



WESTON INSTRUMENTS
GREAT CAMBRIDGE ROAD, ENFIELD,
MIDDLESEX, EN1 3RX, ENGLAND

RESISTORS - R SERIES

VARIANTS:

R2, R4, R5, R6

R7, R8 & R10

COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

STATEMENT OF INITIAL CERTIFICATION

This manual complies with British Civil Airworthiness Requirements, Section A, Chapter A6-2.

Signed: Research & Engineering Manager

Date: 30th June, 1980

CAA Approval No: DA1/1198/39

NOTE: The above certification does not apply to revisions or amendments made after the date of initial certification by other Approved Organisations. Revisions or amendments made by other Approved Organisations must each be separately certified, and recorded on separate record sheets.

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REVISION RECORD SHEET

The introduction of any amendment or revision not certified in accordance with British Civil Airworthiness Requirements Chapter A6-2 will invalidate the statement of certification on the Title Page.

Amendments or revisions embodied in this manual, which have been certified under an approval authorisation other than that applicable to the initial certification must be recorded on separate record sheets.

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MODIFICATION STANDARDS

Modification standards listed on this page are applicable to all variants of the R Series Resistors.

A modification standard relevant only to a particular variant of the model, will be listed in the related variant information.

A designated modification letter (or letters) which is marked on the model indicates that the modification has been embodied, this embodiment also applies to a following letter (or letters) of the modification standard.

Modification letter(s)

Service Bulletin No.

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INTRODUCTION

1. General

This manual contains shop verified instructions for the Weston Instruments R Series Resistors.

The servicing procedures given are consistent with those accomplished by the manufacturer.

Differences between series are defined by variant numbers and details specific to variants are listed separately (refer to Table of Contents).

To accommodate additions of variants to the manual, which could also require additions to other sections of the manual, the block system as outlined in ATA 100 has been used.

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DESCRIPTION AND OPERATION

1. Description

The R series of resistors are wire wound and for use in conjunction with aircraft indicators where the circuit requires a definite resistance value. Resistors are manufactured with various body styles and terminal types for differing applications. A Series (Variant) is defined by a combination of these features. Within a series, resistors are made in a range of ohmic values. Series R.2, R.4, R.5, R.6 and R.10 resistors are for use with thermocouple-operated indicators. Series R.7 and R.8 are for use with pressure-transmitter operated indicators.

2. Operation

Resistors to be used with thermocouples are connected in either series or parallel and are used as ballast or compensation resistors. Resistors to be used with pressure indicators are connected as part of a potential divider chain.

3. Data

Details applicable to each individual series are given in the following Variant Data pages of the manual.

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R.2 THERMOCOUPLE BALLAST RESISTOR

4. Variant Data

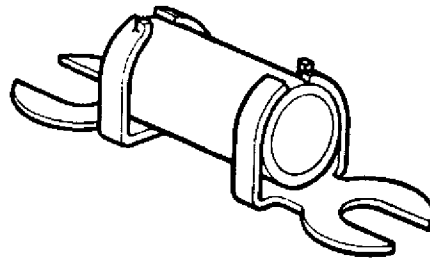


Figure 1

Terminals - Nickel Chromium (+ ve Non-Magnetic)

Nickel Aluminium (- ve Magnetic)

Temperature Range 0 to 150°C

Accuracy $\pm 1\%$

Resistance Value (Ohms)	Code	Resistance Value (Ohms)	Code
5.63	R.2-121	19.00	R.2-133
5.99	R.2-122	23.68	R.2-134
6.38	R.2-123	31.42	R.2-135
6.84	R.2-124	48.05	R.2-136
7.36	R.2-125	90.76	R.2-137
7.97	R.2-126	4.00	R.2-145
8.69	R.2-127	4.17	R.2-146
9.56	R.2-128	4.36	R.2-147
10.61	R.2-129	4.56	R.2-148
11.93	R.2-130	4.79	R.2-149
13.62	R.2-131	5.04	R.2-150
15.86	R.2-132	5.32	R.2-151

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R.2 THERMOCOUPLE BALLAST RESISTOR

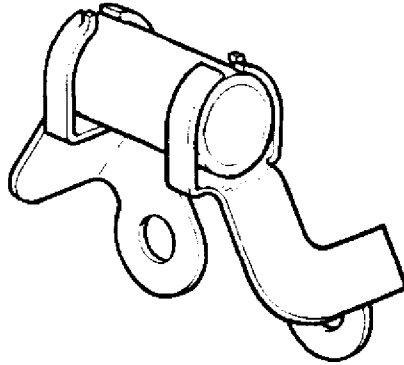


Figure 2

Terminals - Nickel Chromium (+ ve Non-Magnetic)

