

10mm OPEN CARBON PRESET

QUICK REFERENCE DATA

Resistance range (E3-series), linear law	47 Ω – 4,7 M Ω
Maximum dissipation at 40 °C	0,1 W
Climatic category, IEC 68	25/070/21

APPLICATION

These potentiometers are for preset resistance control with provision for re-adjustment. They are particularly suitable for use in radio and television receivers.

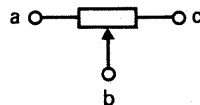
DESCRIPTION

These potentiometers have a resistance element of a special carbon composition with a low temperature coefficient. The element is riveted to a base plate of resin bonded paper.

The potentiometers are provided with printing-wiring pins; pins a and c (see drawings) are connected to the ends of the carbon track, pin b is connected to the wiper. The wiper, which is provided with a double contact, has a screwdriver slot or a plastic knob for adjustment.

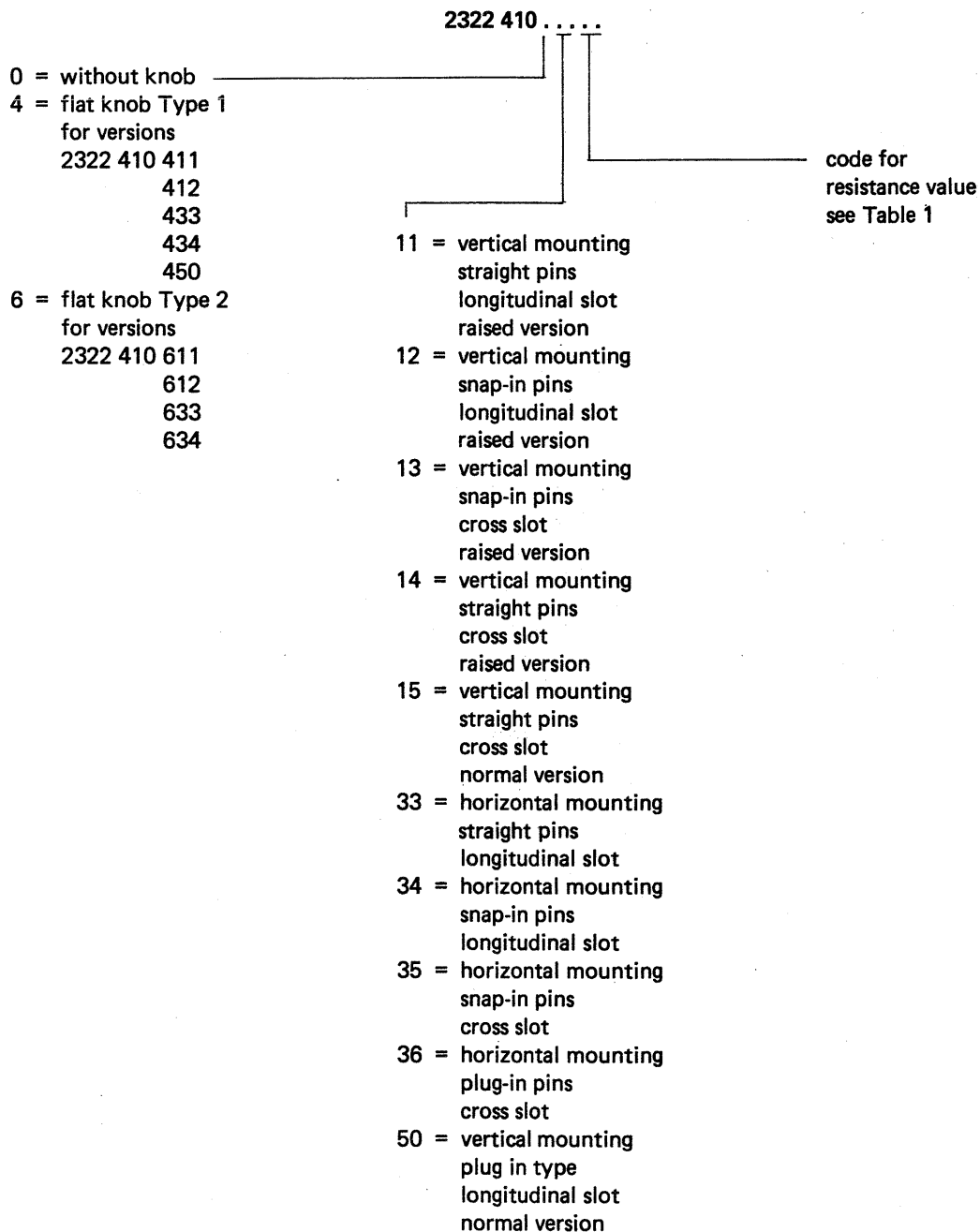
This potentiometer series includes types for vertical and for horizontal mounting on printed-wiring boards. The resistance law is linear and the tolerance on the nominal resistance is $\pm 20\%$, however log. versions and 10% tolerance versions are also available.

