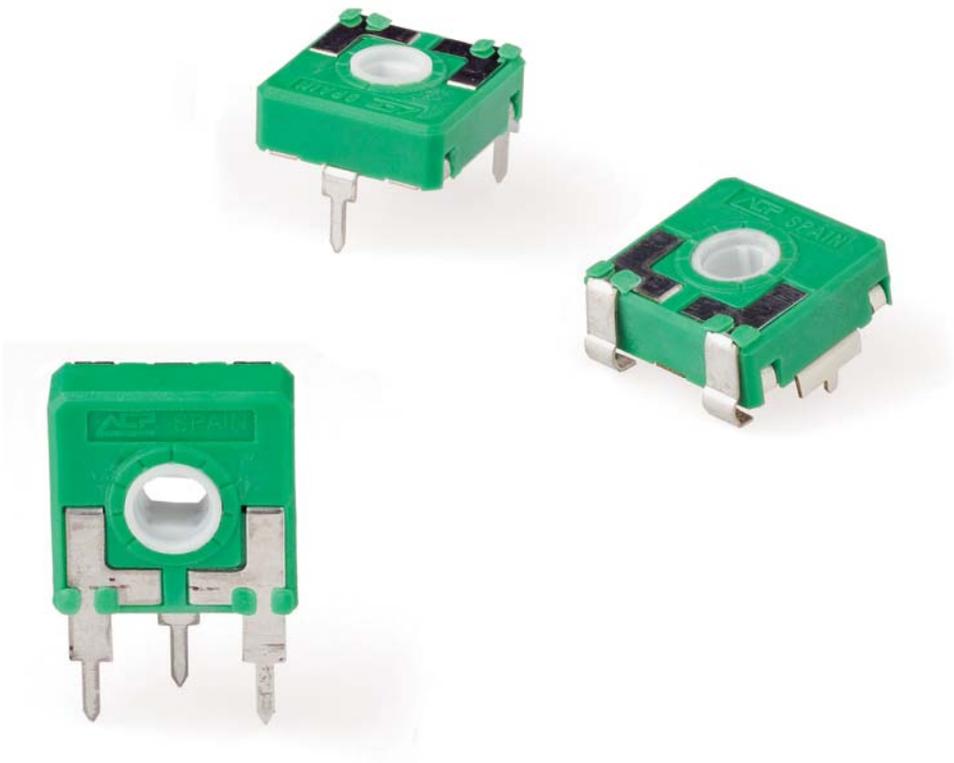


# RS14

Rotary Sensor



## RS14

14mm Rotary Sensor with up to 1.000.000 cycles of mechanical life on its standard configuration, making it particularly appropriate for control applications.

RS14 has 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 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.

Standard taper is linear, with linearity of  $\pm 3\%$ . ACP can study other special tapers (even cut tracks, step curves with areas of constant value, etc), as well as more strict linearity.

Thumbwheels and shafts can be provided either separately or already inserted in the sensor. Our RS14 can be manufactured in a wide range of possibilities regarding: resistance value, tolerance, tapers, pitch, positioning of the wiper, housing and rotor color.

### Applications

- Household appliances: temperature control, position sensor.
- Automotive: position adjustment and sensing.
- Industrial controls.

# RS14 HOW TO ORDER

EXAMPLE: **RS14TV15-10KA3030 WT-14008-NE-V0**

| 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                  |        |       |       |
| RS14              | T     | V15   |        | - 10K     | A     | 3030 |      |                |         |         |         |       |       |      | WT                  | -14008 | -NE   | -V0   |

| Standard configuration: | RS14 Through-hole  | RS14 SMD  |
|-------------------------|--|---|
| Dimensions:             | 14mm   |   |
| Protection:             | IP 54 (dust-proof)<br>On request: Self-extinguishable, to meet UL 94 V-0 |   |
| Substrate:              | Carbon technology  | Carbon technology, special for high temperature |
| Color:                  | Green housing + white rotor  | Green housing + grey rotor                      |
| Packaging:              | Bulk   |   |
| Wiper position:         | at 50% ±15°  |   |
| Terminals:              | Straight, without crimping.  |   |
| 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: RS14TV15-10K CODE C00111.

