BS 1

CLAUDE LYONS POWER RESISTORS

CLAUDE LYONS

Claude Lyons Power Resistors

Many years of experience in the design and manufacture of wirewound power resistors has resulted in an extensive range of highly professional products to suit many applications. Using modern materials and the latest production techniques Claude Lyons pride themselves on providing top quality cost effective resistors to a vast range of users including laboratories, industry and defence.

Claude Lyons Ltd.

Established sixty years ago Claude Lyons Ltd. is now recognised as a world leader in the manufacture of power and voltage control equipment. Specialising in AC and DC control the comprehensive range of products available include 'Berco' and 'Bercostat' power resistors, the famous TS series AC voltage stabiliser, 'Regavolt' variable transformers and 'Stabilac' line voltage conditioners, the latter specifically designed for the rapidly expanding computer market.
Claude Lyons are quality approved to MOD DEF-0529.
Berco, Bercostat, Claude Lyons, Regavol and Stabilac are registered trade names of Claude Lyons Ltd.

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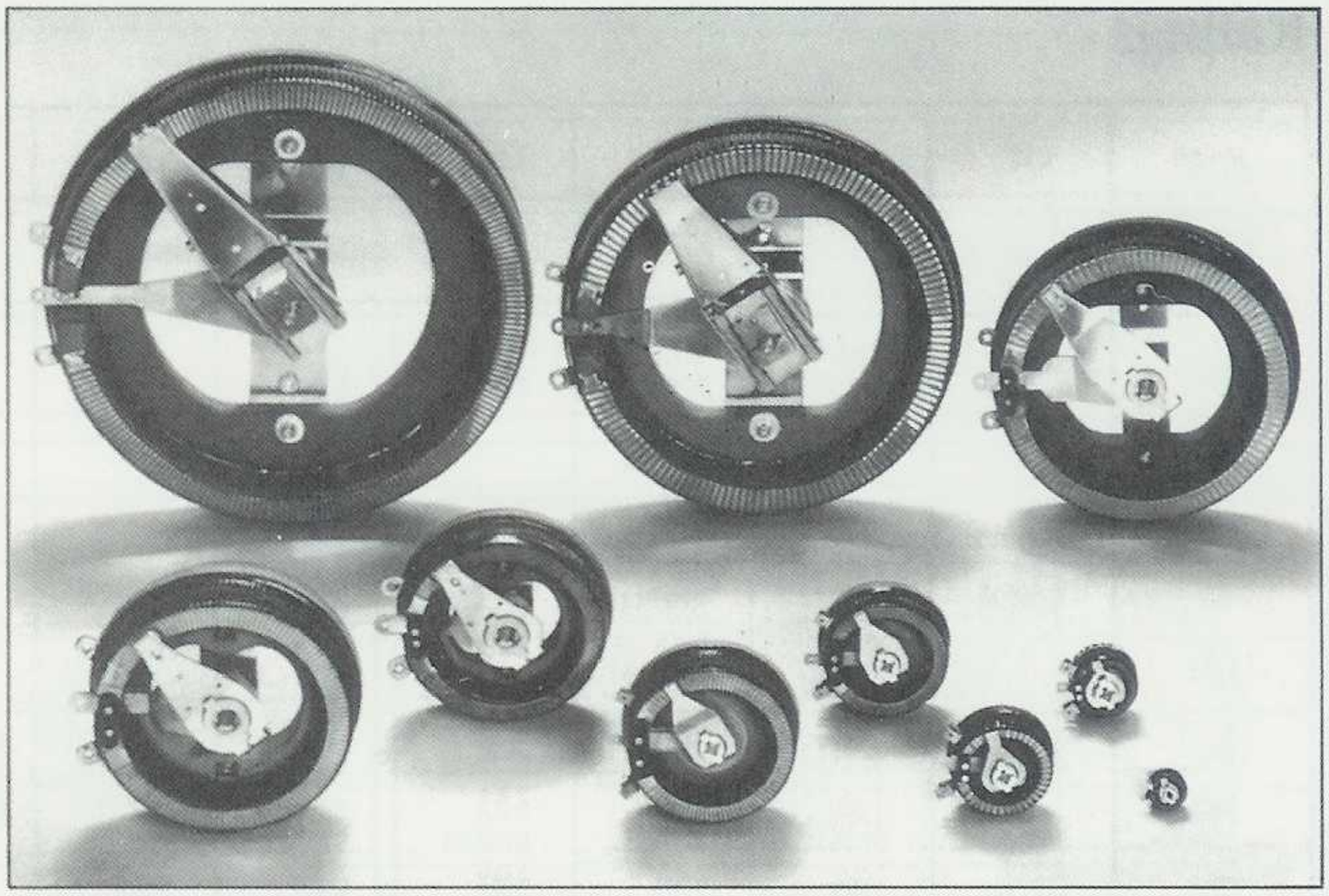
Dimensions

