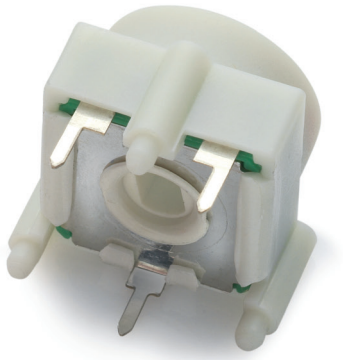
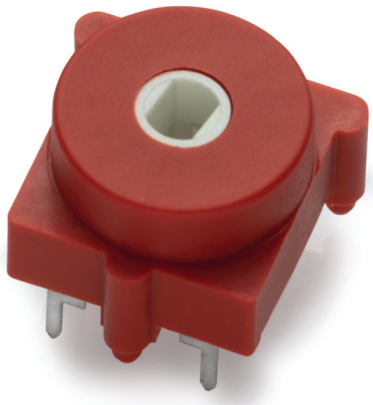
Q16

Rotary Potentiometer Switch

RoHS Compliant





Q16

Q16 is a particular application of the CS14 product family when robust and precise detents are required. This ACP patented design consists of a 16x15mm. rectangular shape external housing with a built-in detent mechanism, fitted on a CS14 V potentiometer.

The standard configuration has 16 detents evenly distributed along its 360º endless rotation, and allows to choose between 4 different detent torque values, from 3 Ncm to 6 Ncm to provide different degrees of softer or harder feeling.

The linear characteristics and materials of the CS14 core potentiometer, combined with the detent mechanism, guarantee at least 10.000 turns and no voltage overlapping between contiguous positions.

The rotor design allows a thru shaft to be inserted into the rotor from either top or below side. A Poka-Yoke feature incorporated in the rotor avoids shaft misplacement.

This Rotary Potentiometer Switch is the ideal alternative to Absolute Encoders and Rotary Switches for control applications like Program Selector Switches in White Goods: Washing Machines, Dishwashers, Dryers, Electrical Ovens etc., Controls in other Appliances like Ranges, Microwave Ovens, Kitchen Robots, etc., and HVAC in Automotive: Air Flow Distribution Switch, Temperature Setting and Fan Speed Selection.

Ingress Protection rating type is IP54 and plastic materials can be self-extinguishable according to UL 94V0 whenever required.

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Q16 HOW TO ORDER

EXAMPLE: Q16RV15 10KA3030 LV10 16DT 3N PDT1

Standard features

Series	Rotor	Model	Packaging	Ohm value	Taper	Tolerance	Life	Nº Detents	Det.torque.	Terminals	Flammability	Position
1	2	3	4	5	6	7	8	9	10	11	12	13
Q16	R	V15		10K	A	3030	LV10	16DT	3N			PDT1

Standard configuration:	**Q16**
Dimensions:	16x15mm
Protection:	IP 54. On request: Self extinguishable, to meet UL 94 V0
Core potentiometer:	CS14
Packaging:	Bulk
Wiper position:	Detent 1 (PDT1)
Terminals:	Straight
Marking:	Resistive value marked on housing. Others on request.

1 - Series

- Q16

2 - Rotors

R Standard. (Others under study).

3 - Model and pitch

V15 Standard. VSMD under study.

4 - Packaging

Bulk	(blank)...(1)

(1) Products supplied bulk packed in bags, unless otherwise specified.

5 - Resistive value

100Ω	200Ω	220Ω	250Ω	470Ω	500Ω	1KΩ	**10KΩ standard...**	5MΩ
100	200	220	250	470	500	1K	**10K**	5M

6 - Taper

Lin - Linear	A

Others under study. Code will be assigned case by case.

7 - Tolerance

100 Ω ≤ Rn ≤ 100KΩ:	100 KΩ < Rn ≤ 1MΩ:	1 MΩ < Rn ≤ 5MΩ:
±30%	±30%	+50%,-30%
3030	3030	5030

Special tolerances under request. Please check availability.