Nickel Aluminium (- ve Magnetic)

Temperature Range 0 to 150°C

Accuracy $\pm 1\%$

Resistance Value (Ohms)	Code	Resistance Value (Ohms)	Code
0.899	R.2-200	1.785	R.2-212
0.937	R.2-201	1.947	R.2-213
0.980	R.2-202	2.141	R.2-214
1.024	R.2-203	2.379	R.2-215
1.076	R.2-204	2.677	R.2-216
1.130	R.2-205	3.059	R.2-217
1.193	R.2-206	3.541	R.2-218
1.263	R.2-207	4.242	R.2-219
1.342	R.2-208	5.291	R.2-220
1.427	R.2-209	7.026	R.2-221
1.530	R.2-210	10.458	R.2-222
1.647	R.2-211	20.440	R.2-223

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R.2 THERMOCOUPLE BALLAST RESISTOR

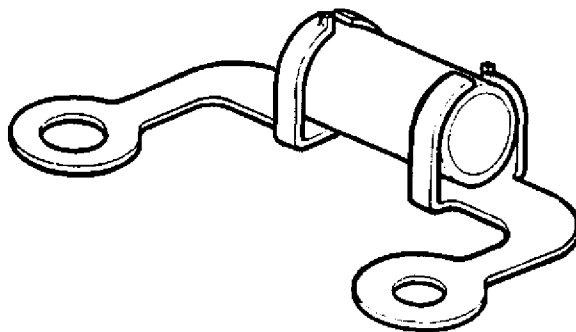


Figure 3

Terminals - Nickel Chromium (+ ve Non-Magnetic)

Nickel Aluminium (- ve Magnetic)

Temperature Range 0 to 150°C

Accuracy $\pm 1\%$

Resistance Value (Ohms)	Code	Resistance Value (Ohms)	Code
3.378	R.2-226	14.592	R.2-239
3.549	R.2-227	19.102	R.2-240
3.793	R.2-228	30.900	R.2-241
4.072	R.2-229	55.295	R.2-242
4.509	R.2-230	2.37	R.2-350
4.754	R.2-231	2.45	R.2-351
5.150	R.2-232	2.56	R.2-352
5.741	R.2-233	2.63	R.2-353
6.253	R.2-234	2.75	R.2-354
7.147	R.2-235	2.84	R.2-355
8.208	R.2-236	2.96	R.2-356
9.465	R.2-237	3.09	R.2-357
11.177	R.2-238	3.22	R.2-358

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R.2 THERMOCOUPLE BALLAST RESISTOR

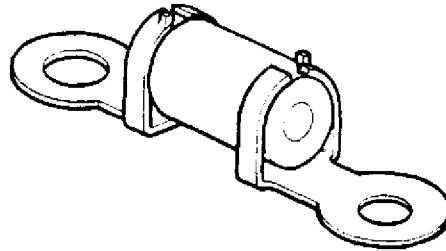


Figure 4

Terminals - Nickel Chromium (+ ve Non-Magnetic)

Nickel Aluminium (- ve Magnetic)

Temperature Range 0 to 150°C

Accuracy $\pm 1\%$

Resistance Value (Ohms)	Code	Resistance Value (Ohms)	Code
5.63	R.2-300	31.42	R.2-314
5.99	R.2-301	48.05	R.2-315
6.38	R.2-302	90.76	R.2-316
6.84	R.2-303	4.00	R.2-317
7.36	R.2-304	4.17	R.2-318
7.97	R.2-305	4.36	R.2-319
8.69	R.2-306	4.56	R.2-320
9.56	R.2-307	4.79	R.2-321
10.61	R.2-308	5.04	R.2-322
11.93	R.2-309	5.32	R.2-323
13.62	R.2-310	74.04	R.2-324
15.86	R.2-311	3.715	R.2-325
19.00	R.2-312	3.549	R.2-326
23.68	R.2-313	3.386	R.2-327

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R.2 THERMOCOUPLE BALLAST RESISTOR