Many products in this catalogue are dimensioned in metric units and imperial equivalents. Others, due to customer requirements, continue to be manufactured with dimensions based on imperial units only.

Bercostat Rotary Rheostats

An extensive range of rotary rheostats to suit all industrial and laboratory needs comprising ten basic single frame size models for 12 (L12) to 1000 (L1000) watt operation with ohmic values from 1Ω to 10kΩ (see table).

Options are available for graded windings, series and parallel operation, manual or motor drive, open or enclosed construction and with a selection of knobs, dials and pointers to suit all applications.



Features

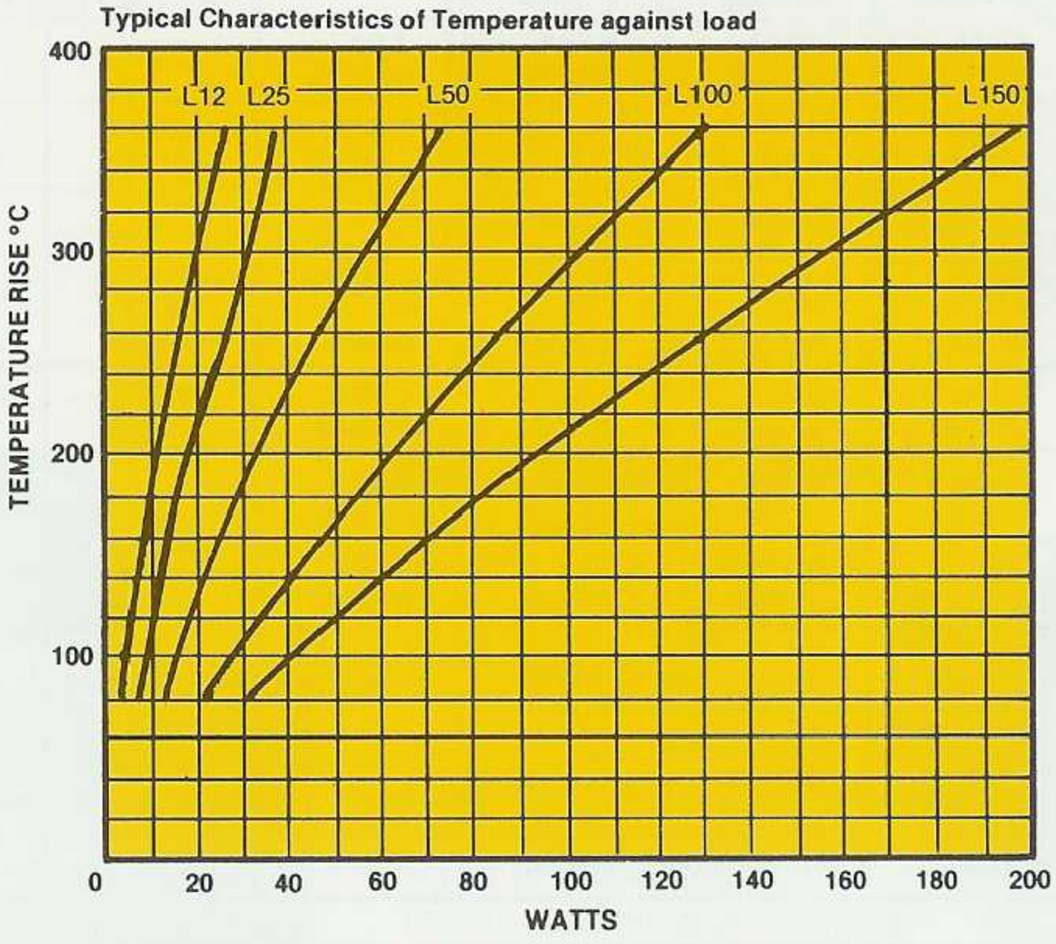
- Permanently self-lubricating brush contact.
- Nickel-chromium alloy winding in the high ohmic values. This combination gives non-oxidising contact at all working temperatures, low wear and long life.
- The brush floats on a balanced point, is self-aligning to present maximum area to the winding, and adjusts to the varying gauges of wire on graded windings.
- Winding held firmly to prevent movement and to provide good mechanical protection.
- All ceramic and metal construction.
- Pigtail and non-grooving return contact plate shunt the brush arm.
- Plated, hardened and tempered spring steel brush arm.
- Porcelain brush arm insulating rotor.
- Winding brazed to terminal band.
- Spindle held to very close tolerance on diameter, ensuring smooth rotary action.