## 1 - Series

■ RS14

## 2 - Rotors

F N T Z

## 3 - Model and pitch

H0 HC0 H2,5 H4 H5 HA5 HL5 V12,5 VA12,5 VL12,5  
VR12,5 V15 VJ15 (V15) ... OFF V17,5 VD7,5 VD11 VSMD VSMD ... CY  
HSMD (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

10K

The RS14 has 10K, linear taper and ±30% by default. Other resistive values, tolerances and tapers (log, antilog, cut tracks, constant value areas, etc.) can be studied on request. Please, enclose a drawing when ordering special tapers.

## 6 - Resistance law / taper

Lin - Linear A  
- Special tapers have codes assigned: CODE YXXXXX

## 7 - Tolerance

±30%

3030

## 8 - Operating Life (Cycles)

Standard (1.000 cycles) (leave blank)

Long life: LV + number of cycles. i.e: LV100 for 100.000 cycles. LV150, LV1M LVXXX: ex: LV100

## 9 - Cut Track – Open circuit.

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

## 10 - Detents (DT)

Not applicable for RS14

## 11 - Terminals

|   |                |
|---|----------------|
| SNAP IN P   | SNP            |
| SNAP IN J   | SNJ            |
| Shorter tip of terminal, TPXX, where XX is tip length (under request) | TPXX, ex: TP30 |

## 12 - Housing

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

## 13 - 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. Self-extinguishable property (blank) can be added. V0 means housing and rotor are V0. V0 Non self-extinguishable. Self-extinguishable according to standard (leave blank) -V0  
If only the housing needs to be V0, then CJ-V0. CJ-V0, RT-V0  
If only rotor: RT-V0

## 14 - 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  |

**Wiper torque** (Standard: <1.5Ncm) (leave blank)  
Stronger or softer torque feeling is available on request.

## 15 - Linearity

|  |                |
|--|----------------|
| Standard linearity 3%  | (leave blank)  |
| Independent linearity controlled & below x%, for example, 2%: LN2% | LNx%; ex: LN2% |
| Absolute linearity controlled & below x%                           | LAX%           |

Other features could be available on request, please, ask.

## 16 - Potentiometers with assembled accessories

|  |  |
|--|--|
| Assembled from terminal side   | WT   |
| Assembled from collector side  | WTI  |
| Accessory Reference  | -XXXXX Example: 14117  |
| See list of shafts and thumbwheels available   |  |
| Color of shaft or thumbwheel   | -YY Example, white: BA   |
| Non self-extinguishable. Self-extinguishable according to standard (leave blank) -V0 | UL 94 (-V0 in box 17 modifies only the accessory, please, note.) |

**For ordering spare accessories:** Accessory reference - color- flammability.  
Ex. 14117-AZ-V0 is a blue self-extinguishable 14117 thumbwheel XXXX-YY-V0

## 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    |

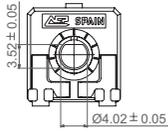
(1) black is not an option for housings.

## Rotors

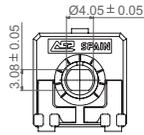
T is the standard rotor for RS14. Rotors are drawn in their standard positioning, 50% of rotation. Alternative delivery positioning can be requested.

Accessories in this catalogue are designed for N, Z and T rotors, unless otherwise stated. Other rotor styles, on request.

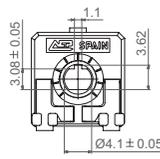
**F**



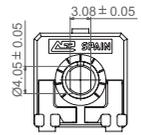
**N**



**T**



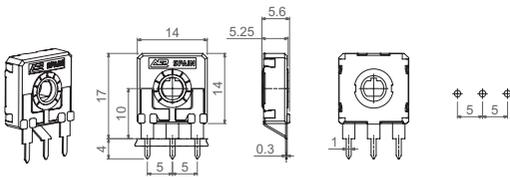
**Z**



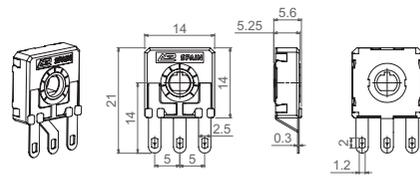
## Models

All models shown here have the most common rotor for 14mm potentiometers, the N rotor, even though RS14 is most commonly used with T rotor, as seen in the menu above.