8 - Operating Life (Turns)

Standard (10.000 turns) (others on request).	LV10
Long life: LV + number of turns. (please inquire availability).	LVXXX: ex: LV20

9 - Numbers of detents

Standard: 16 detents.	16DT
Other configurations under study	

10 - Detent torque

Standard: 3 Ncm	3N
Others available 4Ncm, 5Ncm, 6Ncm	4N, 5N, 6N

11 - Terminals

By default, terminals are always straight	(leave blank)
SNAP IN P	SNP
Steel Terminals	SH

12 - Flammability

Standard: Non self extinguishable. All housings and rotors self extinguishable according to UL 94 V0.	(leave blank) V0
Only Q16 housing and rotor self extinguishable V0	Q-V0

13 - Delivery position

Standard, position at detent 1	PDT1
Position at detent. XX= (position number)	PDTXX

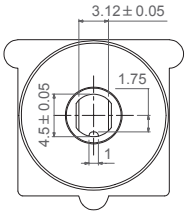
Special marking

Special marking	GRE

Rotor

R is the standard rotor for Q16. Other options can be made under study.

R



This drawing shows the rotor at 50% position in order to better depict the dimensions and tolerances, it is not a valid delivery option of

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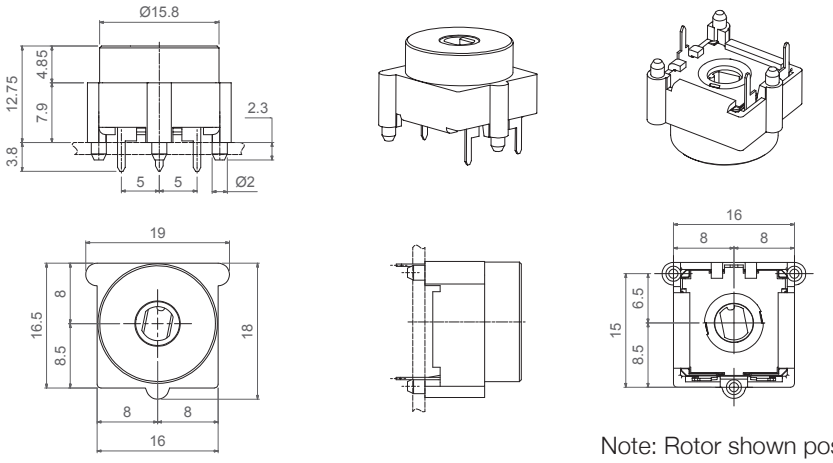
Models

V15 is the standard model.

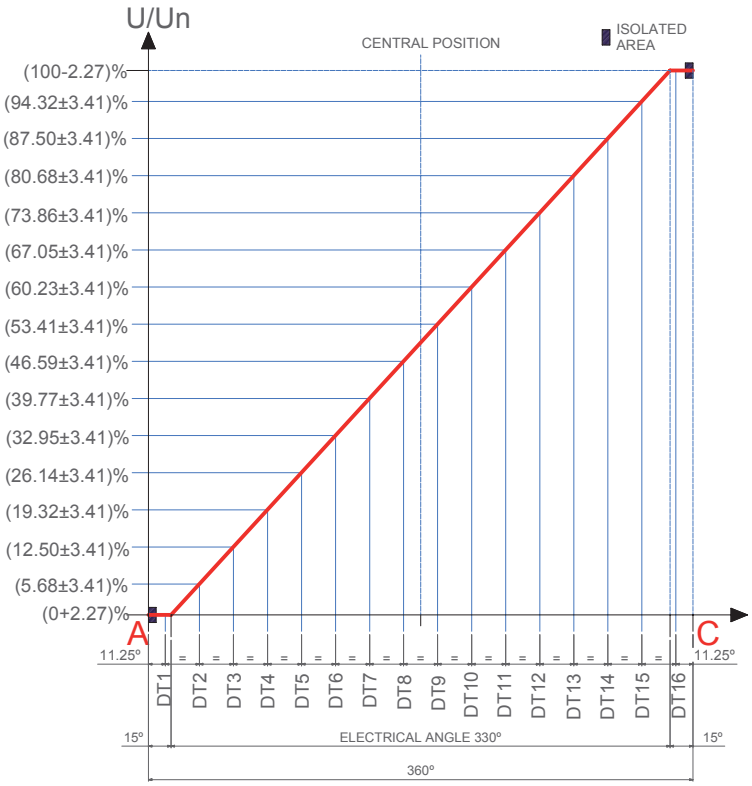
V15



Note: Rotor shown positioned at detent 1 (PDT1)

