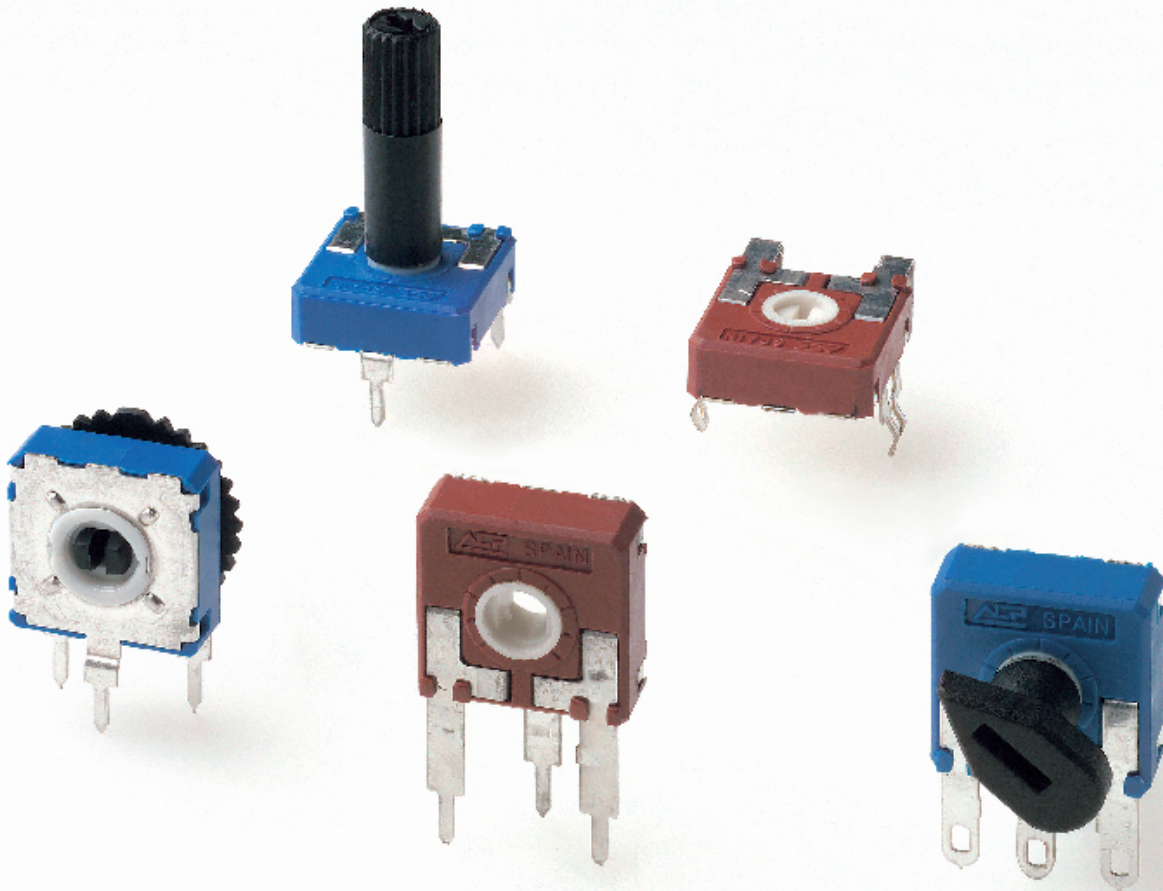


 CA14  CE14

Carbon
Potentiometers
CA

Cermet
Potentiometers
CE



CA14

14mm carbon potentiometers with plastic housing and protection type IP 5 (dust-proof).

Standard tapers available include linear, log and antilog. ACP can also study special requests.

Terminals are manufactured in tinned brass to guarantee better soldering and higher resistance to corrosion. They can be provided straight or crimped (with “snap in”), recommended to hold the potentiometer to the board prior to the soldering operation. SMD configuration can be available on request.

Thumbwheels and shafts can be provided either separately or already inserted in the potentiometer.

ACP's potentiometers can be adjusted from either side, both in the horizontal and the vertical adjustment types. There is a guide on the housing to simplify the manual adjusting operations.