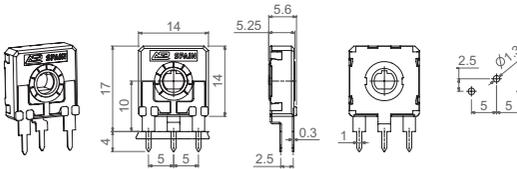
**H0**



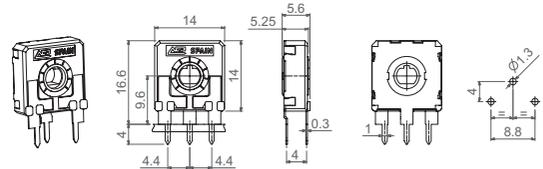
**HC0**



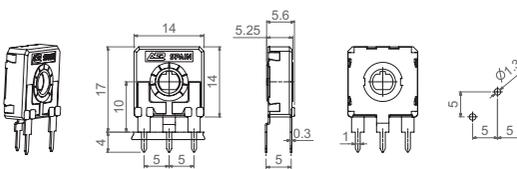
**H2,5**



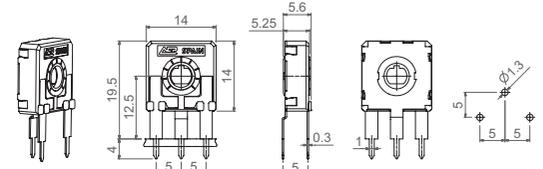
**H4**



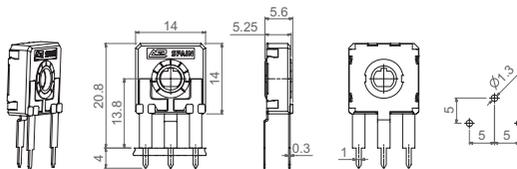
**H5**



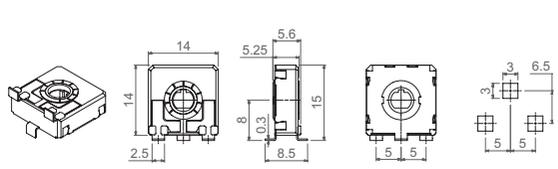
**HA5**



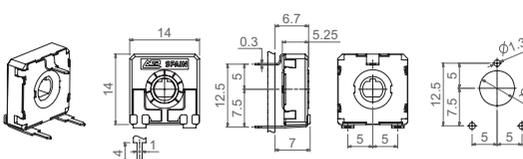
**HL5**



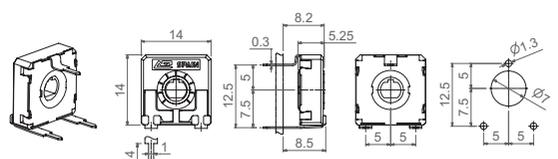
**HSMD (Under request, not readily available)**