Note: The potentiometers are supplied with the wiper positioned at 50% of the angle of rotation.



7Z85818

COMPOSITION OF THE CATALOGUE NUMBER



Note: catalogue number of knob type 1 (Figs 4, 5, 9): 4322 047 00190;
catalogue number of knob type 2 (Figs 6, 10): 4322 047 27740.

MARKING

The potentiometers are marked with the nominal resistance value punched on the wiper.

Outlines

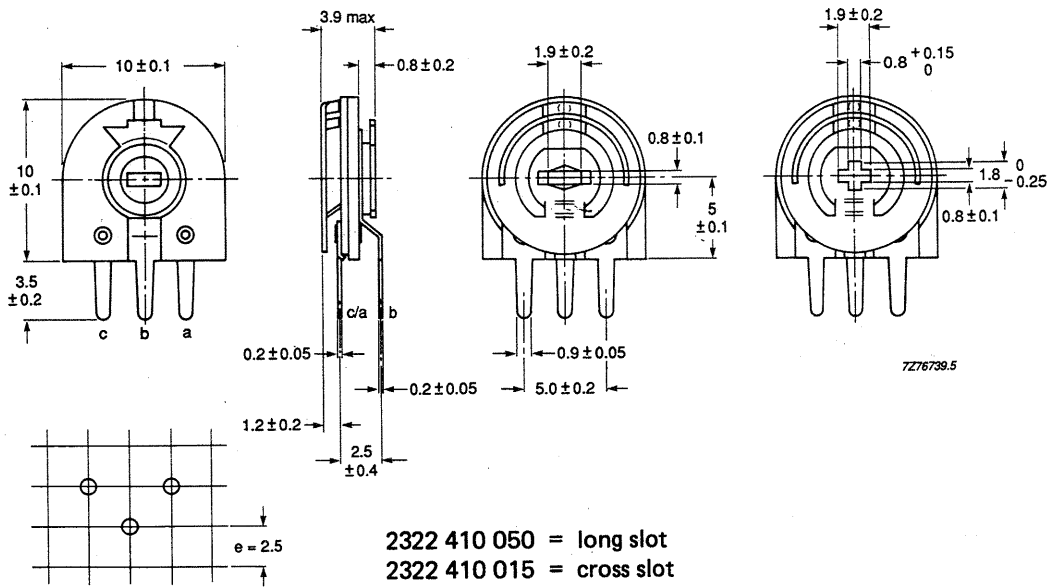


Fig.1 Potentiometers for vertical mounting; straight pins.