Our 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%).
- Housing and rotor color.
- Mechanical life.
- Pause effect (up to 38 detents available).
- Self-extinguishable plastic parts according to UL 94 V-0.

Applications

- Electronic appliances: white goods, brown goods, small household appliances
- Heating and air conditioning equipment and thermostats.
- Automotive: dimmers, climate controls, lighting regulation (position adjustment and sensing).
- Measurement and test equipment.

CE14

14mm cermet potentiometers with plastic housing and protection type IP 5 (dust-proof). Self-extinguishable according to UL 94 V-0.

Standard taper is linear. Log, Antilog and other tapers are available on request. Laser trimming equipment in-house, allowing for very low tolerances.

Terminals are manufactured in tinned brass to guarantee better soldering and higher resistance to corrosion. They can be provided straight or crimped (with “snap in”), recommended to hold the potentiometer to the board prior to the soldering operation. SMD configuration can be available on request.

Thumbwheels and shafts can be provided either separately or already inserted in the potentiometer.

ACP's potentiometers can be adjusted from either side, both in the horizontal and the vertical adjustment types. There is a guide on the housing to simplify the manual adjusting operations.

Our 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.
- Pause effect (up to 38 detents available).

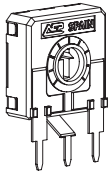
Applications

- Electronic appliances: white goods, brown goods, small household appliances, boilers, water heaters, etc.
- Heating and air conditioning equipment and thermostats.
- Automotive: dimmers, climate controls, position sensors.
- Industrial electronic: multimeters, oscilloscopes, test equipment, time relay.

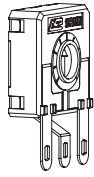
CA14 CE14

Models

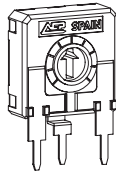
All models shown here have the standard rotor for the 14mm series, the arrow (P). Models can be manufactured with any rotor listed on the rotor menu. The color of the housing or rotor can also be modified. SMD configuration can be available on request.



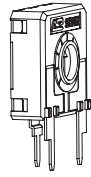
CA14 H0
CE14 H0



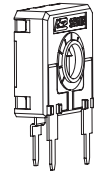
CA14 HC0
CE14 HC0



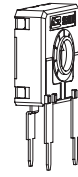
CA14 H2,5
CE14 H2,5



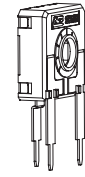
CA14 H4
CE14 H4



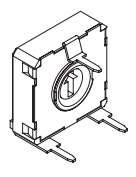
CA14 H5
CE14 H5



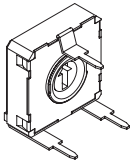
CA14 HA5
CE14 HA5



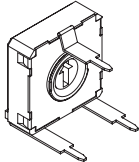
CA14 HL5
CE14 HL5



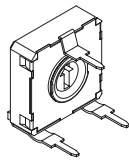
CA14 V12,5
CE14 V12,5



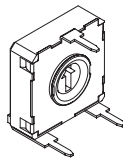
CA14 VA12,5
CE14 VA12,5



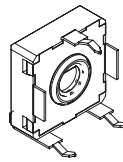
CA14 VL12,5
CE14 VL12,5



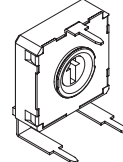
CA14 VR12,5
CE14 VR12,5



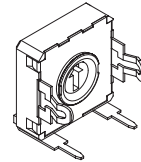
CA14 V15
CE14 V15



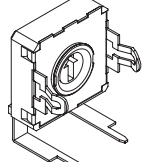
CA14 V15...CFF
CE14 V15...CFF



CA14 V17,5
CE14 V17,5



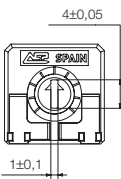
CA14 VD7,5
CE14 VD7,5



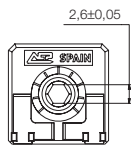
CA14 VD11
CE14 VD11

Rotors

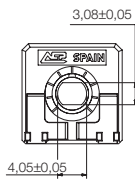
The rotor by default is the arrow (P). Accessories are designed for the N, Z and T rotors, unless otherwise stated.