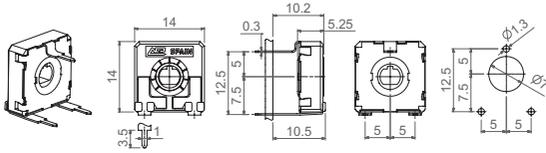
**V12,5**



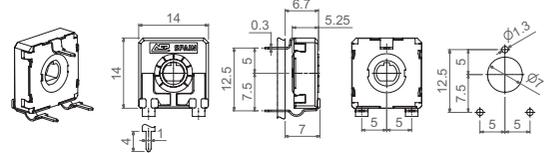
**VA12,5**



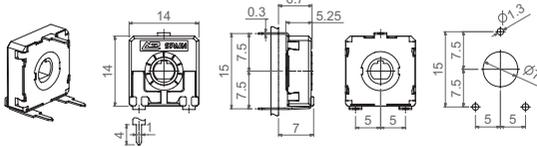
VL12,5



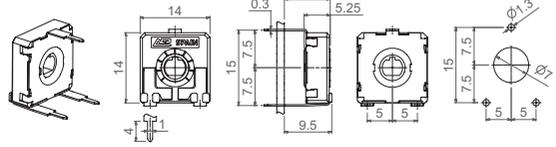
VR12,5



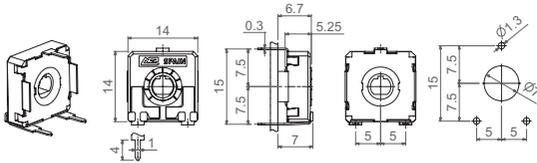
V15



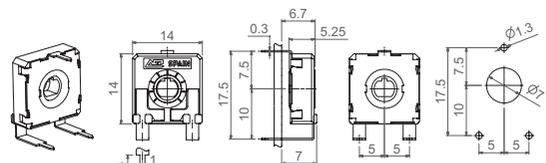
VJ15



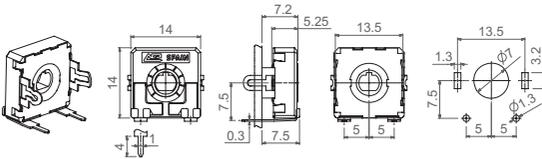
V15...CFF



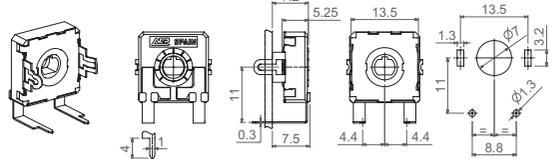
V17,5



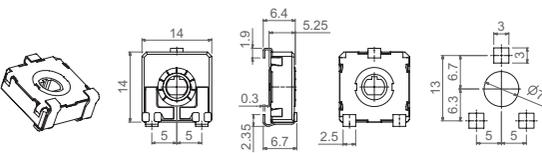
VD7,5



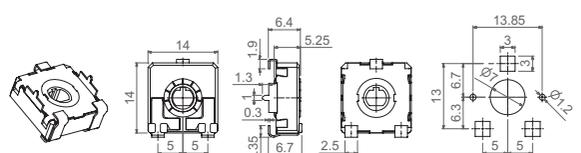
VD11



VSMD



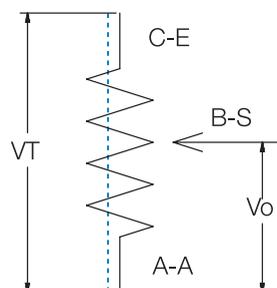
VSMD...CY



Tapers

The standard taper is linear (A) and the standard ohm value is 10K, since a RS14 will normally be used as a voltage divider. For other tapers, please, inquire.

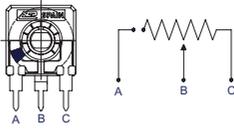
Voltage Divider



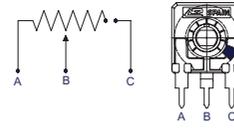
## Potentiometers with cut track

The cut track is an area with very high resistive value, resulting in an open circuit. It is widely used in lighting applications. Mechanical life available with cut track needs to be confirmed case by case.  
 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



