

Chapter 10

POTENTIOMETERS, COLVERN SERIES

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Introduction

1. These potentiometers are wire wound variable resistance units suitable for use in aircraft circuitry.

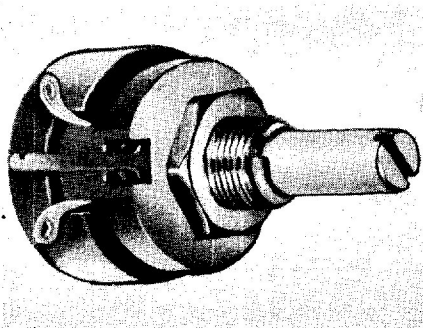


Fig. 1 Potentiometer, Type CLR 1106

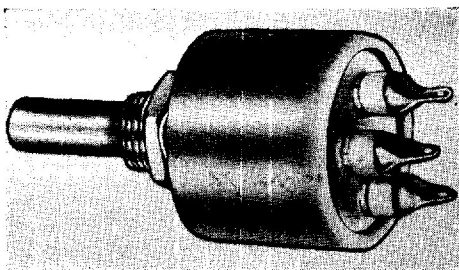


Fig. 2 Potentiometer, Type CLR 1501

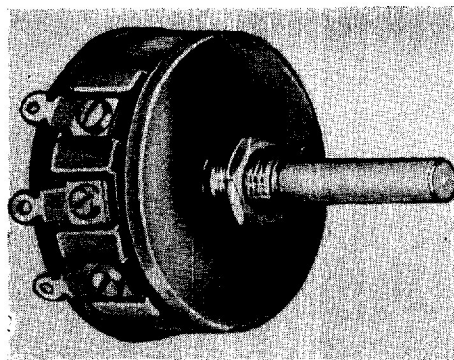


Fig. 3 Potentiometers, Types CLR 3001, CLR 4001 and CLR 5001

DESCRIPTION

2. Typical potentiometers are illustrated in fig. 1 to 4. These potentiometers consist basically of a flat card wound resistance element and a metal contact wiper enclosed within a moulded or metal case. Some units are hermetically sealed.

Cam correction device

3. The accuracy of a potentiometer depends on a number of factors, including the uniformity of both the resistivity, and cross-sectional area of the resistance wire, the uniformity of the element or former on which the wire is wound and the accuracy of mechanical construction. The cam correction device is a method of mechanical correction of these inherent errors.

