Chapter 3

RHEOSTATS, BERCO, TYPE L SERIES

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Introduction

1. These rheostats are toroidially wound variable resistance units suitable for use in aircraft circuitry. They are of the smallest physical size consistent with reliability and are designed to withstand severe mechanical shock and vibration.

2. The rheostats detailed in appendices to this chapter were originally designated as the T series, but have now been re-classified to the L series. Although some slight difference does exist between the two types the principles of construction and general design are identical. The details given for a rheostat with a prefix letter L are applicable, therefore, to that having a prefix T, i.e., information given for Type L25/100 applies also to Type T25/100.

DESCRIPTION

3. A sectional view of the rheostat showing the salient features of the construction is given in fig. 1, the physical size of a particular rheostat being dependent upon its rating. The complete assembly consists of a moulded porcelain base holding the mechanism and mounting, and a former to carry the winding; the final unit comprises one solid mass of porcelain mounted from the centre.

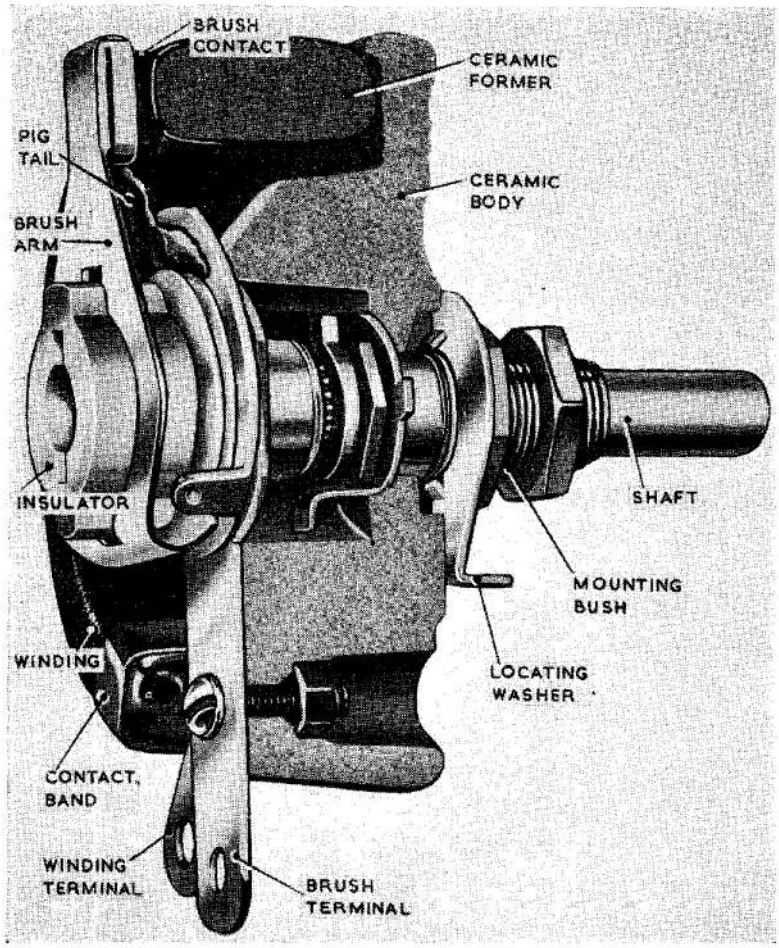

Fig. 1. Sectional view of rheostat

4. The resistance element is wound toroidially on a ceramic former proportioned to give the maximum mechanical strength. The sides of the former are convex so that the wire is held in close contact throughout the length of each turn. In most instances the windings are of nickel chromium wire which is resistant to oxidation. The winding is embedded on the former in vitreous enamel to protect the wire from damage and also to prevent possible movement of the turns under the action of the brush contact. Nickel alloy contact bands terminate the winding and these bands provide a definite zero resistance position in both directions of rotation. The contact boards are tinned to facilitate soldering and have holes for fitting terminal screws.

5. Electrical contact to the winding is made through a silver graphite brush contact. The brush is mounted in a holder in such a way that during its travel it can adjust itself to the contours of the winding thereby ensuring that the maximum contact area is employed. The electrical return from the brush is through a copper pigtail shunting the brush arm and is connected directly to a rotating contact plate engaging with the stationary terminal. The brush arm is of nickel silver alloy which gives adequate spring pressure and is resistant to corrosion. The rheostat is controlled by a spindle which is connected to the brush arm through a ceramic bush.