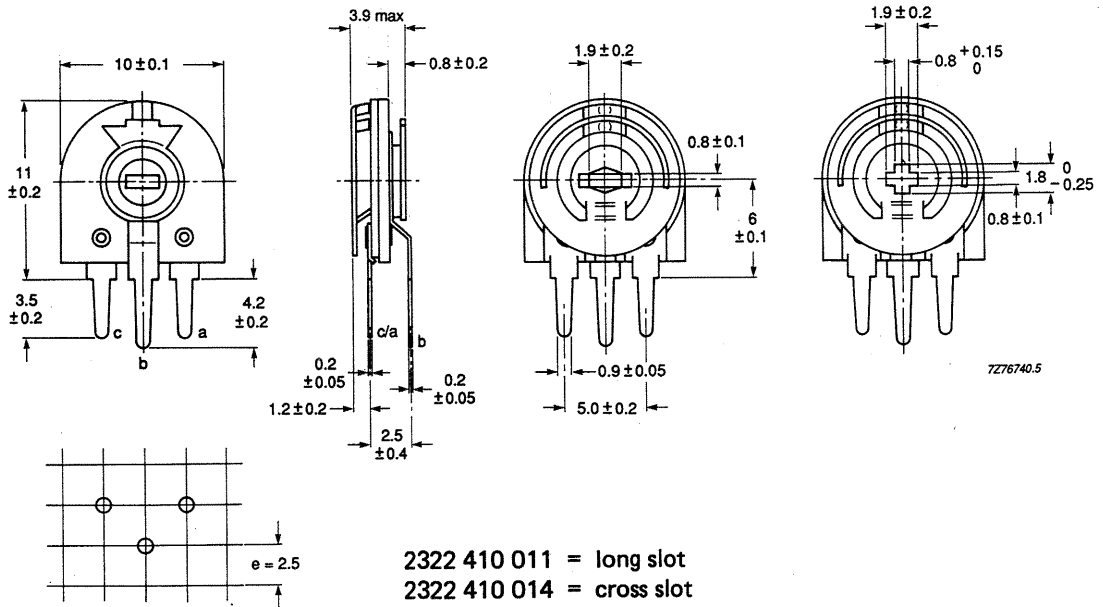


Fig.2 Potentiometers for vertical mounting: straight pins (raised version).

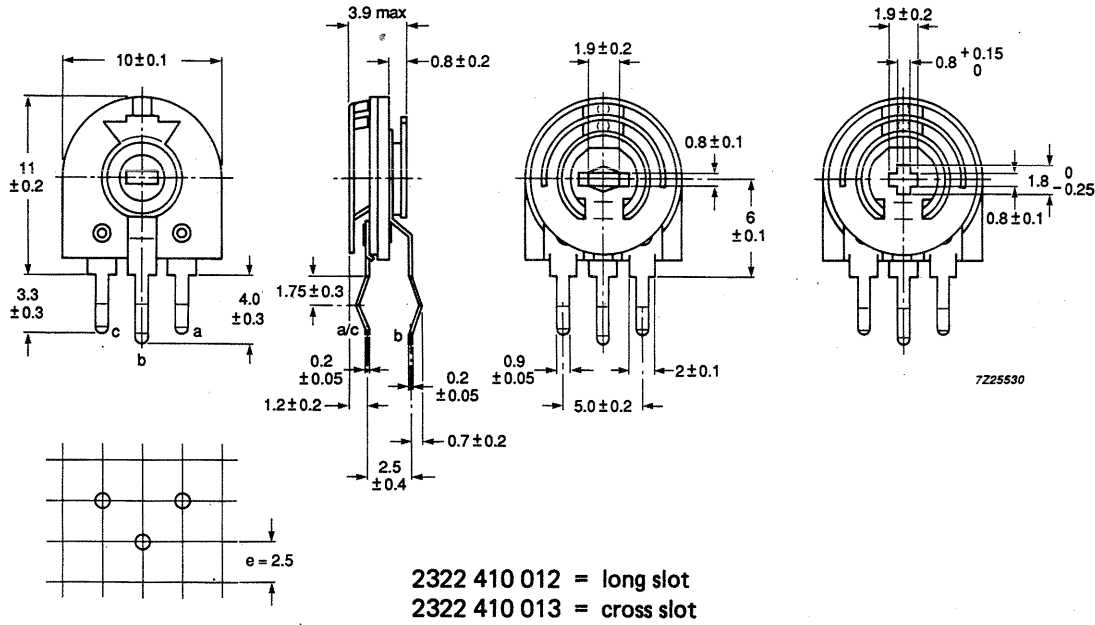


Fig.3 Potentiometers for vertical mounting: snap-in pins (raised version).