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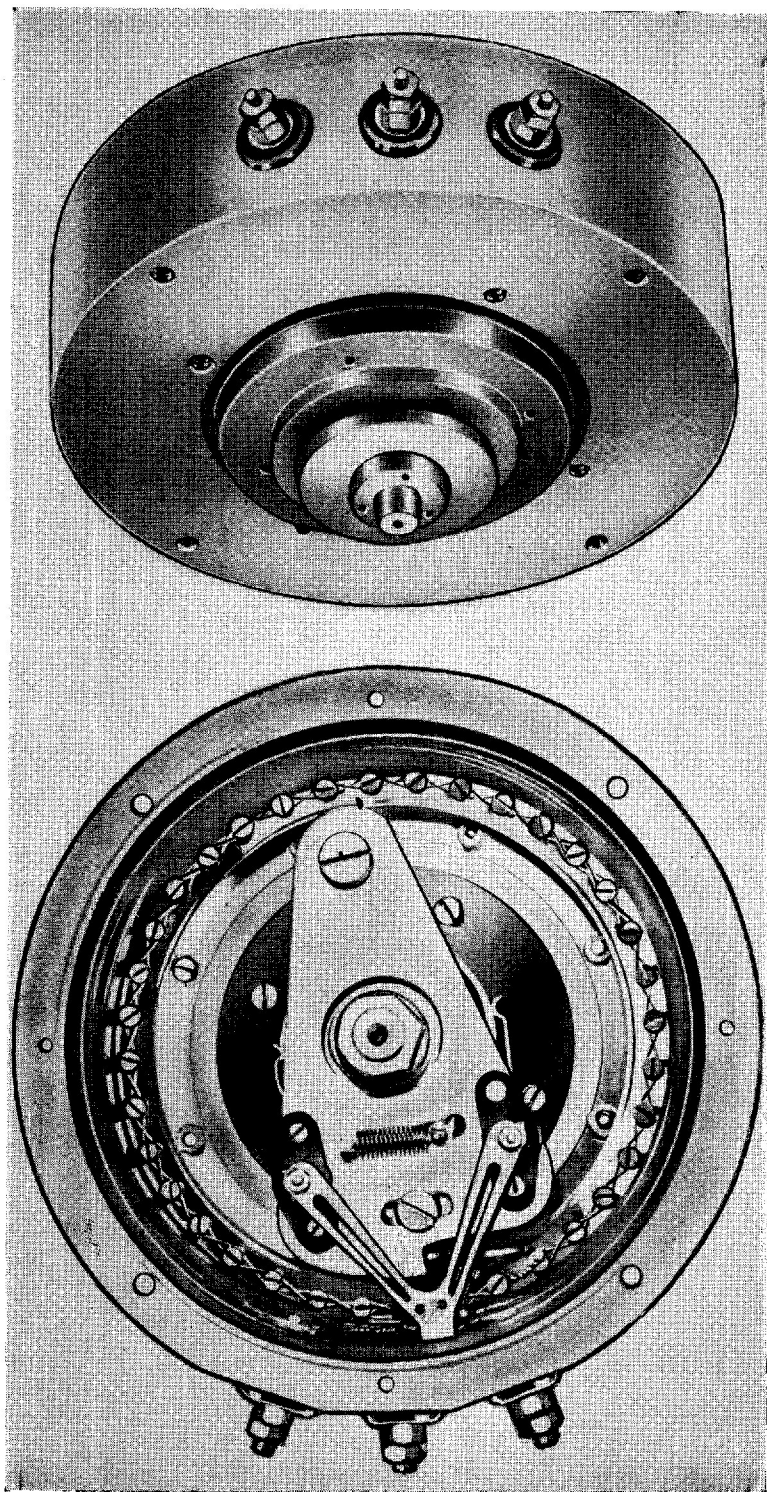


Fig. 4. Potentiometer, Type CLR 91/00 (cam corrected)

4. In the cam corrected potentiometer a certain amount of angular motion is transmitted to the rotor contact, in addition to, and independent of the main spindle. This

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motion being communicated to it by means of a lever which follows a track concentric with the resistance element. The profile of the track is controlled by screws arranged at regular intervals round the circumference and is adjusted so that inherent errors at any point in the winding are compensated for by the automatic retarding or advancing of the rotor contact.

Spindle code

5. A suffix after the potentiometer type number denotes the type of spindle fitted. A suffix /234 or /263 denotes a short slotted spindle suitable for screwdriver adjustment and a suffix /226 or /264 denotes a normal spindle to which a knob can be fitted. Other suffixes are listed in Table 3 of Appendix 1 to this Chapter.

SERVICING

6. Ensure by visual inspection that the potentiometer has not suffered any mechanical damage and that the connections are secure.

7. Check that the resistance of the winding is within ± 10 per cent. of the appropriate value given in Appendix 1 to this chapter and also that, on rotating the spindle over its full travel, its movement feels smooth and the resistance across the terminals rises and falls smoothly.

8. Using a 250-V insulation resistance tester measure the insulation resistance between all terminals connected together and the spindle. A reading of at least 50,000 ohms should be obtained.

Appendix 1.