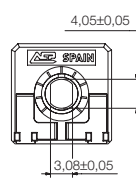
P



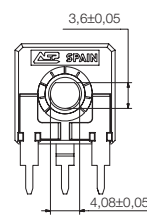
M



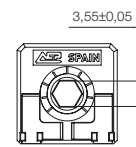
N



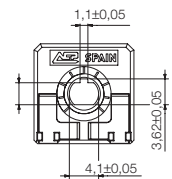
Z



D



E

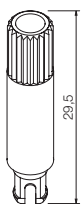


T

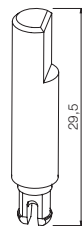
Shafts

• **CA14.** Shafts are available in different colors. They can also be provided in accordance with UL 94 V-0. Potentiometers can be supplied with shafts already inserted in. ACP can also study special shafts.

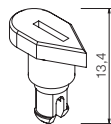
• **CE14.** Shafts provided in accordance with UL 94 V-0 are available in different colors. Potentiometers can be supplied with shafts already inserted in. ACP can also study special shafts.



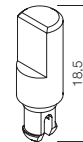
14008



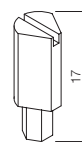
14015



14042



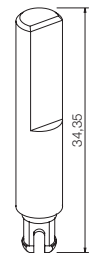
14056



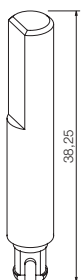
14065
For the M rotor



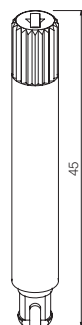
14066



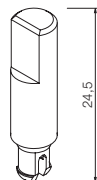
14067



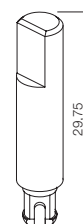
14072



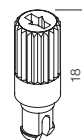
14073



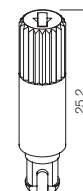
14081



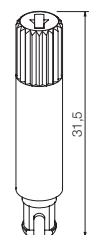
14084



14117



14187

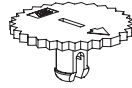


14250

Thumbwheels

• **CA14.** This thumbwheel is available in different colors. It can also be provided in accordance with UL 94 V-0. Potentiometers can be supplied with thumbwheels already inserted in. ACP can also study special requests for thumbwheels.

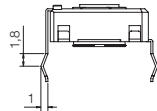
• **CE14.** This thumbwheel in accordance with UL 94 V-0 is available in different colors. Potentiometers can be supplied with thumbwheels already inserted in. ACP can also study special requests for thumbwheels.



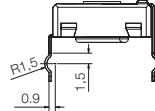
14003

Terminals

By default, terminals are always straight for the 14mm size, as shown on the “models” menu. ACP can provide crimped terminals (with “snap in”), to better hold the component to the board prior to soldering.



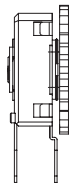
SNP



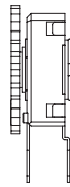
SNR

Adjustment possibilities

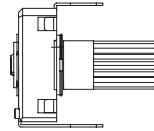
ACP's potentiometers can be adjusted through either the front side (WT) or the collector side (WTI):



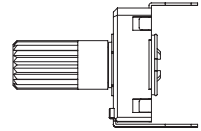
WTI
Collector side



WT
Front side



WTI
Collector side



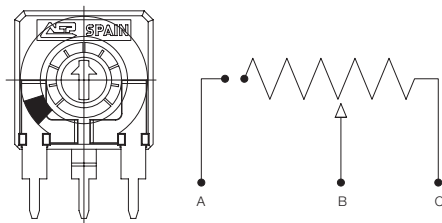
WT
Front side

Potentiometers with cut track

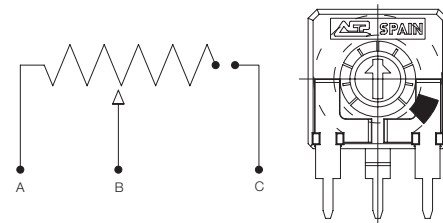
The resistive element in this potentiometer has an area with very high resistive values, resulting in an open circuit. Recommended for lighting regulation.

With cut at the beginning of the track CCW: Off-On.

With cut at the end of track- CW: On-Off. Others position available on request.