Tapers

The CS14 core potentiometer has a linear taper that provides the voltage ratios indicated at each detent shown in the graph. Non overlapping voltage between contiguous positions is guaranteed.



DETENT	VALUE
1	(0+2.27)% Un
2	(5.68±3.41)% Un
3	(12.50±3.41)% Un
4	(19.32±3.41)% Un
5	(26.14±3.41)% Un
6	(32.95±3.41)% Un
7	(39.77±3.41)% Un
8	(46.59±3.41)% Un
9	(53.41±3.41)% Un
10	(60.23±3.41)% Un
11	(67.05±3.41)% Un
12	(73.86±3.41)% Un
13	(80.68±3.41)% Un
14	(87.50±3.41)% Un
15	(94.32±3.41)% Un
16	(100-2.27)% Un

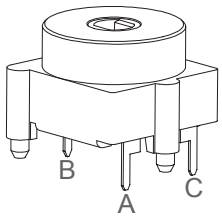
Detents/ Torque

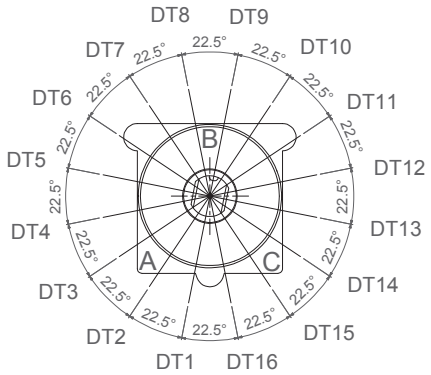
Conceived specifically for control applications where robust click feeling is required along the full circumference. The Q16 incorporates an ACP patented design that provides 4 possible different torque levels: 3Ncm, 4Ncm, 5Ncm or 6Ncm, upon customer's choice, with a mechanical life of at least 10.000 turns.

The standard number of detents is 16, all of them evenly spread along the 360º mechanical travel, an ideal configuration for 16 function selection in White Goods.

Tailor-made configurations with different number of detents, preferably even numbers equally spread along the 360º, can be studied on

16DT





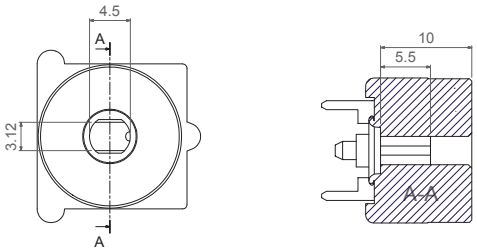
Delivery Position

Unless otherwise specified, the Q16 is delivered with the wiper on position 1 (PDT1).

Shafts

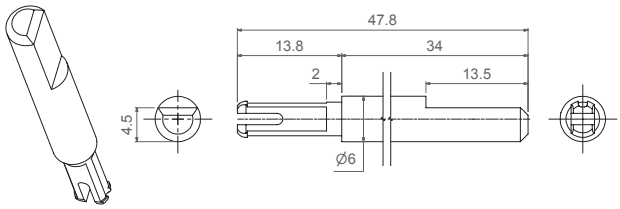
Shafts are sold separately. They can be inserted from either top or below side.
Please consult ACP for studying special designs.
Rotor inner dimensions shown for customer's own shaft design.