Resistance Value (Ohms)	Code	Resistance Value (Ohms)	Code
3.238	R.2-328	81.38	R.2-419
3.103	R.2-329	86.11	R.2-420
2.978	R.2-330	91.43	R.2-421
5.75	R.2-382	97.44	R.2-422
5.87	R.2-383	104.30	R.2-423
6.12	R.2-384	112.50	R.2-424
6.25	R.2-385	121.40	R.2-425
6.52	R.2-386	132.24	R.2-426
6.67	R.2-387	146.65	R.2-427
7.01	R.2-388	162.76	R.2-428
7.18	R.2-389	182.85	R.2-429
7.56	R.2-390	208.61	R.2-430
7.76	R.2-391	242.81	R.2-431
8.21	R.2-392	290.42	R.2-432
8.45	R.2-393	370.28	R.2-433
8.91	R.2-394	528.97	R.2-434
9.20	R.2-395	740.56	R.2-435
9.91	R.2-396	1481.13	R.2-436
10.26	R.2-397	48.88	R.2-504
52.33	R.2-411	45.86	R.2-505
56.32	R.2-412	43.18	R.2-506
60.95	R.2-413	40.80	R.2-507
63.57	R.2-414	38.67	R.2-508
66.42	R.2-415	36.75	R.2-509
69.86	R.2-416	35.01	R.2-510
73.32	R.2-417	33.51	R.2-511
77.95	R.2-418		

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R.4 THERMOCOUPLE BALLAST RESISTOR

4. Variant Data

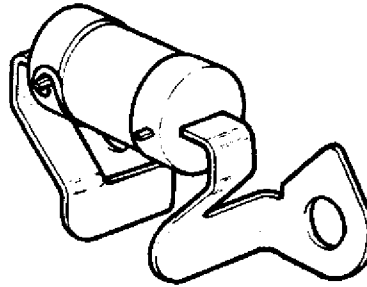


Figure 5

Terminals - Nickel Chromium (+ ve Non-Magnetic)

Nickel Aluminium (- ve Magnetic)

Temperature Range 0 to 150°C

Accuracy $\pm 1\%$

Resistance Value (Ohms)	Code
1.062	R.4-363
1.191	R.4-364
1.355	R.4-365
1.571	R.4-366
1.889	R.4-367
2.339	R.4-368
3.119	R.4-369
4.678	R.4-370
8.932	R.4-371

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R.5 TRIMMING RESISTOR

4. Variant Data

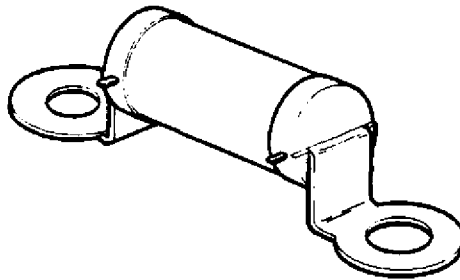


Figure 6

Terminals - Nickel Chromium (+ ve Non-Magnetic)

Nickel Aluminium (- ve Magnetic)

Temperature 0 to 150°C

Accuracy $\pm 1\%$

Resistance Value (Ohms)	Code
1000	R.5-472

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 R.6 TRIMMING RESISTOR

4. Variant Data

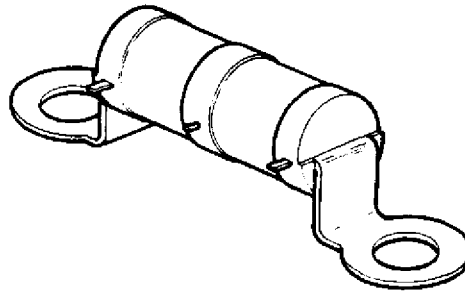


Figure 7

Terminals - Nickel Aluminium
 Temperature Range 0 to 150°C
 Accuracy $\pm 1\%$

Resistors in the R6 series are double wound to be temperature compensating.

1st Winding Resistance (Ohms)	2nd Winding Resistance (Ohms)	Total Resistance (Ohms)	Code
72.007	35.239	107.246	R.6-441
73.735	36.076	109.811	R.6-442
75.441	36.952	112.393	R.6-443
77.373	37.916	115.289	R.6-444
79.091	38.773	117.864	R.6-445
80.808	39.630	120.438	R.6-446
82.525	40.486	123.011	R.6-447
84.242	41.343	125.585	R.6-448
85.960	42.191	128.151	R.6-449
87.677	43.056	130.733	R.6-450
70.288	34.383	104.671	R.6-473
66.854	32.670	99.524	R.6-474
63.681	30.707	94.388	R.6-475
59.771	29.135	88.906	R.6-476