6. A list of ohmic values and current ratings for each type of rheostat is detailed in Table 1; the current in each case is the maximum for any position of the brush.

TABLE 1

Ohmic values and ratings

Ohms ±10%	Current Ratings				
	L.25	L.50	L.75	L.100	L.150
1	—	7·07	8·66	10·00	12·50
2	3·54	5·00	6·12	7·07	8·66
3	2·89	4·08	5·00	5·75	7·07
5	2·24	3·16	3·88	4·77	5·48
7·5	1·82	2·58	3·16	3·65	4·47
10·00	1·58	2·24	2·74	3·16	3·88
15·00	1·29	1·83	2·24	2·58	3·16
25·00	1·00	1·41	1·73	2·00	2·45
50·00	0·707	1·00	1·23	1·41	1·73
75·00	0·578	0·818	1·00	1·15	1·41
100·00	0·500	0·707	0·866	1·00	1·23
150·00	0·408	0·575	0·707	0·818	1·00
200·00	0·354	0·500	0·612	0·707	0·866
350·00	0·268	0·378	0·463	0·535	0·655
500·00	0·224	0·316	0·388	0·447	0·548
1000·00	0·158	0·224	0·274	0·316	0·388
1500·00	0·129	0·183	0·224	0·258	0·316
2500·00	0·100	0·141	0·173	0·200	0·245
5000·00	—	0·100	0·123	0·141	0·173
7500·00	—	0·081	0·100	0·115	0·141
10000·00	—	—	—	0·100	0·125

7. The rheostat spindle is of sufficient length to enable a knob to be fitted.

SERVICING

8. These components are very robust in construction and will require little servicing during their operational life. In the event of a rheostat suffering any mechanical damage, or the winding being burnt out, the defective rheostat should be removed and replaced by a serviceable unit.

Appendix 1

STANDARD MODELS

Type	Ref. No. 5CZ/
L25/30	5680
L25/65	5678
L25/75	6157
L25/83/393	5365
L25/100	5363
L25/780	5677
L50/3	6184
L50/10	7612
L50/25	5969
L50/30	5898
L50/38	5899
L50/50	5445
L50/80	5364
L75/17	6089
L150/7·5	6751

1. The standard models are of the basic design described in the main chapter. The first figure of the type number gives the wattage and the second figure the resistance of the winding, e.g. Type L25/30 has a 25 watt, 30 ohm winding.

2. The rheostat, Type L25/83/393 has a 25 watt, 83 ohm winding and is supplied with a special knob, Type MOU/46 (Ref. No. 5CZ/5366).

3. The type number may have a further suffix which denotes that an accessory is fitted. This suffix takes the form of the type of the accessory, e.g. L75/17/MOU 228.

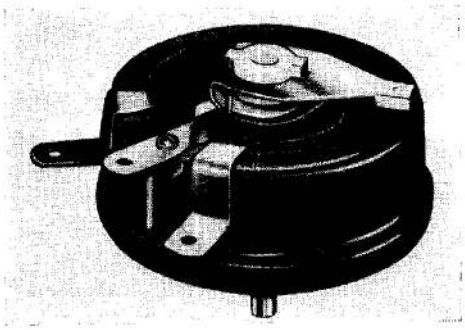

Fig. 1. Rheostat, standard model

ACCESSORIES

Collet fitting knobs

Type	MOU228	1·75 in. diam.
	MOU229	2·25 in. diam.
	MOU230	3·0 in. diam.

Grub screw fitting knobs

Type	MOU231	1·75 in. diam.
	MOU232	1·75 in. diam.
	MOU233	1·75 in. diam.
	MOU234	2·25 in. diam.
	MOU235	2·25 in. diam.
	MOU236	2·25 in. diam.
	MOU237	3·0 in. diam.
	MOU238	3·0 in. diam.
	MOU239	3·0 in. diam.

Engraved dials

Type	D163	2·75 in. diam.
	D164	3·5 in. diam.
	D172	2·125 in. diam.

Plain dials

Type	D169	2·75 in. diam.
	D170	3.5 in. diam.
	D171	2·125 in. diam.

