

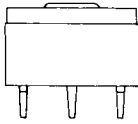
FILM DIELECTRIC TRIMMERS

- High temperature type
- Housing dimensions 11 mm x 14 mm x 9 mm
- For basic grid of 2,54 mm
- For professional applications, e.g. fine adjustment of h.f. tuned circuits, capacitive volume or voltage control

QUICK REFERENCE DATA

C_{min}/C_{max}	single stator type	2,5/20 to 7/100
	differential type	2/12 to 7/150
Rated voltage (d.c.)		200 V
Housing dimensions		11 mm x 14 mm x 9 mm
Climatic category (IEC 68)		40/125/21
Related specification		IEC 418- 1 and 4

Selection chart

C_{min}/C_{max}	catalogue number	
	vertical spindle	
pF	single stator type	differential type
2/12		2222 809 07018
2,5/20	2222 809 07004	2222 809 07006
4/40	2222 809 07008	2222 809 07009
5/60	2222 809 07011	2222 809 07012
6/80	2222 809 07013	2222 809 07014
7/100	2222 809 07015	2222 809 07016
7/150		2222 809 07107

DESCRIPTION

The trimmers consist of a glass reinforced polysulphone frame with a polysulphone dust cover, brass rotor and stator with PTFE or polycarbonate film as the dielectric. The stator plates are stacked on pins and separated by rings, so that it is possible to produce a single-stator or a differential type. The rotor contact surfaces are plated to ensure a long life and a stable contact even under severe climatic conditions.

The trimmers have top adjustment by means of a screwdriver; capacitance increase is obtained with clockwise rotation. (Trimmers with counter-clockwise rotation and trimmers with insulated rotor are available on request.)

MECHANICAL DATA

Dimensions in mm

Outlines	See Fig.1
Effective angle of rotation	180°
Operating torque	1,5 to 25 mNm
Maximum axial thrust ($\Delta C \leq 0,3\%$ of C_{max})	2 N
Mass	
single-stator type	approx. 2,3 g
differential type	approx. 2,9 g

Mounting

The trimmers can be mounted on printed-wiring boards with a grid of 2,54 mm; hole diameter min. 1,25 mm. See for hole pattern Fig.2.

Soldering conditions: max. 260 °C, max. 10 s. (See also 'Tests and Requirements'.)

ELECTRICAL DATA; see also Table 1

Rated voltage (d.c.)	200 V
Test voltage (d.c.) for 1 min.	400 V
Contact resistance	max. 5 m Ω
Insulation resistance between stator and rotor	min. 10 000 M Ω
Category temperature range	-40 to +125 °C
Climatic category (IEC 68)	40/125/21
Minimum storage temperature	-55 °C

Table 1

guaranteed max. C_{min} min. C_{max} at 200 kHz pF	type	cat. number 2222 809 followed by	spindle	adjustment mode	dielectric film	$\tan \delta$ at C_{max} $\times 10^{-4}$	temp. coeff. 10 ⁻⁶ /K	smallest packing quantity
2/12	differential	07018	vertical	top	PTFE	< 10	0 \pm 200	70
2.5/20	single-stator differential	07004 07006	vertical	top	PTFE	< 10	0 \pm 200	70
4/40	single-stator differential	07008 07009	vertical	top	PTFE	< 10	0 \pm 200	70
5/60	single-stator differential	07011 07012	vertical	top	PTFE	< 10	0 \pm 200	70
6/80	single-stator differential	07013 07014	vertical	top	PTFE	< 10	0 \pm 200	70
7/100	single-stator differential	07015 07016	vertical	top	PTFE	< 10	0 \pm 200	70
7/150	differential	07107	vertical	top	PC	< 50	0 \pm 200	70

Notes to Table 1

1. PTFE = polytetrafluorethylene;
PC = polycarbonate.
2. C at 60 to 80% of C_{max} ; ΔT from +20 to +125 °C.

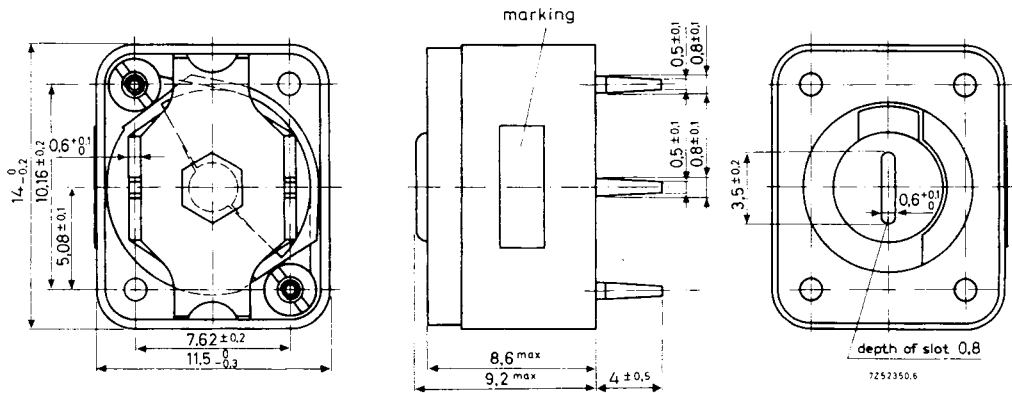


Fig.1.

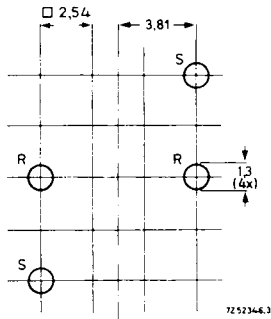


Fig.2 Hole pattern; R = rotor, S = stator.

MARKING

The trimmers are marked with the capacitance value in pF, followed by the letter E (single-stator type) or the letter D (differential type).

ADJUSTMENT

The trimmers can be adjusted with a screwdriver or trimming key (top adjustment).

PACKING

Blister packs of 70 pieces each.

QUALITY LEVEL

Sampling and data evaluation for quality level in accordance with MIL-STD-105D and IEC 410.

A.Q.L. 0,4%, major defects

A.Q.L. 1,5%, minor defects

Each capacitor is tested for minimum C_{max} and is also subjected to the full test voltage. See also Note under Survey of variable capacitors.

TESTS AND REQUIREMENTS

IEC418-1 clause	IEC68 test method	test	procedure	requirements
4.2		method of mounting	method A	
14		capacitance drift	after T.C. measurement	$\Delta C/C$ < 1%
19		thrust	axial thrust of 2 N	$\Delta C/C$ < 0,3%
21		robustness of terminations:		
21.1	Ua	tensile	1 N	no damage
21.2	Ub	bending		bending not allowed
22	Na	rapid change of temperature	1 cycle: 1/2 h at lower and 1/2 h at upper category temp.	$\Delta C/C$ < 1%
23	T	soldering		
	Ta	solderability	solder bath, immersion 3 mm, 235 °C, 2 s	good wetting, no mechanical damage
	Tb	resistance to heat	solder bath 260 °C, 10 s	no mechanical damage
24	Eb	impact bump	4000 \pm 10 bumps, 40g, 6 ms	$\Delta C/C$ < 0,2% no mechanical damage
25	Fc	vibration	freq. 10 to 55 Hz, ampl. 0,35 mm, 1,5 h	$\Delta C/C$ < 0,25% no mechanical damage

TESTS AND REQUIREMENTS (continued)

IEC418-1 clause	IEC68 test method	test	procedure	requirements	
26		climatic sequence		$\Delta C/C$	$\leq 3\%$
				$\tan \delta$	$\leq 10 \times 10^{-4}$
26.1	B	dry heat	16 h at upper category temp.	R_{ins} rotor contact R	$> 10\,000\ M\Omega$ $< 10\ m\Omega$
26.2	D	damp heat accelerated, first cycle	1 cycle, 24 h, + 40 °C, 95 to 100% R.H.	voltage proof	400 V for 1 min
				visual examination	no mechanical damage
26.3	Aa	cold	16 h, - 40 °C	operating torque	1,5 to 35 mNm
26.5		damp heat accelerated remaining cycles	1 cycle, 24 h, + 40 °C, 95 to 100% R.H.		
27	Ca	damp heat steady state	21 days, + 40 °C, 90 to 95% R.H.	$\Delta C/C$	$\leq 3\%$
				$\tan \delta$	$\leq 10 \times 10^{-4}$
				R_{ins} rotor contact R	$> 10\,000\ M\Omega$ $< 10\ m\Omega$
				voltage proof	400 V for 1 min
				visual examination	no mechanical damage
				operating torque	1,5 to 35 mNm
29		endurance	25 cycles	$\Delta C/C$	$\leq 0,3\%$
29.1		mechanical		$\Delta C/C$ after axial thrust	$\leq 0,3\%$
				rotor contact R	$< 10\ m\Omega$
				voltage proof	400 V for 1 min
				visual examination	no mechanical damage
				operating torque	1 to 50 mNm