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R.6 TRIMMING RESISTOR

1st Winding Resistance (Ohms)	2nd Winding Resistance (Ohms)	Total Resistance (Ohms)	Code
56.336	27.442	83.778	R.6-477
52.901	25.709	78.610	R.6-478
49.253	23.887	73.140	R.6-479
45.818	22.175	67.993	R.6-480
42.383	20.461	62.844	R.6-481
38.732	18.643	57.375	R.6-482
35.300	16.527	51.827	R.6-483
31.653	15.149	46.802	R.6-484
28.214	13.393	41.607	R.6-485
24.782	11.679	36.461	R.6-486
21.132	9.860	30.992	R.6-487
17.697	8.147	25.844	R.6-488
14.049	6.324	20.373	R.6-489
10.593	4.632	15.225	R.6-490
6.966	2.790	9.756	R.6-491
3.529	1.080	4.609	R.6-492
68.57	33.53	102.10	R.6-725
65.27	31.69	96.96	R.6-726
61.72	29.93	91.65	R.6-727
58.05	28.29	86.34	R.6-728
54.62	26.57	81.19	R.6-729
51.08	24.80	75.88	R.6-730
47.54	23.03	70.57	R.6-731
44.10	21.32	65.42	R.6-732
89.420	43.910	133.330	R.6-739
91.113	44.737	135.890	R.6-740
92.850	45.590	138.440	R.6-741
94.594	46.456	141.050	R.6-742
2.15	1.00	3.15	R.6-798

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R.7 POTENTIAL DIVIDER RESISTOR

4. Variant Data

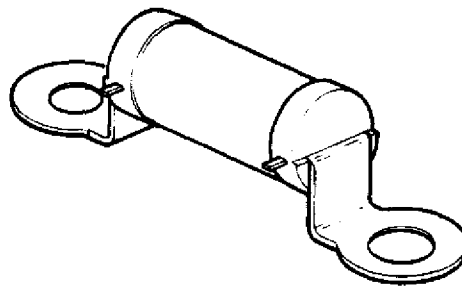


Figure 8

Terminals - Brass	
Temperature Range	0 to 110°C
Accuracy	$\pm 1\%$
Resistance Value	Code
(Ohms)	
8000	R.7-494

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R.8 POTENTIAL DIVIDER RESISTOR

4. Variant Data

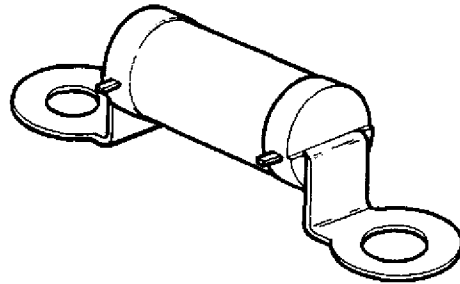


Figure 9

Terminals - Brass

Temperature Range 0 to 110°C

Accuracy $\pm 1\%$

Resistance Value (Ohms)	Code	Resistance Value (Ohms)	Code
30	R.8-495	3.50	R.8-631
48	R.8-496	3.60	R.8-632
74	R.8-497	3.70	R.8-633
102	R.8-498	3.80	R.8-634
134	R.8-499	3.90	R.8-635
168	R.8-500	4.00	R.8-636
200	R.8-501	4.10	R.8-637
240	R.8-502	4.20	R.8-638
270	R.8-503	4.30	R.8-639
3.00	R.8-626	4.40	R.8-640
3.10	R.8-627	4.50	R.8-641
3.20	R.8-628	4.60	R.8-642
3.30	R.8-629	4.70	R.8-643
3.40	R.8-630	4.80	R.8-644

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R.8 POTENTIAL DIVIDER RESISTOR

Resistance Value (Ohms)	Code	Resistance Value (Ohms)	Code
4.90	R.8-645	184	R.8-778
5.00	R.8-646	220	R.8-779
5.10	R.8-647	255	R.8-780
5.20	R.8-648	289	R.8-781
5.30	R.8-649	304	R.8-782
5.40	R.8-650	322	R.8-783
5.50	R.8-651	339	R.8-784
5.60	R.8-652	354	R.8-785
5.70	R.8-653	371	R.8-786
5.80	R.8-654	391	R.8-787
5.90	R.8-655	411	R.8-788
6.00	R.8-656	426	R.8-789
24.0	R.8-745	442	R.8-790
20.0	R.8-746	460	R.8-791
15.0	R.8-747	478	R.8-792
10.0	R.8-748	498	R.8-793
5.0	R.8-749	518	R.8-794
61.0	R.8-750	538	R.8-795
39.0	R.8-751	558	R.8-796
88.0	R.8-752		
118.0	R.8-753		
151.0	R.8-754		