Pointers

Type PO14
PO15
PO16

Appendix 2

TYPE CB

Type	Ref. No. 5CZ/
L25/CB/60	5027
L25/CB/220	5501
L100/CB/10	5915

1. The Type CB incorporates the basic rheostat as described in the main chapter. The complete assembly is enclosed within a pressed steel cover designed for mounting at the back of a panel and fixing holes have been provisioned to facilitate this mounting. The unit is supplied with a moulded collet fitting knob and the cable entry to the case is fitted with a rubber grommet.

2. The first figure of the type number gives the wattage and the second figure the resistance of the winding, e.g. Type L25/CB/60 has a 25 watt, 60 ohm winding.

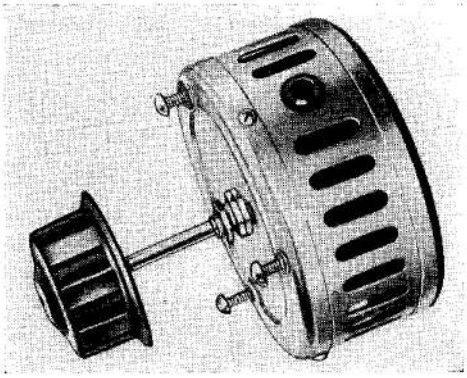

Fig. 1. Rheostat, Type CB

Appendix 3

TYPE CF

Type	Ref. No. 5CZ/
L25/CF/10	4177
L25/CF/60	5028
L25/CF/100	7100

1. The Type CF incorporates the basic rheostat as described in the main chapter. The complete assembly is enclosed within a pressed steel cover designed for mounting on the front of a panel and fixing feet are provided to facilitate this method of mounting. The unit is supplied with a black dial and a moulded plastic collet fitting knob.

2. The first figure of the type number gives the wattage and the second figure the resistance of the winding, e.g. Type L25/CF/10 has a 25 watt, 30 ohm winding.

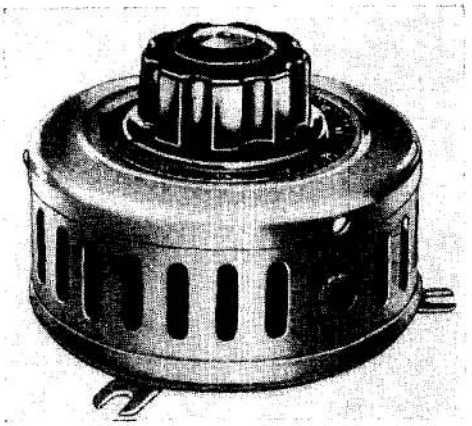

Fig. 1. Rheostat, Type CF

Appendix 4

TYPES G2 AND G3

Type	Ref. No. 5CZ/
L25/G2/19...	6437
L25/G2/65...	5679
L25/G2/112	5900
L25/G2/114	5547
L25/G2/165	5897
L25/G2/200	5985
L25/G2/350	5987
L50/G2/5·3	5545
L50/G2/19...	6268
L50/G2/19·5	5984
L50/G2/23...	6144
L50/G2/26·9	5546

1. The Types G2 and G3 are multi-ganged units using pressed steel parts and couplings as shown in fig. 1. The unit is supplied with a collet fitting knob.

2. The first figure of the type number gives the wattage and the last figure the resistance of the winding, G2 denotes a double ganged assembly and G3 denotes a triple ganged assembly, e.g. Type L25/G2/65 is a double ganged assembly with a 25 watt, 65 ohm winding.

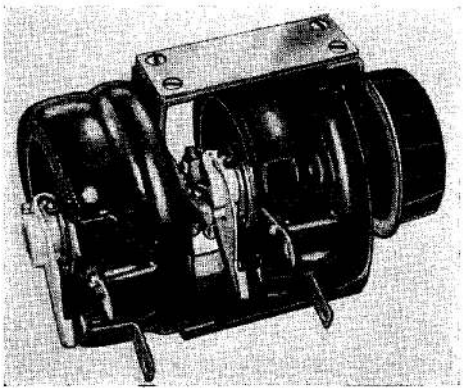

Fig. 1. Rheostat, Type G2

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(82207) Wt. 31090-3853. 1875/9/64 Gp.375/1.