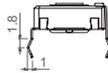
### PCF



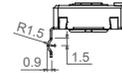
## Terminals

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

### SNP



### SNR



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

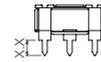
### Standard Terminal



### Shorter terminal, for V12,5 TP30



### Shorter terminal, TPXX (under request)



## 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.

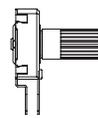
### WT Front side



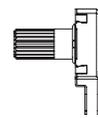
### WTI Collector side



### WT Front side



### WTI Collector side



## Shafts

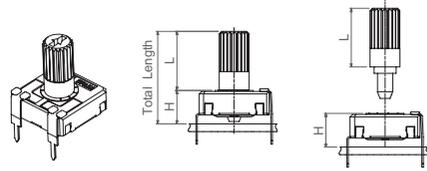
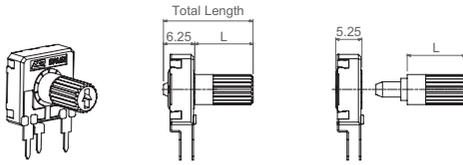
Shafts are available in different colors (color chart in “how to order” section) and with self-extinguishable property, according to UL 94 V-0, under request. ACP can study special shaft designs.

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

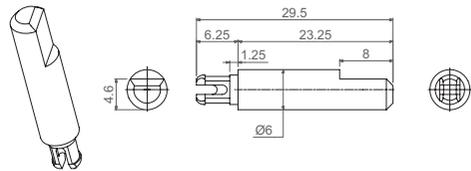
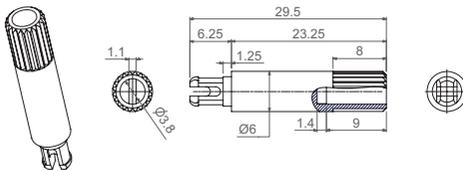
### V potentiometer + shaft



| Shaft       | 14042 | 14252 | 14065<br>(For E rotor) | 14117 | 14056 | 14253 | 14081 | 14187 | 14251 | 14067 | 14008 | 14015 | 14066 | 14084 | 14250 | 14072 | 14073 |
|-------------|-------|-------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L Dimension | 7.05  | 11.25 | 11.50                  | 11.70 | 12.25 | 13.75 | 18.25 | 18.75 | 18.75 | 27.75 | 23.25 | 23.25 | 23.50 | 23.50 | 25.00 | 31.75 | 38.50 |

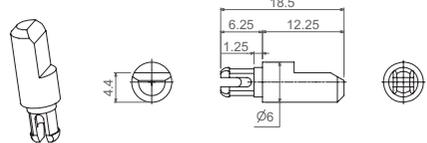
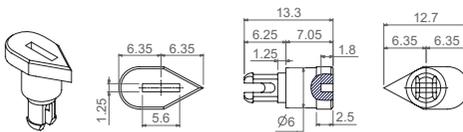
### 14008

### 14015



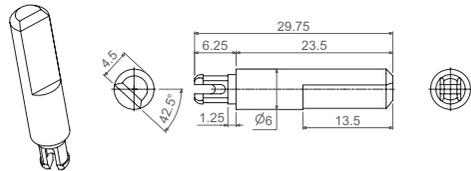
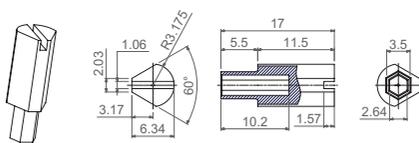
### 14042

### 14056



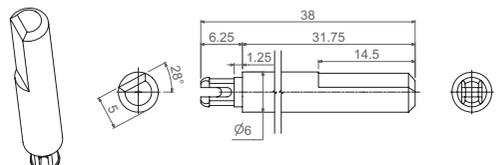
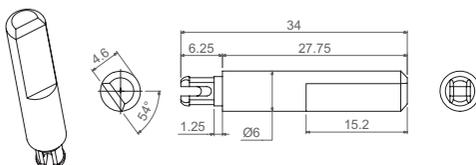
### 14065 (For E rotor)