Rotor inner dimensions

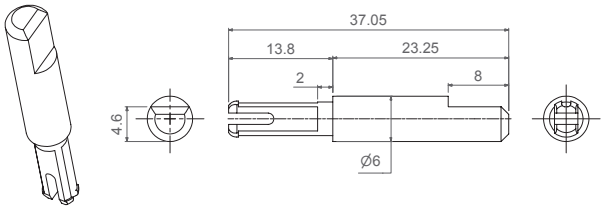


This drawing shows the rotor at 50% position in order to better depict the dimensions and tolerances, it is not a valid delivery option of the 16 position version.

14301



14315



Packaging

Bulk packaging:

Q16 model	Pieces per box (250 x 150 x 70)
	200

Electrical Specifications

(See CS14 Through Hole table on page 66).

Mechanical Specifications

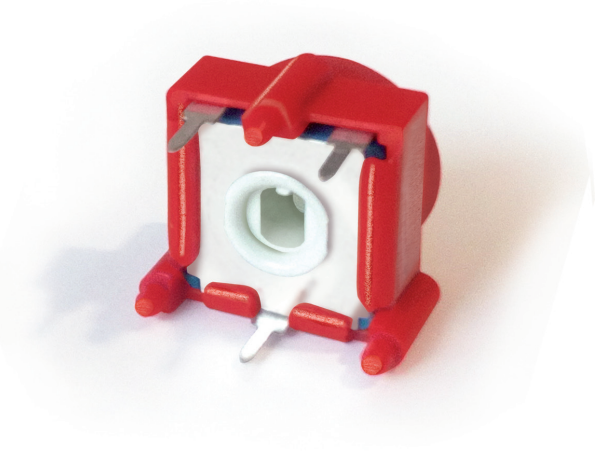
Resistive element	Carbon
Angle of rotation (mechanical)	360º
Wiper standard delivery position	Detent 1 (PDT1)
Max. push/pull on rotor	50N
Wiper torque*	From 3N to 6N depending on customer choice.

Test results

Damp heat	(See CS14 table on page 66)
Temperature Coefficient	
Load life	
Mechanical life	
Storage (3 years)	

QJ16

Spring Loaded Potentiometer



QJ16

ACP Q16 series expands its range with the launching of the new spring loaded potentiometer version called QJ16.

Keeping the same dimensions and layout of the Q16, the functionality is completely different. When the operator turns the knob CW or CCW from the central rest position, a spring mechanism fitted into the component provides an opposite torque. When releasing the knob, the spring returns the potentiometer to the central rest position.

Electrically, the potentiometer is a standard 245° linear taper with a 5% absolute linearity. The mechanical rest position corresponds to the physical middle position, hence to the central value of the output signal. Starting from there, the output value varies along the linear curve until reaching the corresponding end stop.

An alternative output signal to the above is an SPDT (Single Pole, Doble Throw) configuration, with “on” positions at both mechanical end stops and “off” position in the central rest position. Mechanical angle option available is ±45°.

Application:
This Spring Loaded potentiometer is the ideal alternative to a tact switch or incremental encoder to increase or decrease the value of a certain parameter.

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QJ16 HOW TO ORDER

EXAMPLE: QJ16RV15 10KA3030 LV10

Standard features

Series	Rotor	Model	Packaging	Ohm value	Taper	Tolerance	Life	Mechanical Angle	Terminals	Flammability	Position
1	2	3	4	5	6	7	8	9	10	11	12
QJ16	R	V15		10K	A	3030	LV10	±45°			

Standard configuration:	**QJ16**
Dimensions:	16x15mm
Protection:	IP 54. On request: Self extinguishable, to meet UL 94 V0
Core potentiometer:	CA14 // RS14
Packaging:	Bulk A
Wiper position:	Middle position
Terminals:	Straight
Marking:	Resistive value marked on housing. Others on request.

1 - Series

QJ16

2 - Rotors

R Standard. (Others under study).

3 - Model and pitch

V15 Standard. VSMD under study.

4 - Packaging

Bulk	(blank)...(1)

(1) Products supplied bulk packed in bags, unless otherwise specified.

5 - Resistive value

100Ω	200Ω	220Ω	250Ω	470Ω	500Ω	1KΩ	10KΩ standard...	5MΩ
100	200	220	250	470	500	1K	**10K**	5M

6 - Taper

Lin - Linear	A
Others under study. Code will be assigned case by case.	

7 - Tolerance

100Ω ≤Rn≤ 100KΩ:	100KΩ ≤Rn≤ 1MΩ:	1MΩ ≤Rn≤ 5MΩ:
±30%	±30%	+50%,-30%
3030	3030	5030

Special tolerances under request. Please check availability.

8 - Operating Life (Turns)

Standard (10.000 cycles)	LV10
Long life: LV + number of cycles. (please inquire availability).	LVXXX: ex: LV20

9 - Mechanical Angle

Standard ±45°	(leave blank)
Other configurations under study	

10 - Terminals

By default, terminals are always straight	(leave blank)
SNAP IN P	SNP
Steel Terminals	SH

11 - Flammability

Standard: Non self extinguishable. All housings and rotors self extinguishable according to UL 94 V0.	(leave blank) V0
Only QJ16 housing and rotor self extinguishable V0	Q-V0

12 - Delivery position

Standard, middle position	(leave blank)

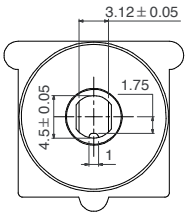
Special marking

Special marking	GRE

Rotor

R is the standard rotor for QJ16. Other options can be made under study.

R



This drawing shows the rotor at 50% position, which is the standard delivery position.

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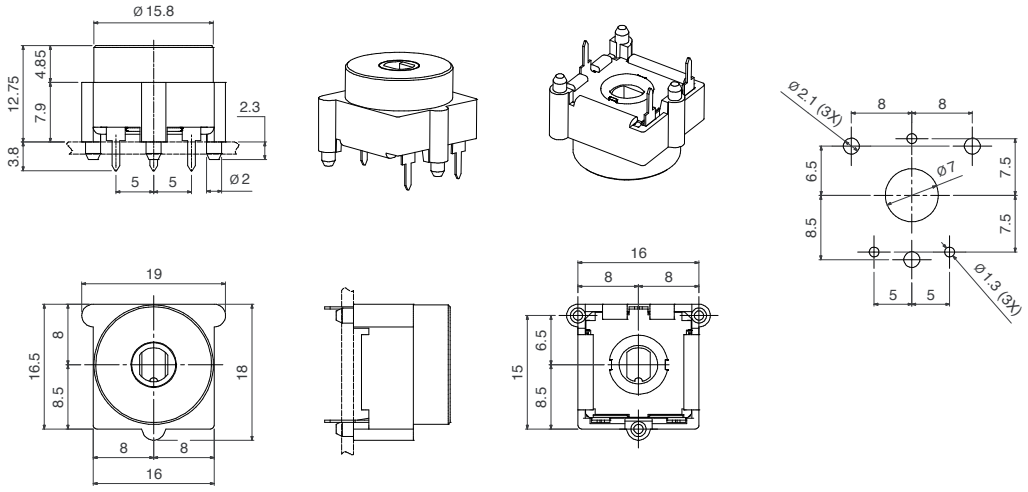
Models