CCW: Off-On



CW: On-Off

Packaging

Bulk packaging: Potentiometers are first bagged and then introduced in boxes:

| Potentiometer model | + Shaft or thumbwheel inserted | Pieces per box (130 x 60 x 90) |
|--|--|--------------------------------|
| H2,5 - H4 - H5 - HA5 - HL5 - HC0 - H0 | - (only potentiometers) | 200 (models with * : 150) |
| V12,5 - VA12,5 - VL12,5 - V15 - V17,5* - VD11* | 14003, 14117, 14042 | 100 |
| VD7,5 - VR12,5 | 14008, 14015, 14250, 14187, 14056, 14065 14066, 14067, 14072, 14073, 14081, 14084 | 75 |

Tape and reel (T&R) packaging will be available for SMD configurations, on request.

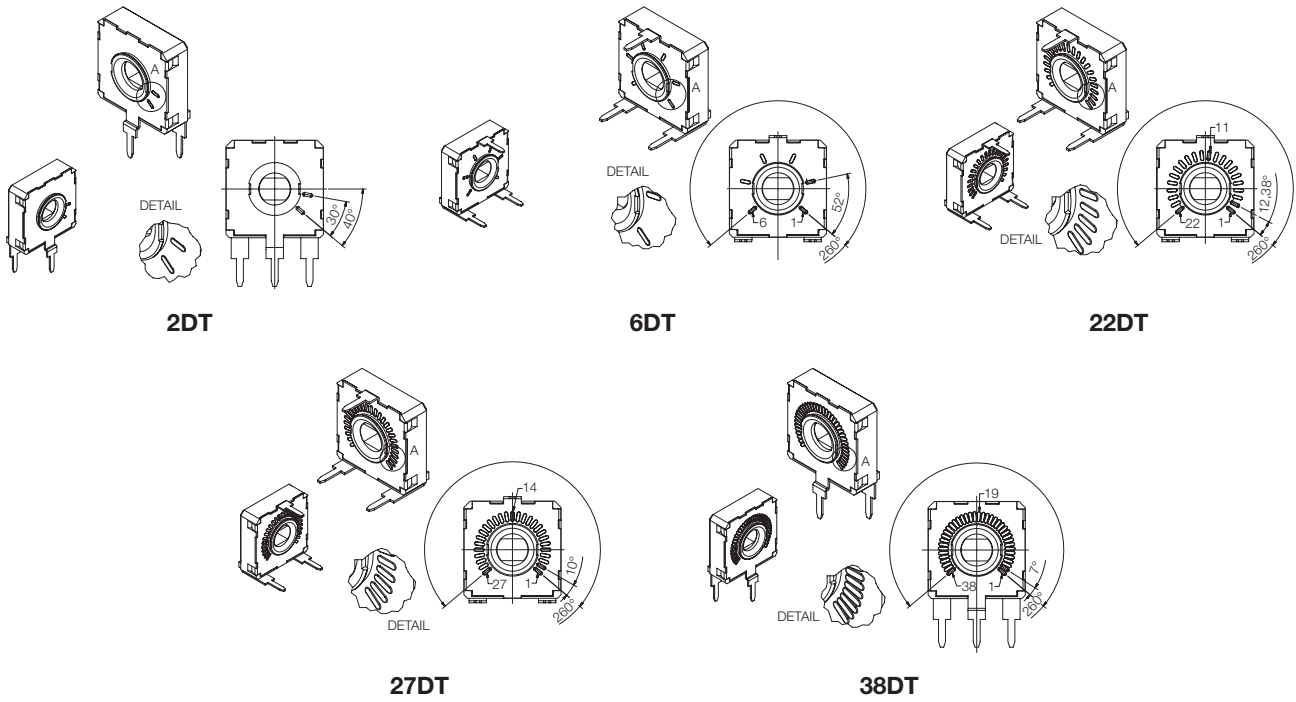
Potentiometers with detents

ACP's "detent" (DT) feature is specially suitable for control applications. Our patented design has improved the performance of these potentiometers:

- Longer mechanical life: 10.000 cycles.
- More stable electrical parameters.
- Improved reliability and Contact Resistance Variation (CRV).
- Narrower tolerances for detent positioning.