### 14066

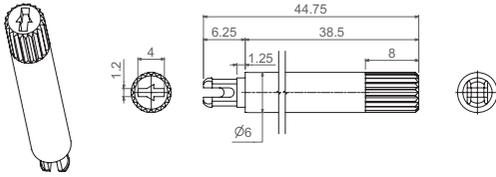


### 14067

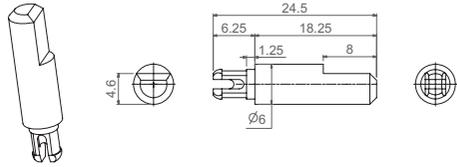
### 14072



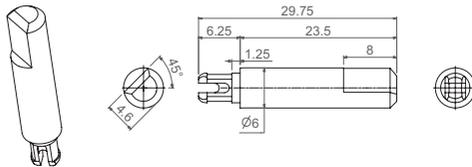
14073



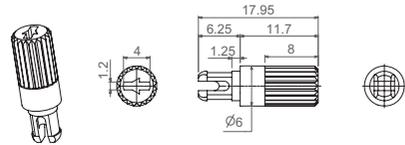
14081



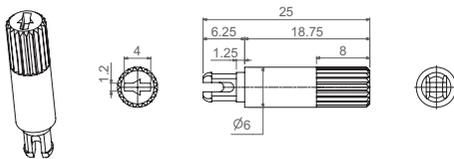
14084



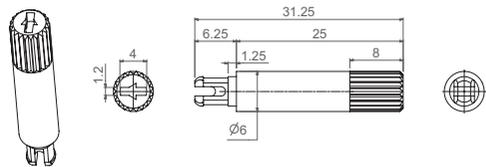
14117



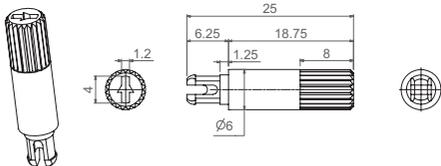
14187



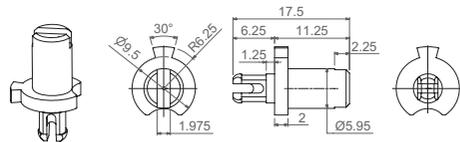
14250



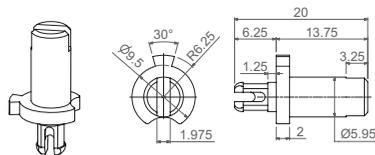
14251



14252

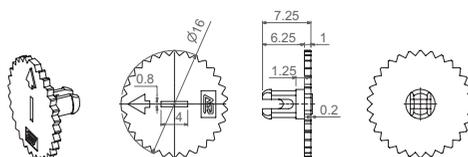


14253



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 or sold separately. ACP can study special thumbwheel designs.

14003



## Packaging

### Bulk packaging:

| RS14 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 - H4 - H5- HA5- HL5- H0<br>V12,5 - V15 - VA12,5 - VL12,5<br>VJ15 - V17,5* - VD11*<br>VD7,5* - VR12,5 | None, only potentiometers.  | 200<br>150 for models with*           | 700<br>600 for VJ15 - V17,5 - VD7,5<br>500 for VD11       |
|   | 14003, 14117, 14042,<br>14056, 14065  | 100                                   | 400<br>350 for models with*                               |
|   | 14008, 14015, 14066, 14067,<br>14072, 14073, 14081, 14084,<br>14187, 14250. | 75                                    | To be determined.   |

For models with \* and an inserted accessory, please, inquire about the quantity per box in that case.

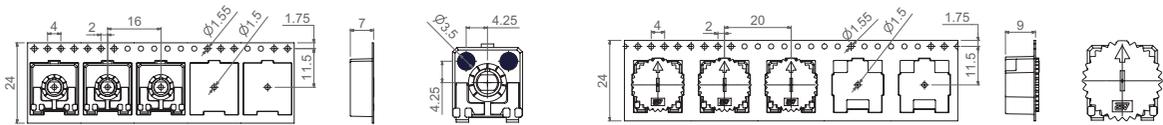
### Tape & Reel packaging:

|            | With thumbwheel inserted?  | 13" Reel (Standard), with 24mm width tape     | 15" Reel, with 24mm width tape                |
|------------|----------------------------|---|---|
| VSMD       | None, only potentiometers. | 500 pcs per reel, 16mm step between cavities. | 800 pcs per reel, 16mm step between cavities. |
|            | 14003                      | 350 pcs per reel, 20mm step between cavities. | To be determined.                             |
| VSMD... CY | None, only potentiometers. | 350 pcs per reel, 20mm step between cavities. | 500 pcs per reel, 20mm step between cavities. |
|            | 14003                      | To be determined.                             | To be determined.                             |