LEADING PARTICULARS

Table 1

Type	Fixing	Rating (Watts)	Angle of Rotation (deg.)		Case	Remarks
			Mechanical	Effective		
CLR 91/00	4 holes 0.187 in. dia.	10	360 cont.	315	Aluminium alloy	Cam corrected
◀ CLR 901C	2 holes tapped 6 B.A.	3	290	275	Moulded	Insulated spindle ▶
CLR 1106	Bush 0.375 in. dia. × 0.375 in. long	1	285	265	Moulded	Midget
CLR 1501	Bush 0.375 in. dia. × 0.375 in. long	1	285	265	Aluminium alloy	Sealed
CLR 3001	Bush 0.375 in. dia. × 0.375 in. long	2	285	260	Moulded	Standard
CLR 4001	Bush 0.375 in. dia. × 0.375 in. long	3	295	275	Moulded	Standard
◀ CLR 4201	Bush 0.375 in. dia. × 0.375 in. long	3	295	275	Moulded	Sealed ▶
CLR 4239	Bush 0.375 in. dia. × 0.375 in. long	3	295	275	Moulded	Sealed
CLR 4501	Bush 0.375 in. dia. × 0.375 in. long	3	295	275	Aluminium alloy	Sealed
CLR 5001	Bush 0.375 in. dia. × 0.375 in. long	4	295	275	Moulded	Standard
CLR 5237	Bush 0.375 in. dia. × 0.375 in. long	4	295	275	Moulded	Sealed
◀ CLR 7017	3 holes tapped 4 B.A.	12	320	300	Moulded	Tropical sealed ▶
CLR 7037	3 holes tapped 4 B.A. on a 1.75 in. P.C.D.	12	320	300	Moulded	Sealed

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Table 2

Resistance (ohms $\pm$ 10%)	Inter Service Ref. No.					
	Type CLR 1501/263 (Style RVW1)	Type CLR 1501/264 (Style RVW2)	Type CLR 4239/263 (Style RVW7)	Type CLR 4239/264 (Style RVW8)	Type CLR 4501/263 (Style RVW3)	Type CLR 4501/264 (Style RVW4)
5	Z 119841	Z 119852	Z 271051	Z 271052	Z 271057	Z 271058
10	Z 119842	Z 119853	Z 271101	Z 271102	Z 271107	Z 271108
25	Z 119843	Z 119854	Z 271155	Z 271156	Z 271161	Z 271162
50	Z 119844	Z 119855	Z 271205	Z 271206	Z 271211	Z 271212
100	Z 119845	Z 119856	Z 271305	Z 271306	Z 271313	Z 271314
250	Z 119846	Z 119857	Z 271405	Z 271406	Z 271413	Z 271414
500	Z 119847	Z 119858	Z 271505	Z 271506	Z 271513	Z 271514
1,000	Z 119848	Z 119859	Z 271605	Z 271606	Z 271614	Z 271615
2,500	Z 119849	Z 119860	Z 271755	Z 271756	Z 271764	Z 271765
5,000	Z 119850	Z 119861	Z 272005	Z 272006	Z 272023	Z 272024
10,000	Z 119851	Z 119862	Z 272141	Z 272142	Z 272149	Z 272150
25,000			Z 272301	Z 272302	Z 272309	Z 272310
50,000			Z 272410	Z 272409	Z 272417	Z 272418
100,000			Z 272549	Z 272557	Z 119863	Z 119864

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Table 2 (continued)

Resistance (ohms $\pm 10\%$)	Inter Service Ref. No.			
	Type CLR 5237/263 (Style RVW9)	Type CLR 5237/264 (Style RVW10)	Type CLR 7037/234 (Style RVW11)	Type CLR 7037/226 (Style RVW12)
5	Z 271053	Z 271054	Z 271055	Z 271056
10	Z 271103	Z 271104	Z 271105	Z 271106
25	Z 271157	Z 271158	Z 271159	Z 271160
50	Z 271207	Z 271208	Z 271209	Z 271210
100	Z 271307	Z 271308	Z 271309	Z 271310
250	Z 271407	Z 271408	Z 271409	Z 271410
500	Z 271507	Z 271508	Z 271509	Z 271510
1,000	Z 271607	Z 271608	Z 271609	Z 271610
2,500	Z 271757	Z 271758	Z 271759	Z 271760
5,000	Z 272007	Z 272008	Z 272009	Z 272010
10,000	Z 272143	Z 272144	Z 272145	Z 272146
25,000	Z 272303	Z 272304	Z 272305	Z 272306
50,000	Z 272411	Z 272412	Z 272413	Z 272414
100,000	Z 119768	Z 119769	Z 272551	Z 272552

Note . . .

Suffix /234 or /263 denotes $\frac{5}{8}$ in. slotted spindle.

Suffix /226 or /264 denotes 1 in. normal spindle.