Detents can be lighter or stronger, or even a combination of both feelings. They can also be evenly distributed along the angle (standard) or tailored to match customers' request. They can also be combined with special tapers: constant value areas, different slopes, etc.

Examples:





CA14. Electric Specifications

These are standard features; other specifications can be studied on request.

| | |
|---|---|
| Range of resistance values Lin (A) Log (B) Antilog (C) | $100\Omega \leq R_n \leq 5M\Omega$ 1 K Ω ... 2,2 M Ω |
| Tolerance Special tolerances available on request | 100 Ω ... 1M Ω $\pm 20\%$ >1M Ω ... 5M Ω $\pm 30\%$ Out of range: $R_n > 5M\Omega$: +50%, -30% |
| Variation laws | Lin (A), Log (B), Antilog (C) Other tapers available on request |
| Residual resistance | Lin (A), Log (B), Antilog (C) $\leq 5 \cdot 10^{-3} R_n$ Minimum value 2 Ω |
| CRV - Contact Resistance Variation (dynamic) | $\leq 3\% R_n$ |
| CRV - Contact Resistance Variation (static) | $\leq 5\% R_n$ |
| Maximum power dissipation at 40° C. Lin (A) No Lin (B, C) | 0,25W 0,13W |
| Maximum voltage at 40°C Lin (A) No Lin (B, C) | 250VDC 200VDC |
| Operating temperature | -25°C ... +70°C |
| Temperature coefficient | 100 Ω - 10K Ω \rightarrow +200/ -300 ppm. >10K Ω - 5M Ω \rightarrow +200/ -500 ppm |



CA14. Mechanical Specifications

| | |
|--------------------------------|---|
| Resistive element | Carbon technology |
| Angle of rotation (mechanical) | 265° \pm 5° |
| Wiper position | Middle position: 50% \pm 15° |
| Angle of rotation (electrical) | 245° \pm 20° |
| Max. stop torque | 10 Ncm |
| Max. push/pull on rotor | 50 N |
| Wiper torque | < 2,5 Ncm (0,5 ... 3,5Ncm for pots. with detents) |
| Mechanical life | 1000 cycles (more available on request) (10.000 cycles for pots. with detents) |



CA14. Test

Test // Conditions // Typical variation of Nominal Resistance

| |
|--|
| Damp heat // 500 h. at 40°C and 95% RH // +5%; -2% |
| Thermal cycles // 16h at 85°C, plus 2h at -25°C // $\pm 2,5\%$ |
| Load life // 1.000 h. at 40°C // +0%; -5% |
| Mechanical life // 1000 cycles at 10 c.p.m. and at 23°C \pm 2°C // $\pm 3\%$ |
| Soldering effect // 2 seconds at 350°C // $\pm 1\%$ |
| Storage (3 years) // at 23°C \pm 2°C // $\pm 3\%$ |

For further information on tests, go to TESTS AND RELIABILITY on pages 10-11.

All specifications are given at 23°C \pm 2°C and 50% \pm 25% RH.



CE14. Electric Specifications

These are standard features; other specifications can always be studied on request.

| | |
|--|---|
| Range of resistance values Lin (A) Log (B) and Antilog(C) | $100\Omega \leq R_n \leq 5M\Omega$ 1K Ω ... 2,2M Ω |
| Tolerance Special tolerances available on request | 100 Ω ... 1M Ω $\pm 20\%$ >1M Ω ... 5M Ω $\pm 30\%$ Out of range: $R_n > 5M\Omega$: +50%, -30% |
| Variation laws | Lin (A) Log (B), Antilog (C) and other tapers available on request |
| Residual resistance | Lin (A) $\leq 2\Omega$ |
| CRV - Contact Resistance Variation (dynamic) | $\leq 3\% R_n$ |
| CRV - Contact Resistance Variation (static) | $\leq 5\% R_n$ |
| Maximum power dissipation at 70° C. Lin (A) Non Lin (B, C) | 0,7W See note 1 |
| Maximum voltage at 40°C Lin (A) Non Lin (B, C) | 250VDC See note 1 |
| Operating temperature | -40°C ... +125°C |
| Temperature coefficient | ± 100 ppm. |

Note 1: Value depends on taper, please, inquire.