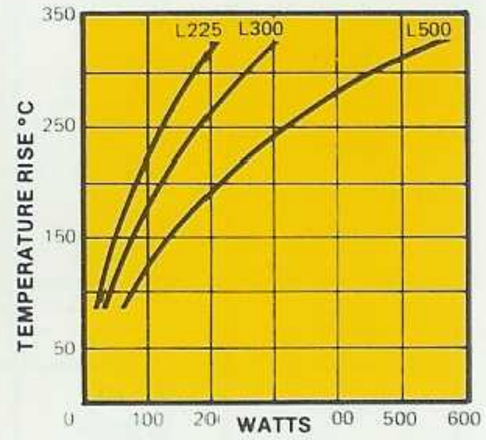
Temperature curves

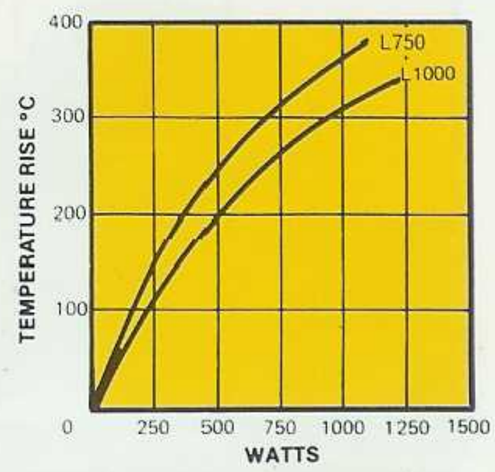
Temperature Rise Against Load

These curves show the temperature rise at the hottest point of 'Bercostats' against total dissipation over the entire former, when mounted with the shaft horizontal in free air, and terminals pointing downward.

In practice, owing to the reduction of current that occurs as the resistance in circuit is increased, the formers rarely have to dissipate the maximum designed power.