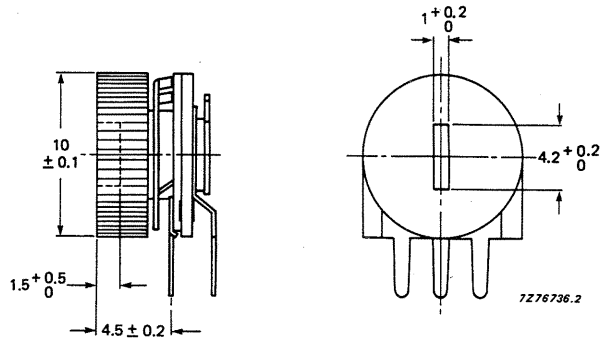
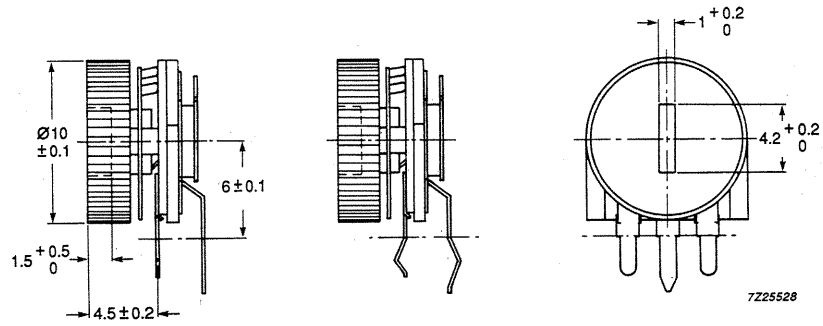
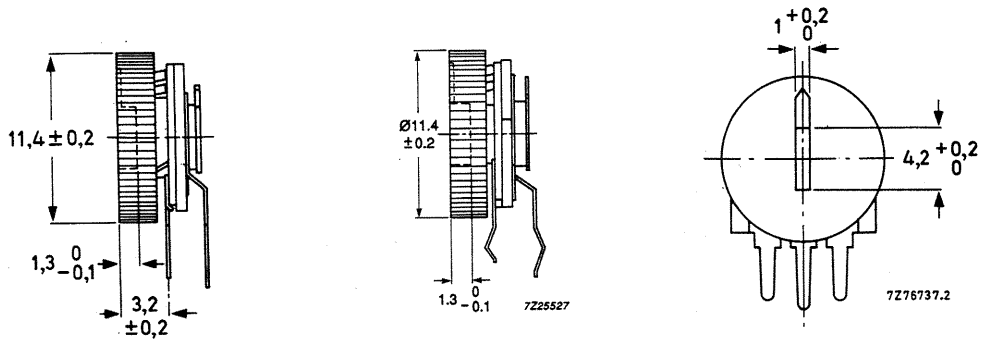


Fig.4 Potentiometers for vertical mounting, with knob type 1: straight pins, 2322 410 450.



2322 410 411 = straight pins
 2322 410 412 = snap-in pins

Fig.5 Potentiometers for vertical mounting, with knob type 1: (raised version).



2322 410 611 = straight pins
 2322 410 612 = snap-in pins

Fig.6 Potentiometers for vertical mounting, with knob type 2: (raised version).