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

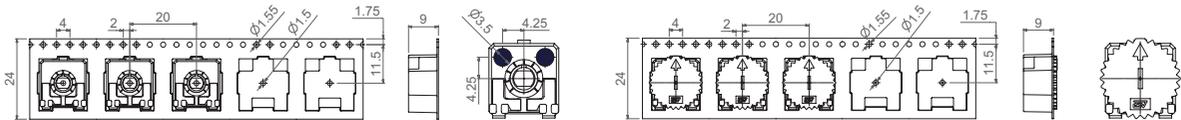
#### VSMD-T&R

#### VSMD-T&R...WT-14003



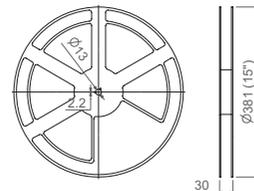
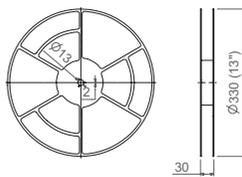
#### VSMD-T&R ... CY

#### VSMD-T&R...CY WT-14003



#### 13" Reel

#### 15" Reel



## Electric Specifications

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

|  | RS14 Through-hole   | RS14 SMD                        |
|--|---|---------------------------------|
| Range of resistance values*<br>Lin (A)                         | Standard value is 10K, as voltage divider use is supposed |                                 |
| Tolerance*   | 30%   |                                 |
| Variation laws   | Lin (A). Other tapers available on request                |                                 |
| Residual resistance  | Minimum value 2Ω  |                                 |
| CRV - Contact Resistance<br>Variation (dynamic)                | ≤3%Rn   |                                 |
| CRV - Contact Resistance Variation (static)                    | ≤5%Rn   |                                 |
| Maximum power dissipation** Lin (A)                            | at 50°C, 0.15W  |                                 |
| Maximum voltage Lin (A)  | 250VDC  |                                 |
| Operating temperature  | -25°C ... +85°C   |                                 |
| Linearity  | 3%  |                                 |
| Temperature coefficient<br>100Ω ≤ Rn ≤ 10KΩ<br>10KΩ < Rn ≤ 5MΩ | +200/-300 ppm<br>+200/-500 ppm                            | +200/-500 ppm<br>+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

### RS14 Through-hole and SMD

|                                  |   |
|----------------------------------|---|
| Resistive element                | Carbon technology   |
| Angle of rotation (mechanical)   | 265° ± 5°   |
| Angle of rotation (electrical)   | 245° ± 20°  |
| Wiper standard delivery position | 50% ± 15°   |
| Max. stop torque                 | 10 Ncm  |
| Max. push/pull on rotor          | 50 N  |
| Wiper torque*                    | <1.5 Ncm  |
| Mechanical life                  | Up to 1.000.000 cycles (please, specify the cycles needed). |

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

## Test results

The following typical test results (with 95% confidence) are given at 23°C ±2°C and 50% ±25% RH. Maximum linearity after mechanical tests: 4%.

### RS14 Through-hole and SMD

|                         | Test conditions                               | Typical variation of Rn |
|-------------------------|---|-------------------------|
| Damp heat               | 500 h. at 40°C and 95% RH                     | ±20%                    |
| Temperature Coefficient | 16 h at 85°C, plus 2 h at -25°C               | ±20%                    |
| Load life               | 1.000 h. at 50°C                              | ±20%                    |
| Mechanical life         | 150.000 cycles at 10 c.p.m. and at 23°C ± 2°C | ±20%                    |
| Storage (3 years)       | 3 years at 23°C ± 2°C                         | ±3%                     |

Power derating curve:

