

## FILM DIELECTRIC TRIMMERS

- High temperature type
- Housing dimensions 6 mm x 8 mm x 9 mm
- For basic grid of 2.54 mm
- For professional applications, e.g. fine adjustment of h.f. tuned circuits

### QUICK REFERENCE DATA

$C_{\min}/C_{\max}$	0.5/2 to 2/18 pF
Rated voltage (DC)	300 V
Housing diameter	6 mm x 8 mm x 9 mm
Climatic category (IEC 68)	40/125/21
Related specification	IEC 418-1 and 4

### Selection chart

Vertical spindle, top and bottom adjustment.

value (pF) $C_{\min}/C_{\max}$	round head	hex. head
	catalogue number	catalogue number
0.5/2	2222 809 05011	2222 809 05021
1.2/3.5	2222 809 05215	2222 809 05225
1.8/10	2222 809 05216	2222 809 05226
2/18	2222 809 05217	2222 809 05227

### DESCRIPTION

The trimmers consist of a polysulphone housing, brass rotor and plated brass stator with a PTFE film as the dielectric. The stator plates with their tag are heat sealed to the housing. The rotor contact surfaces are plated to ensure a long life and a stable contact even under severe climatic conditions. Flux absorption between the vanes is prevented. A colour dot indicates the maximum capacitance.

The trimmers have top and bottom adjustment. Top adjustment should be done by means of a screw-driver and bottom adjustment by means of the key as shown in Fig.4.

**MECHANICAL DATA**

Outlines	see Fig.1
Effective angle of rotation	180°
Operating torque	
$C_{max} = 3.5 \text{ pF}$	1 to 15 mNm
$C_{max} = 10 \text{ and } 18 \text{ pF}$	2.5 to 20 mNm
Maximum axial thrust ( $\Delta C \leq 0.3\%$ of $C_{max}$ )	2 N
Mass	approx. 0.45 g

**Mounting**

The trimmers can be mounted on printed-circuit boards with hole diameter min. 2.54 mm. For hole pattern, see Fig.3.

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

**ELECTRICAL DATA**

Rated voltage (DC)	300 V
Test voltage (DC) for 1 min.	600 V
Contact resistance	max. 5 mΩ
Insulation resistance between stator and rotor	min. 10 000 MΩ
Category temperature range	-40 to + 125 °C
Climatic category (IEC 68)	40/125/21
Minimum storage temperature	-55 °C

Table 1

guaranteed max. C <sub>min</sub> min. C <sub>max</sub> at 200 kHz pF	catalogue number	shape of head	tan δ at C <sub>max</sub> x 10 <sup>-4</sup> 1 100 MHz	temp. coeff. (note 1) 10 <sup>-6</sup> /K	min. f <sub>res</sub> at C <sub>max</sub> MHz	colour of base	smallest packing quantity
0.5/2	2222 809 05011 2222 809 05021	round hex	≤ 10 ≤ 20	-250 ± 200	1200	no	140
1.2/3.5	2222 809 05215 2222 809 05225	round hex	≤ 10 ≤ 20	-250 ± 150	850	orange	140
1.8/10	2222 809 05216 2222 809 05226	round hex	≤ 10 ≤ 20	-350 ± 150	580	white	140
2/18	2222 809 05217 2222 809 05227	round hex	≤ 10 ≤ 25	-350 ± 150	360	red	140

Note

1. C at 60% to 80% of C<sub>max</sub>; T from + 20 °C to + 125 °C.

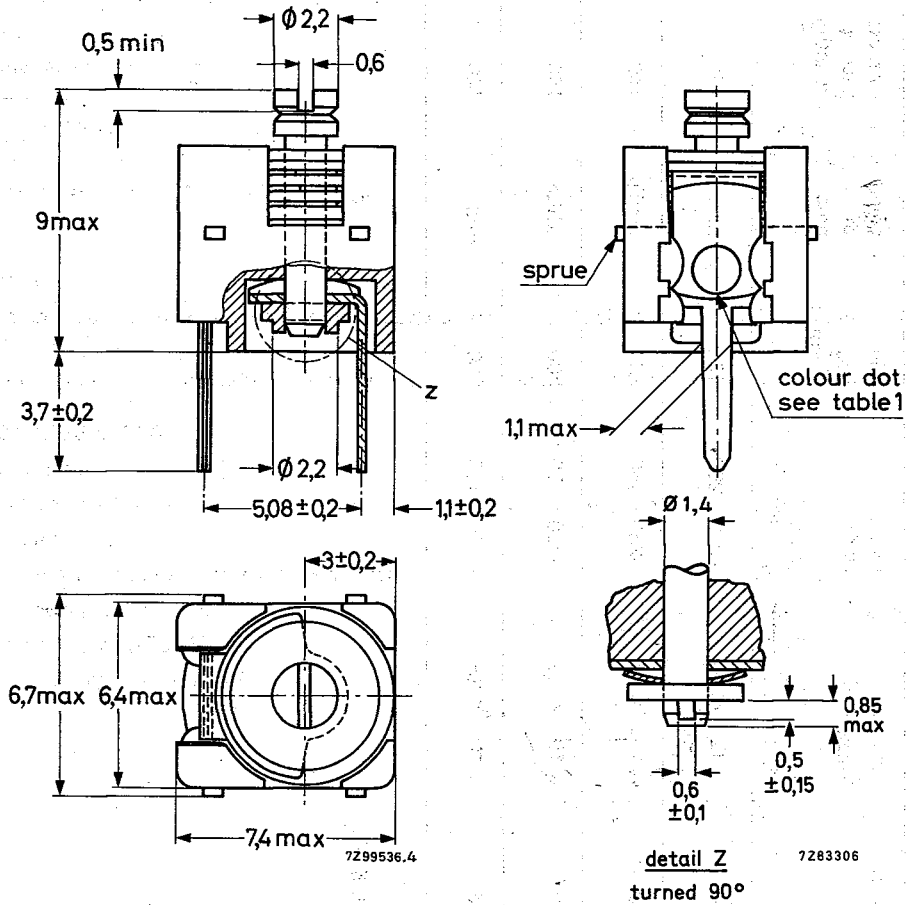
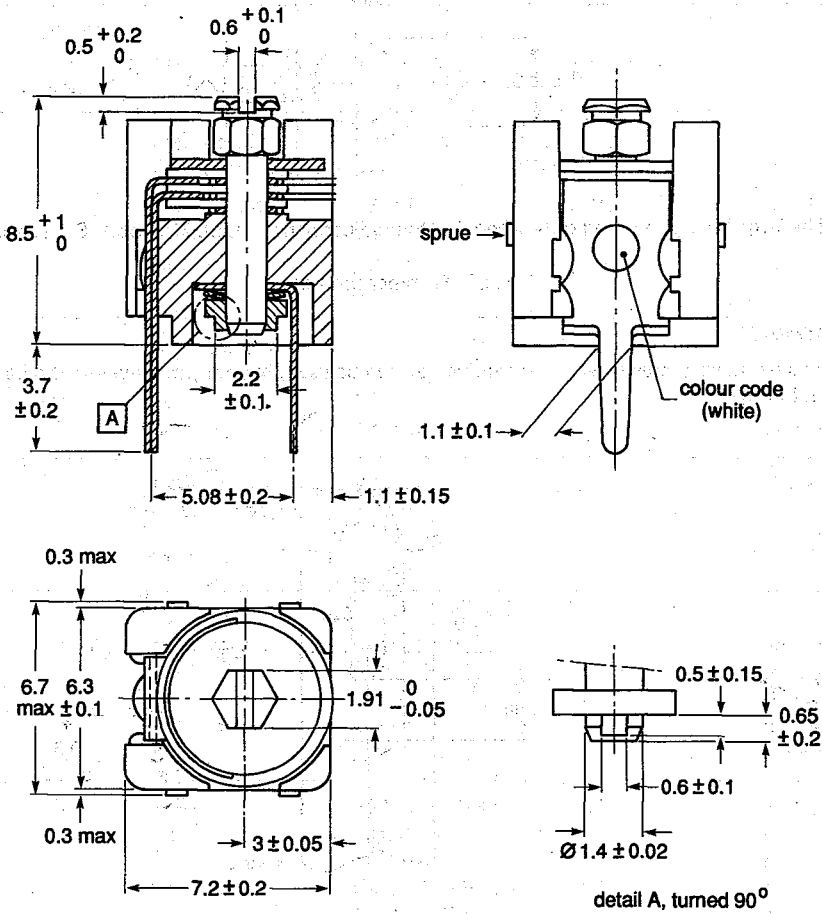
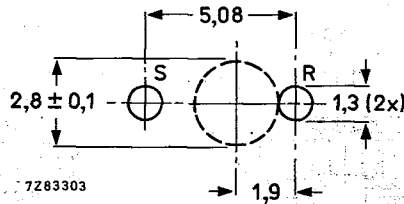


Fig.1 Trimmers 2222 809 05 ... series, round head.



7225428

Fig.2 Trimmers 2222 809 05 ... series, hex. head.



**Note:** The large hole is required only where bottom adjustment is used. R = rotor, S = stator.

Fig.3 Trimmer pin holes.

### ADJUSTMENT

For top adjustment a screwdriver or trimming key can be used; for bottom adjustment a key is required as shown in Fig.4.

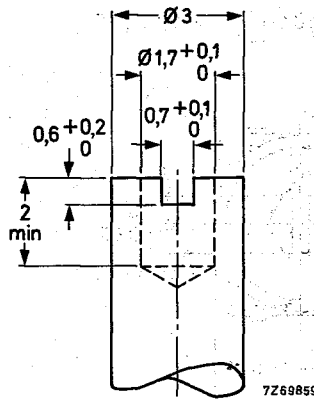


Fig.4 Bottom adjustment key.

### PACKING

Blister packs of 140 pieces each.

### QUALITY LEVEL

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

AQL 0.4% major defects, 1.5% minor defects.

Each capacitor is tested for min.  $C_{max}$  and is also subjected to the full test voltage. See also note under survey of variable capacitors.

## TESTS AND REQUIREMENTS

IEC 418-1 clause	IEC 68 test method	test	procedure	requirements
4.2		method of mounting	method A	
14		capacitance drift	after T.C. measurement	$\Delta C/C$ $\leq 1\%$
19		thrust	axial thrust of 2 N	$\Delta C/C$ $\leq 0.3\%$
21		robustness of terminations:		
21.1	Ua	tensile	1 N	
21.2	Ub	bending	1 cycle	no damage
22	Na	rapid change of temperature	1 cycle: $\frac{1}{2}$ h at lower and $\frac{1}{2}$ h at upper category temp.	$\Delta C/C$ $\leq 2\%$
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	$\Delta C/C$ $\leq 0.6\%$ no mechanical damage
25	Fc	vibration	freq. 10 to 55 Hz, ampl. 0.35 mm 1.5 h	$\Delta C/C$ $\leq 0.2\%$ no mechanical damage

## TESTS AND REQUIREMENTS (continued)

IEC 418-1 clause	IEC 68 test method	test	procedure	requirements
26		climatic sequence		$\Delta C/C$ $\leq 2.5\%$  $\tan \delta$ ( $< 18$ pF) $\leq 10 \times 10^{-4}$ ( $\geq 18$ pF) $\leq 40 \times 10^{-4}$
26.1	B	dry heat	16 h at upper category temp.	$R_{ins}$ $\geq 10\,000$ M $\Omega$ rotor contact R $\leq 5$ m $\Omega$
26.2	D	damp heat accelerated, first cycle	1 cycle, 24 h, + 40 °C, 95 to 100% R.H.	voltage proof 600 V for 1 min  visual examination no mechanical damage
26.3	Aa	cold	16 h, -40 °C	operating torque 1 to 20 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.	$\Delta C/C$ $\leq 2.5\%$  $\tan \delta$ ( $< 18$ pF) $\leq 10 \times 10^{-4}$ ( $\geq 18$ pF) $\leq 25 \times 10^{-4}$  $R_{ins}$ $\geq 10\,000$ M $\Omega$ rotor contact R $\leq 5$ m $\Omega$  voltage proof 600 V for 1 min  visual examination no mechanical damage  operating torque 1 to 20 mNm
29 29.1		endurance mechanical	25 cycles	$\Delta C/C$ $\leq 0.3\%$  $\Delta C/C$ after axial thrust $\leq 0.3\%$  rotor contact R $\leq 5$ m $\Omega$  voltage proof 600 V for 1 min  visual examination no mechanical damage  operating torque 1 to 20 mNm