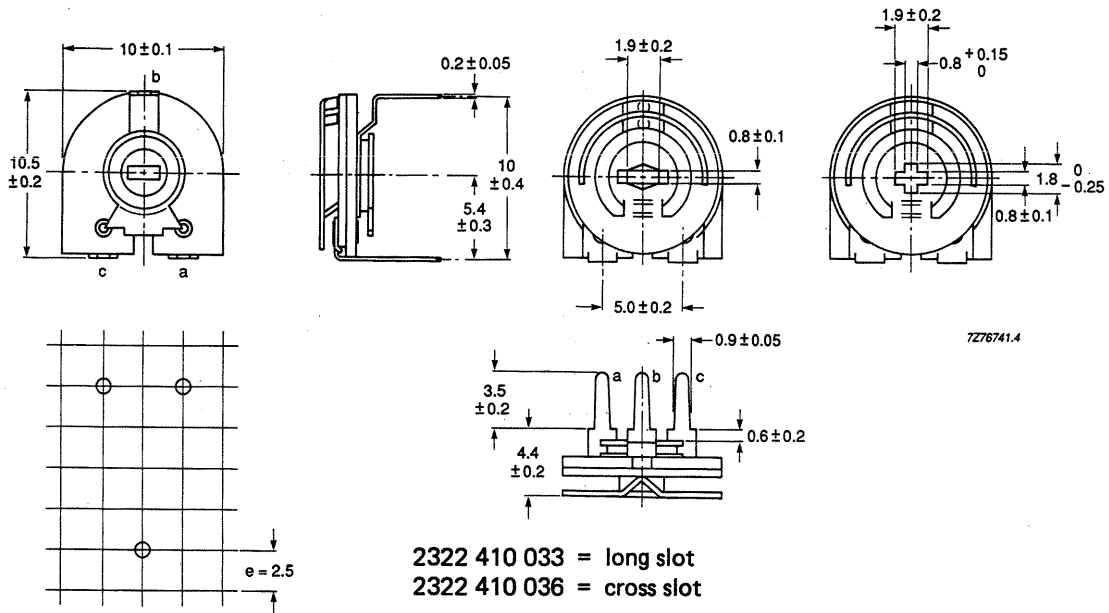


Fig.7 Potentiometers for horizontal mounting: straight pins.