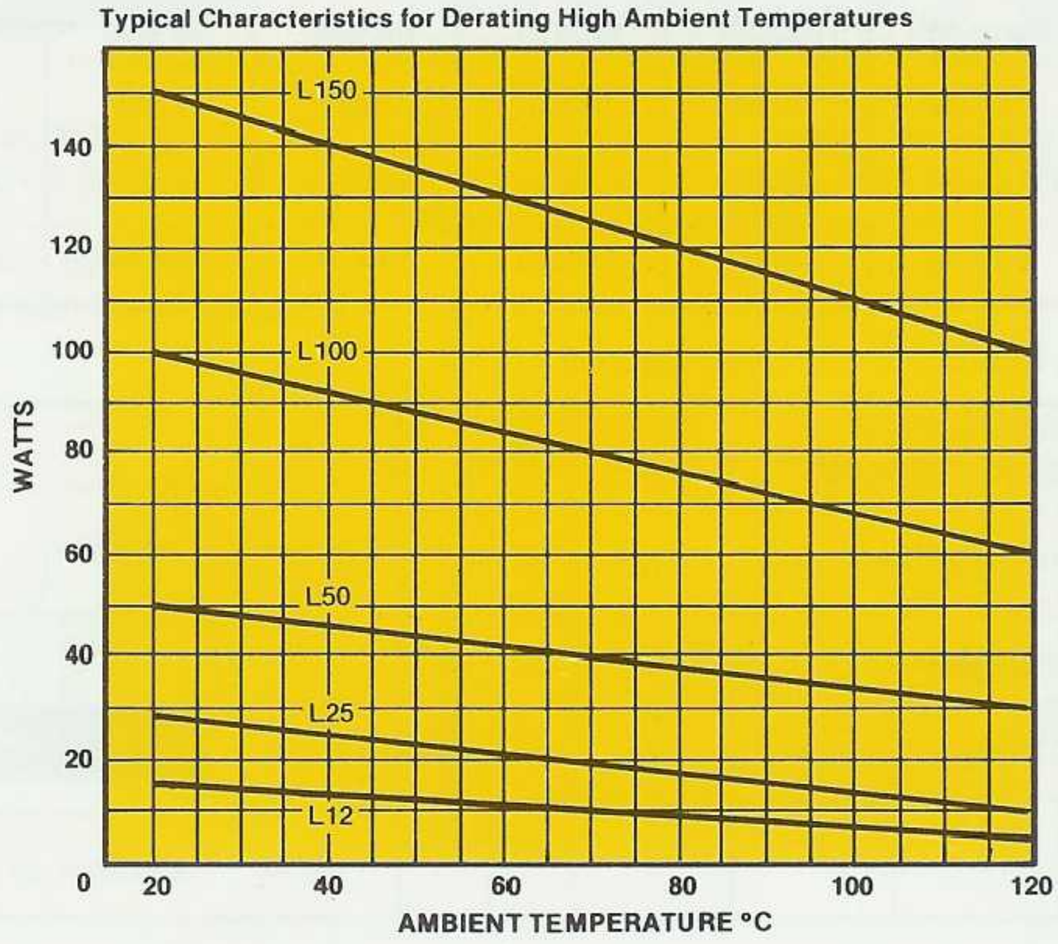


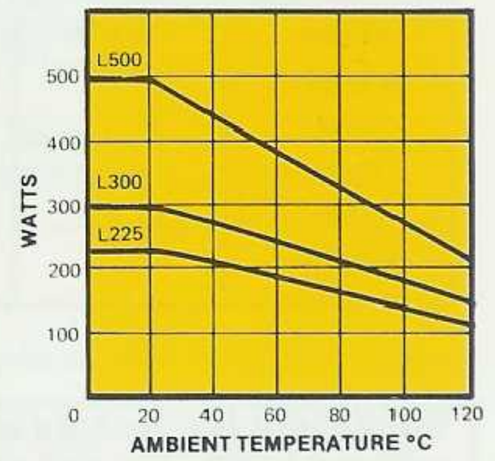


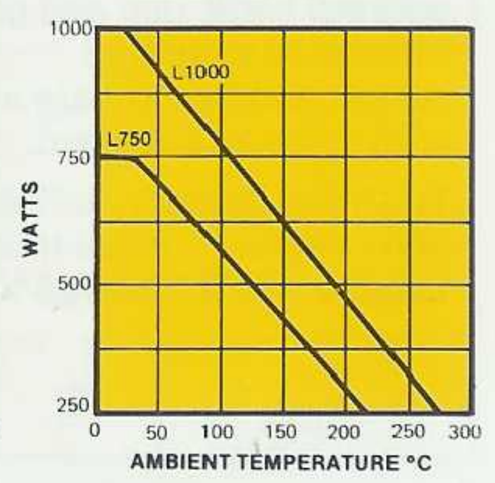


Derating for High Ambient Temperatures

These curves show the reduction in loading which must be applied to the standard range of 'Bercostats' operating in higher than normal ambient temperatures. All the ratings given in the tables of ohmic values are applicable in ambient temperatures of 20°C with unrestricted ventilation.