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Table 3
SPINDLE DETAILS

Plain	Type of Spindle		Length of spindle from fixing face (in.)
	Screwdriver slot	Standard flat	
	/7s		$\frac{1}{2}$
/8	/8s		$\frac{9}{16}$
/9	/9s		$\frac{5}{8}$
/10	/10s		$\frac{11}{16}$
/11	/11s		$\frac{3}{4}$
/12	/12s		$\frac{13}{16}$
/13	/13s	/13F	$\frac{7}{8}$
/14	/14s	/14F	$\frac{15}{16}$
/15	/15s	/15F	1
/16	/16s	/16F	$1\frac{1}{16}$
/17	/17s	/17F	$1\frac{1}{8}$
/18	/18s	/18F	$1\frac{3}{16}$
/19	/19s	/19F	$1\frac{1}{4}$
/20	/20s	/20F	$1\frac{5}{16}$
/21	/21s	/21F	$1\frac{3}{8}$
/22	/22s	/22F	$1\frac{1}{2}$
/23	/23s	/23F	$1\frac{5}{8}$
/24	/24s	/24F	$1\frac{3}{4}$
/25	/25s	/25F	$1\frac{7}{8}$
/26	/26s	/26F	2
/27	/27s	/27F	$2\frac{1}{8}$
/28	/28s	/28F	$2\frac{1}{4}$
/29	/29s	/29F	$2\frac{3}{8}$

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Chapter 14

SILICON RECTIFIERS, FERRANTI

LEADING PARTICULARS

Type	Ref. No.	Maximum peak inverse voltage (volts)
ZR 20	10CV/7014	50
ZR 20R		
ZR 21	{ 10CV/7015 5CZ/5779 }	100
ZR 21R		
ZR 22	10CV/7016	200
ZR 22R		
ZR 23	{ }	300
ZR 23R		
ZR 24	10CV/7017	400
ZR 24R		

The following particulars are applicable to all types:—

Overall dimensions (in.)

Length of body ... 1.12

Across hexagon corners ... 0.42

Flexible lead length ... 0.95

Mounting stud ... No. 10 Unified thread

Maximum ambient operating temperature ... 140 deg. C

Maximum mean rectified current when mounted on heat sink

At ambient temperature of 25 deg. C ... 8 amp.

At ambient temperature of 100 deg. C ... 4 amp.

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Introduction

1. These silicon rectifiers are encapsulated in a hermetically sealed can which is provided at one end with a screwed stud suitable for mounting on to a heat sink. They may be operated at mean rectified current ratings up to 8 amperes, with a maximum permissible case temperature of 130 deg. C. General information on semi-conductors may be found in A.P.4343, Vol. 1, Sect. 1.

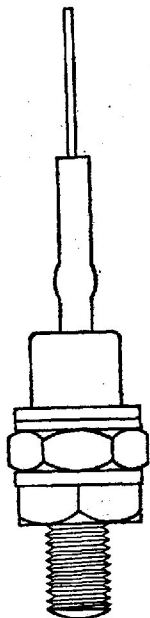


Fig. 1. Silicon rectifier

2. Rectifiers without a suffix letter, e.g. ZR 20, the lead corresponds to the cathode of a thermionic rectifier and rectifiers with a

suffix letter R, e.g. ZR 20R, the stud corresponds to the cathode.

3. The flexible lead should not be bent at any point between the systoflex and the body of the diode. The temperature of the lead wire must not exceed 300 deg. C when soldering and the soldered connection should be made only to that portion of the wire which projects from the insulating sleeve.

4. These rectifiers are designed for use with heat sinks and it is advisable to ensure that the surface of the heat sink in contact with the rectifier is quite flat so that good thermal contact is maintained. A film of silicone oil between the rectifier and the heat sink will reduce the thermal resistance.

TESTING

5. The following figures should be used for checking whether a diode is still operating with reasonable efficiency and has not gone open-circuit. If the values are outside these figures the diode should be rejected.

Forward characteristic

6. The d.c. voltage drop across the rectifier when it is passing 5 amps in the conducting direction at an ambient temperature of 25 deg. C should not exceed 1.2 volts.

Reverse characteristic

7. The reverse current through the rectifier at an ambient temperature of 25 deg. C when the peak inverse voltage is applied should not be greater than 50 microamps. It should be noted that the peak inverse voltages are maximum values and the test set should contain no transients.

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