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R.10 COMPENSATING RESISTOR

4. Variant Data

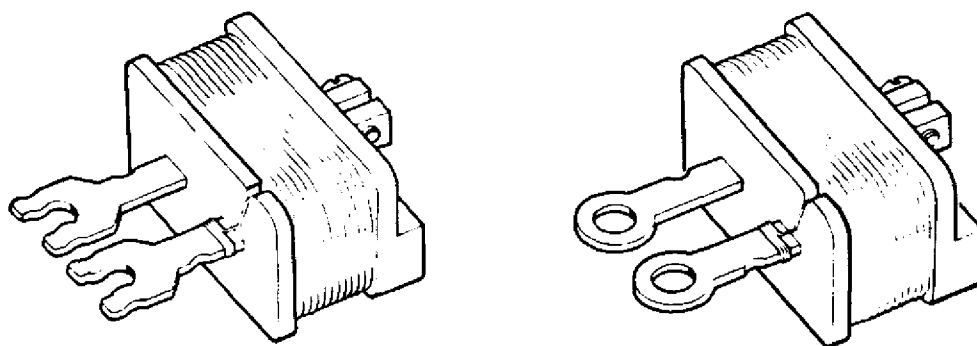


Figure 10

Resistors in the R10 series are provided un-adjusted. For adjusting instructions see the Check and Adjustment section of the manual.

Terminals - Brass

Temperature Range 0 to 120°C

Minimum Resistance (Ohms)	Terminal Type	Code
7	Fork	R.10-32
7	"	R.10-33
10	"	R.10-97
20	"	R.10-98
7	Eyelet	R.10-99
10	"	R.10-100
20	"	R.10-101
25	Fork	R.10-120
5	Eyelet	R.10-225
40	"	R.10-336

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CLEANING

1. Preparation

TABLE 401

MATERIALS

Material/Specification	Supplier
Genklene or Arklone P or Inhibisol	I.C.I. I.C.I. Penetone Paripan

NOTE: Equivalent substitutes may be used for listed items.

2. Procedure

- A. Dampen a piece of clean cloth with the cleaning fluid listed in Table 401 and thoroughly clean the resistor.
- B. Remove surplus fluid with a clean dry cloth.

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CHECK AND ADJUSTMENT

1. Preparation

TABLE 501
MATERIALS AND EQUIPMENT

Item	Code	Supplier
Wheatstone Bridge	5785/4	H. Tinsley & Co. Ltd., Stanger Road, London SE25
Varnish	B.S. 42	Weston Instruments
Bostik (thinned)	B.S. 104	" "

NOTE: Equivalent substitutes may be used for listed items.

2. Inspection

Examine resistors for:

- A. Cleanliness.
- B. Security of terminals.
- C. Good conditions of former; visually check for cracks.
- D. Good condition of all metal parts.

3. Check

Check the accuracy of resistance values using a Wheatstone bridge.

4. Adjustment of Resistors (R.10 variants only)

If required, adjust resistors as follows:

- A. Loosen the screw clamping the outer end of the resistance wire.
- B. Using a resistance bridge or ohmmeter of known accuracy adjust the length of the wire to give the required circuit resistance value.

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- C. Secure the wire in the split boss so that it rests in position above the screw i.e. at the open end of the slot. Tighten the screw.
- D. Recheck the resistance value and if it is satisfactory coat the outer layer with BS.42 varnish.
- E. Secure the screw against vibration by applying a coat of Bostik prepared to Weston Instruments specification BS 104.

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STORAGE

1. Conditions

- A. The resistor or spool should be retained in its original packing while being stored. They should be kept remote from any process emitting fumes which might damage the packing materials or contents.
- B. Store in conditions where the temperature range is within -20°C to $+50^{\circ}\text{C}$ and where humidity does not exceed 50%.

2. Limiting Period

- A. The storage limiting period for the resistor is five years.
- B. After expiration of the period the resistor must be checked as described in the CHECK section of this Manual.
- C. If found satisfactory, repack the resistor as described in the appropriate packing specification and return to store.



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