CE14. Mechanical Specifications

| | |
|--------------------------------|---|
| Resistive element | Cermet |
| Angle of rotation (mechanical) | 265° \pm 5° |
| Wiper position | Middle position: 50% \pm 15° |
| Angle of rotation (electrical) | 245° \pm 20° |
| Max. stop torque | 10 Ncm |
| Max. push/pull on rotor | 50 N |
| Wiper torque | < 2,5 Ncm (0,5 ... 3,5Ncm for pots. with detents) |
| Mechanical life | 1000 cycles (more available on request) (10.000 cycles for pots. with detents) |



CE14. Test

Test // Conditions // Typical variation of Nominal Resistance

| |
|--|
| Damp heat // 500 h. at 40°C and 95% RH // $\pm 2\%$ |
| Thermal cycles // 16h at 90°C, plus 2h at -40°C // $\pm 2\%$ |
| Load life // 1.000 h. at 70°C // $\pm 2\%$ |
| Mechanical life // 1000 cycles at 10 c.p.m. and at 23°C \pm 2°C // $\pm 2\%$ |
| Soldering effect // 2 seconds at 350°C // $\pm 1\%$ |
| Storage (3 years) // at 23°C \pm 2°C // $\pm 1\%$ |

For further information on tests, go to TESTS AND RELIABILITY on pages 10-11.

CA14 CE14 HOW TO ORDER

- **EXAMPLE: CA14NH2,5-10KA2020 10DT SNP PI WT14117-BA**
- **EXAMPLE: CE14NH2,5-10KA2020 10DT SNP PI WT14117-BAV0**

| Standard features | | | | | | | | Extra features | | | | | | | Assembled accessory | | | |
|-------------------|-------|-------|-------|-----------|-------|------|------|----------------|---------|---------|---------|-------|-------|-----|---------------------|-------|-------|-------|
| Series | Rotor | 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 | | 17 |
| CA14/CE14 | N | H2,5 | | -10K | A | 2020 | | 10DT | SNP | | | | PI | | WT | 14117 | -BA | -V0 |

| Standard configuration | | Customized products | |
|------------------------|--|--|--|
| Dimensions: | 14mm | A drawing is requested to order a customized product. The code assigned will include all special specifications. | |
| Protection: | <ul style="list-style-type: none"> • CA14: IP 5 (dust-proof) • CE14: IP 5 (dust-proof). Self-extinguishable, to meet UL 94 V-0 | Series, rotor, model and total resistive value are given before the special code: CA14PH2,5 10K CODE C00111. | |
| Substrate: | <ul style="list-style-type: none"> • CA14: Carbon technology • CE14: Cermet | | |
| Color: | <ul style="list-style-type: none"> • CA14: Blue housing with white rotor • CE14: Brown housing with white rotor | | |
| Packaging: | Bulk | | |
| Wiper position: | at 50% ±15° | | |
| Terminals: | Straight, without SNAP IN. | | |
| Marking: | Resistive value marked on housing. Others on request | | |

1 - Series

- CA14
- CE14

3 - Model and pitch

| H0 | HC0 | H2,5 | H4 | H5 | HA5 | HL5 | V12,5 |
|--------|--------|--------|------|-------|-----|-------|-----------|
| VA12,5 | VL12,5 | VR12,5 | VD11 | VD7,5 | V15 | V17,5 | V15...OFF |

HSMD and VSMD models can be available on request.

5 - Resistance value

| Taper: | Lin (A) | Log (B), Antilog (C) |
|----------|---------------------------------------|---------------------------------------|
| Value Rn | 100 Ω / 100 ... / ... 5 MΩ / 5M | 1KΩ / 1K ... / ... 2,2 MΩ / 2M2 |

Other resistive values available on request.

7 - Tolerance

| | |
|---|------|
| 100 Ω ≤ Rn ≤ 1MΩ: ±20% | 2020 |
| 1 MΩ ≤ Rn ≤ 5MΩ: ±30% | 3030 |
| For out of range values: Rn > 5MΩ, tol : +50% - 30% | 5030 |

Special tolerances available: <5% ... 10%, etc.