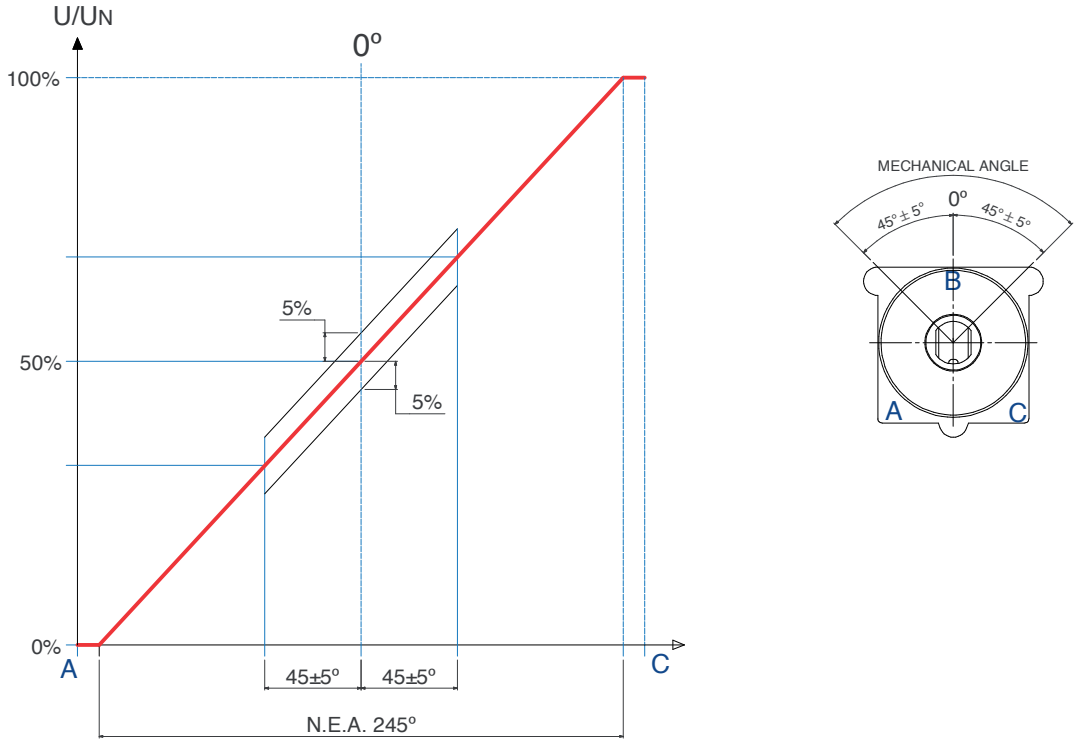
V15 is the standard model.

V15



Tapers

The core potentiometer is a standard 245° linear taper with a 5% absolute linearity. The mechanical rest position corresponds to the physical middle position, hence to the central value of the output signal. Starting from there, the output value varies along the linear curve until reaching the corresponding end stop.



An alternative output signal to the above is an SPDT* configuration, with “on” positions at both mechanical end stops and “off” position in the central rest position. Mechanical angle option available: ±45°

*Single pole, double throw. A simple break-before-make changeover switch: C (COM, Common) is connected either to L1 or to L2

Delivery Position

The QJ16 is delivered with the wiper on middle position.

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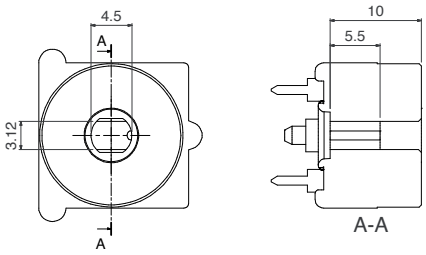
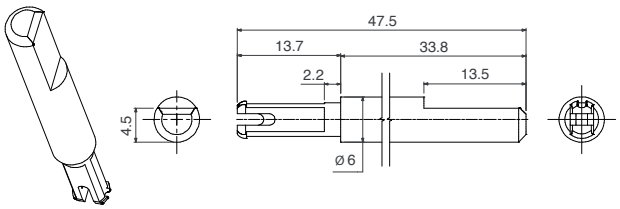
Rotor inner dimensions

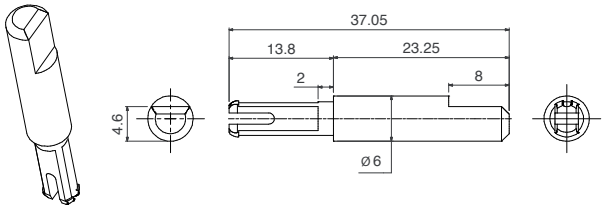


This drawing shows the rotor at 50% position, which is the standard delivery position

14301



14315



Packaging

Bulk packaging:

	Pieces per box (250 x 150 x 70)
QJ16 model	200

Electrical Specifications

Range of resistance values*	Standard value is 10k
Tolerance	±30%
Variation laws	Lin (A). Other tapers available on request
CRV - Contact Resistance Variation (dynamic)	Lin (A) Electrical Angle 245º±20º ≤ 3%Rn. Other tapers, please inquire
CRV - Contact Resistance Variation (static)	Lin (A) Electrical Angle 245º±20º ≤ 5%Rn. Other tapers, please inquire
Maximum power dissipation**	at 50ºC, 0.15W
Maximum voltage	250VDC
Operating temperature	-25ºC … +70ºC (Other under request)
Electrical angle	245º ± 20º
Linearity	5%
Temperature coefficient	+200/ -300 ppm

Mechanical Specifications

Resistive element	Carbon technology
Angle of rotation (mechanical)	±45º ±5º
Wiper standard delivery position	Neutral position ±5º
Max. stop torque	50Ncm
Max. push/pull on rotor	50N
Wiper torque*	0,5-3,5Ncm
Mechanical life	10.000 cycles.

* Out of range ohm values and tolerances are available on request, please, inquire.
** Dissipation of special tapers will vary, please, inquire.

Test results

The following typical test results (with 95% confidence) are given at 23ºC ±2ºC and 50% ±25% RH.

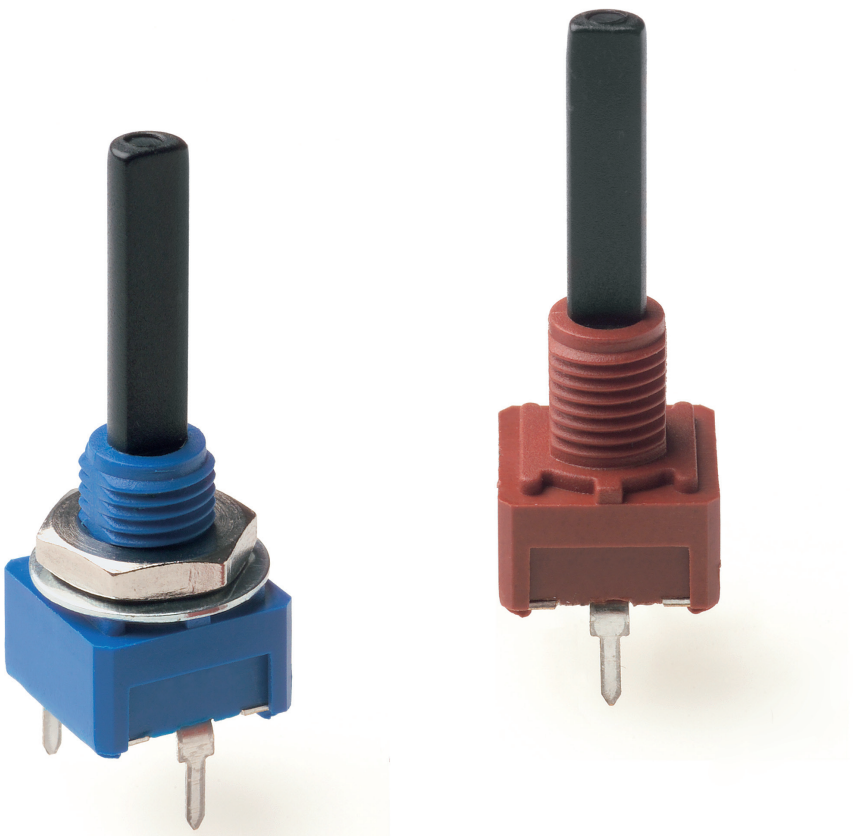
	Test conditions	Typical variation of Rn	Linearity after test
Damp heat	500 h. at 40°C and 95% RH	±20%	7%
Thermal cycles	16 h at 85ºC, plus 2 h at –25ºC	±20%	7%
Load life	1.000 h. at 50°C	±20%	7%
Mechanical life	10.000 cycles at 10 c.p.m. and at 23°C ± 2°C	±20%	7%

MCA9

Control Carbon
Potentiometers MCA

MCE9

Control Cermet
Potentiometers MCE



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