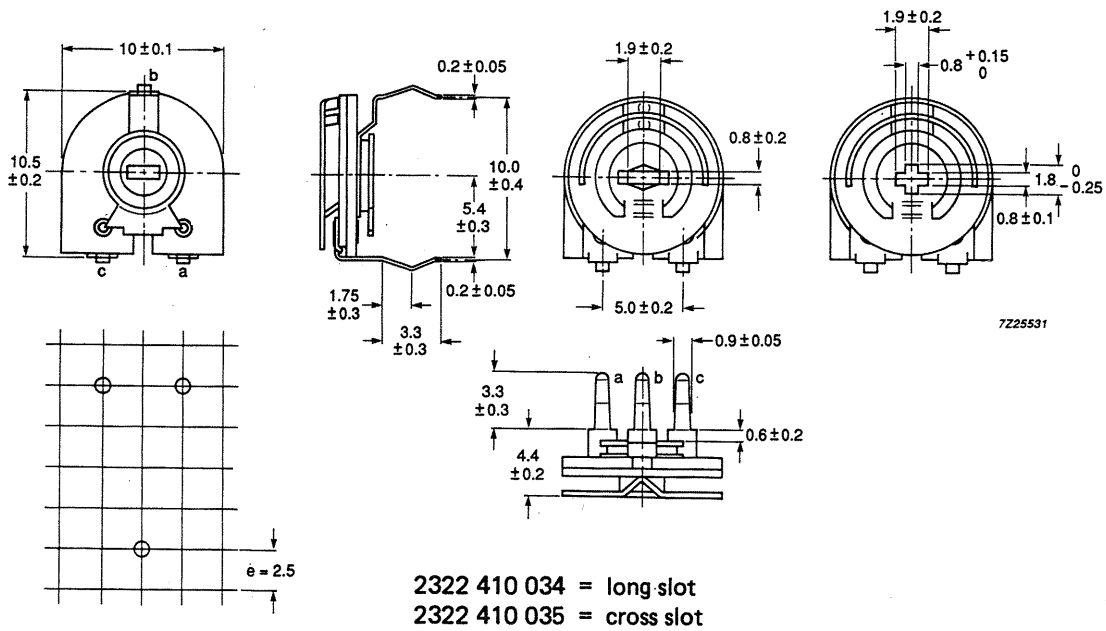
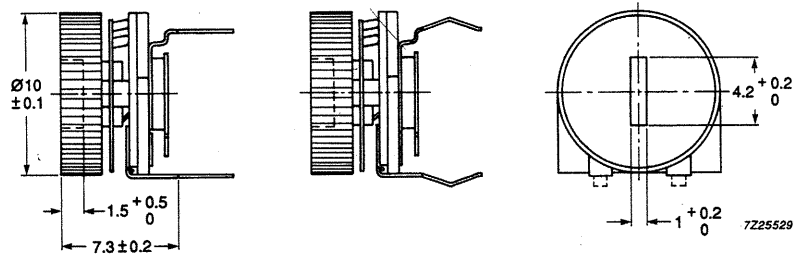
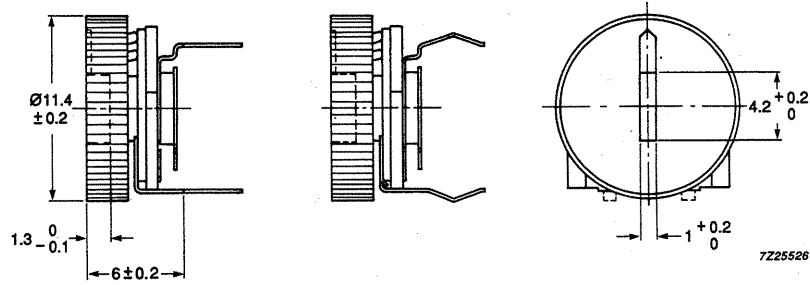


Fig.8 Potentiometers for horizontal mounting: snap-in pins.



2322 410 433 = straight pins
 2322 410 434 = snap-in pins

Fig.9 Potentiometers for horizontal mounting, with knob type 1.



2322 410 633 = straight pins
 2322 410 634 = snap-in pins

Fig.10 Potentiometers for horizontal mounting, with knob type 2.

TECHNICAL DATA

Unless otherwise specified all electrical values apply at an ambient temperature of 15 to 35 °C, an atmospheric pressure of 86 to 106 kPa and a relative humidity of 45 to 75%.

Table 1

nom. resistance R_{nom}	max. voltage (V) at 40 °C	max. terminal resistance Ω	limiting wiper current (mA) at 40 °C	code in catalogue number
47 Ω	2,2	10	46	91
100 Ω	3,2	10	32	51
220 Ω	4,7	10	21	52
330 Ω	5,7	10	17	69
470 Ω	6,9	10	15	53
1 k Ω	10	20	10	54
2,2 k Ω	14,8	40	6,7	55
4,7 k Ω	21,7	100	4,6	56
10 k Ω	32	200	3,2	57
22 k Ω	47	400	2,1	58
47 k Ω	69	1 000	1,5	59
100 k Ω	100	2 000	1,0	61
220 k Ω	148	4 000	0,7	62
470 k Ω	150	10 000	0,32	63
1 M Ω	150	20 000	0,15	64
2,2 M Ω	150	40 000	0,068	65
4,7 M Ω	150	100 000	0,032	66

Tolerance on the nominal resistance

$\pm 20\%$

Resistance law

linear

Maximum dissipation (P_{max}),
at 40 °C

0,1 W

at 70 °C

0,05 W

Maximum voltage

$\sqrt{P_{max} R_{nom}}$; maximum 200 V
(DC or AC) (see table above)