9 - Cut track

| | |
|--------------------------------------|-----|
| At beginning of track, CCW: Off - On | PCI |
| At end of track, CW: On - Off | PCF |

11 - Crimped terminals (SNAP IN)

| | |
|-----------|-----|
| SNAP IN P | SNP |
| SNAP IN R | SNR |

2 - Rotors

| | | | | | | | |
|--------------|---|---|---|---|---|---|---|
| P (standard) | M | N | Z | D | E | T | F |
|--------------|---|---|---|---|---|---|---|

4 - Packaging

| | Through-hole | SMD models |
|---------------------|---------------------------|------------|
| Bulk | (blank)... ⁽¹⁾ | On request |
| T&R (Tape and reel) | (N.A.) ⁽²⁾ | On request |

(1) If blank, bulk packaging is implied.

(2) N.A. - Not Available: Tape and Reel packaging is only available for SMD terminals.

6 - Resistance law / taper

| | |
|---------------------------------------|-----------------------|
| Lin - Linear | A |
| Log - Logarithmic | B (on request for CE) |
| Antilog - Antilogarithmic | C (on request for CE) |
| - Special tapers have codes assigned: | CODE YXXXXX |

Please, indicate terminal position when ordering a special taper.

8 - Operating life (cycles)

| | |
|--|----------------|
| Standard (1000cycles) | -(leave blank) |
| Long life: LV + the number of cycles. ex: LV10 for 10000 cycles ⁽¹⁾ | LVXX: ex: LV10 |

(1) Others on request.

10 - Detents (DT)

| | |
|-----------------------------|-----------|
| One detent at the beginning | DTI |
| One detent at the end | DTF |
| X number of detents | XDT: 10DT |

Detents readily available: 1, 2, 3, 4, 5, 6, 8, 9, 17, 22, 27, up to 38 -evenly distributed along 260°±3°.

Others on request.

12 - Housing color

- **CA14:** standard is blue
- **CE14:** standard is brown

With other colors -See color chart below-, for example, red CJ-color, ex.: CJ-RO

13 - Rotor color

Standard: white. With other colors: see color chart below RT-color; ex., red: RT-RO

15 - Linearity

Independent linearity controlled & below x%, for example, 3%: LN3% LNx%; ex: LN3%
Absolute linearity controlled & below x% LAx%

17 - Flammability (according to UL 94 V-0)

- **CA14:** Not self-extinguishable (leave blank)
Self-extinguishable according to standard UL 94 (including all plastic parts of the potentiometer: rotor, housing and accessory. If only one part needs to be V0, please, inform) -V0
- **CE14:** All accessories assembled with cermet potentiometers will have the self-extinguishable property according to standard UL 94 -V0

For ordering spare accessories

Accessory reference - color- flammability. Ex. 14117-AZ-V0 is a blue self-extinguishable 14117 thumbwheel XXXX-YY-__

Color chart for rotor, housing and accessories

| | |
|----------------------|----|
| Black ⁽¹⁾ | NE |
| White | BA |
| Neutral | IN |
| Transparent | TA |
| Red | RO |
| Green | VE |
| Yellow | AM |
| Blue | AZ |
| Grey | GS |
| Brown | MR |

(1) Black is not an option for housings.

14 - Wiper

| | |
|---|---------------|
| Wiper position (Standard: 50% ± 15°) | (leave blank) |
| Initial or CCW | PI |
| Final or CW | PF |
| Others: following clock positions; at 3hours: P3H | PXH, ex: P3H |
| Wiper torque (Standard: <2,5Ncm) | (leave blank) |
| Low torque (< 1.5Ncm) | PGB |

16 - Potentiometers with assembled accessories

| | |
|---|---------------------------|
| Assembled from terminal side | WT |
| Assembled from collector side | WTI |
| Accessory Reference See list of shafts and thumbwheels available | XXXX Example: 14117 |
| Color of shaft or thumbwheel | -YY Example, white: BA |

Specifications on this catalogue are for reference only; they are subject to change without notice.