Ambient temperature range

-25 to + 70 °C

Climatic category, IEC 68

25/070/21

Temperature coefficient

-500 to + 300 $\cdot 10^{-6}$ /K

Operating torque

3,5 to 25 mNm

Maximum end stop torque

50 mNm

Effective angle of rotation

200 $\pm 10^\circ$

Mechanical angle of rotation

260 $\pm 5^\circ$

Mechanical endurance (200 cycles)

$\frac{\Delta R_{ac}}{R_{ac}} \leq 5\%$

Mass

potentiometer without knob

0,40 g

potentiometer with knob

0,60 g

TESTS AND REQUIREMENTS

Clause numbers of tests and conditions of test refer to IEC 393-1 (potentiometers; part 1: terms and methods of test).

The potentiometers have been tested whilst mounted by their terminations on a printed wiring board. When drying is called for, procedure 1 of IEC 393-1, sub. 5.2 is used (24 ± 4 h, sub. 55 ± 2 °C, R.H. $\leq 20\%$). When the contact resistance variation (CRV) is measured, the wiper is rotated in both directions over 90% of the effective resistance.

IEC 393-1 clause	IEC 68-2 test method	test	procedure	typical result
6.22.3	Ta	Solderability	solder bath: $235^{\circ} \pm 5$ °C, $2 \pm 0,5$ s	good tinning
6.22.4	Tb	Resistance to heat	solder bath: 260 ± 5 °C 5 ± 1 s	$\frac{\Delta R_{ac}}{R_{ac}} \leq 0,5\%$
6.25	Eb	Bump	acceleration 40g number of bumps: 4000	$\frac{\Delta R_{ac}}{R_{ac}} \leq 2\%$
6.24	F	Vibration	frequency: 10 to 500 Hz amplitude: 0,75 mm or 10g, 3 directions, 2 h per direction	$\frac{\Delta R_{ac}}{R_{ac}} \leq 2\%$ $\frac{\Delta V_{ab}}{V_{ab}} \leq 0,3\%$
6.13	—	Temperature characteristics of resistance	temp. cycle: $+20$ °C; -25 °C; $+20$ °C; $+70$ °C; $+20$ °C	$-500 < TC < +300 \cdot 10^{-6}/K$
6.26 6.26.2 6.26.3 6.26.4 6.26.6	— Ba Db Aa Db	Climatic sequence Dry heat Damp heat acc. 1st cycle Cold Damp heat, remaining cycle	16 h at 70 ± 2 °C 24 h at 55 ± 2 °C 95 – 100% R.H. 2 h at -55 ± 3 °C 24 h at 55 ± 2 °C 95 – 100% R.H.	$\frac{\Delta R_{ac}}{R_{ac}} \leq 5\%$ operating torque ≤ 25 mNm
6.30	—	Electrical endurance	T_{amb} : 70 °C, 1000 h, cycle (1,5 h on and 0,5 h off, b at 0,67 a – c) Load: 0,05 W between a and c Load: 0,033 W between a and b	CRV $< 1\%$ of R_{ac} $\frac{\Delta R_{ac}}{R_{ac}} \leq 10\%$ $\frac{\Delta V_{ab}}{V_{ac}} \leq 0,5\%$ $\frac{\Delta R_{ab}}{R_{ab}} \leq 10\%$

IEC 393-1 clause	IEC 68-2 test method	test	procedure	typical result
6.29	—	Mechanical endurance	200 cycles, 4 cycles/min, no load	$\frac{\Delta R_{ac}}{R_{ac}} \leq 3\%$ CRV < 0,5% of R_{ac}
6.27	Ca	Damp heat steady state	slider at 0,67 a - c load via a - c recovery 24 h $22 \pm 1 \text{ }^\circ\text{C}$, 50% R.H. $\pm 5\%$	CRV < 0,5% of R_{ac} $\frac{\Delta R_{ac}}{R_{ac}} \leq 5\%$ $\frac{\Delta R_{ab}}{R_{ab}} \leq 5\%$ $\frac{\Delta V_{ab}}{V_{ac}} \leq 0,5\%$