Standard Models

Ratings

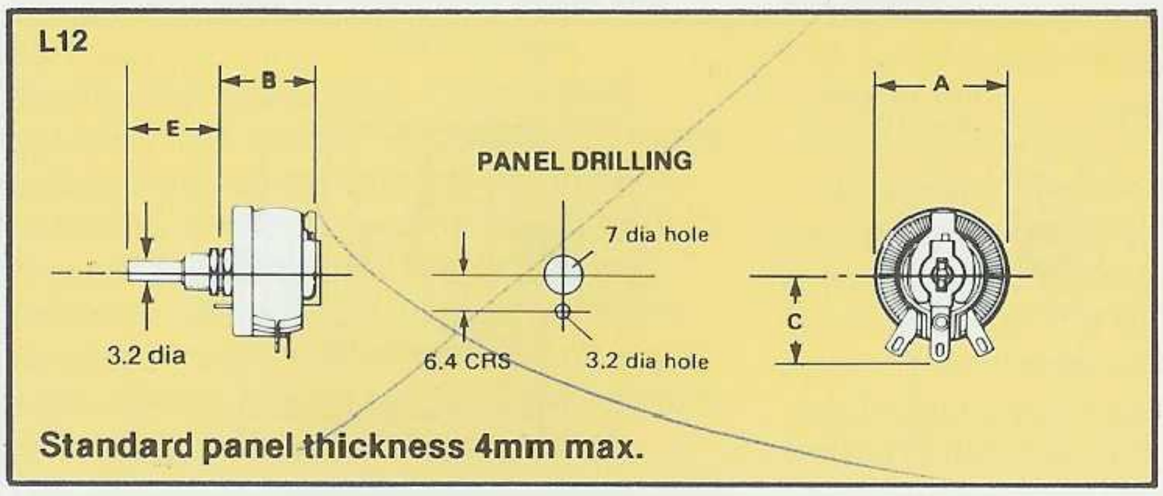
Model	L12	L25	L50	L100	L150	L225	L300	L500	L750	L1000
Ohmic Value	CURRENT RATING									
1Ω		5.0A 975511	7.1A 975530	10.0A 975550	12.2A 975570	15.0A 975590				31.6A 975626
2Ω		3.5A 975512	5.0A 975531				12.2A 975600			
3Ω			4.1A 975532	5.7A 975551	7.1A 975571					
5Ω	1.6A 975500	2.2A 975513	3.2A 975533	4.5A 975532	5.5A 975572		7.7A 975601	10.0A 975610	12.2A 975621	14.2A 975627
7.5Ω			2.6A 975534		4.5A 975573		6.3A 975602			
10Ω	1.1A 975501	1.6A 975514	2.2A 975535	3.2A 975553	3.9A 975574	4.7A 975591		7.1A 975611		10.0A 975628
15Ω		1.2A 975515	1.8A 975536	2.6A 975554	3.2A 975575		4.5A 975603			8.2A 975629
25Ω	0.71A 975502	1.0A 975516	1.4A 975537	2.0A 975555	2.4A 975576	3.0A 975592		4.5A 975612		6.3A 975630
50Ω	0.5A 975503	0.71A 975517	1.0A 975538	1.4A 975556	1.7A 975577	2.1A 975593	2.5A 975604	3.2A 975613	3.9A 975622	
75Ω				1.1A 975557	1.4A 975578			2.6A 975614		
100Ω	0.35A 975504	0.5A 975518	0.71A 975539	1.0A 975558			1.7A 975605	2.2A 975615		3.2A 975631
150Ω		0.41A 975519	0.57A 975540	0.82A 975559	1.0A 975579			1.8A 975616	2.2A 975623	
200Ω	0.25A 975505	0.35A 975520	0.5A 975541		0.87A 975580	1.1A 975594	1.2A 975606	1.6A 975617		2.2A 975632
350Ω	0.19A 975506	0.27A 975521	0.38A 975542	0.53A 975560			0.93A 975607	1.2A 975618	1.5A 975624	
500Ω		0.22A 975522	0.32A 975543	0.45A 975561	0.55A 975581	0.67A 975595	0.77A 975608	1.0A 975619	1.2A 975625	1.4A 975633
1kΩ	0.11A 975507	0.16A 975523	0.22A 975544	0.32A 975562	0.39A 975582	0.47A 975596	0.55A 975609	0.71A 975620		1.0A 975634
1.5kΩ	0.09A 975508	0.13A 975524	0.18A 975545	0.26A 975563	0.32A 975583					
2.5kΩ	0.07A 975509	0.1A 975525	0.14A 975546	0.2A 975564	0.24A 975584					
5kΩ		0.07A 975526	0.1A 975547	0.14A 975565	0.17A 975585					
7.5kΩ			0.08A 975548							
10kΩ				0.1A 975566	0.12A 975586					

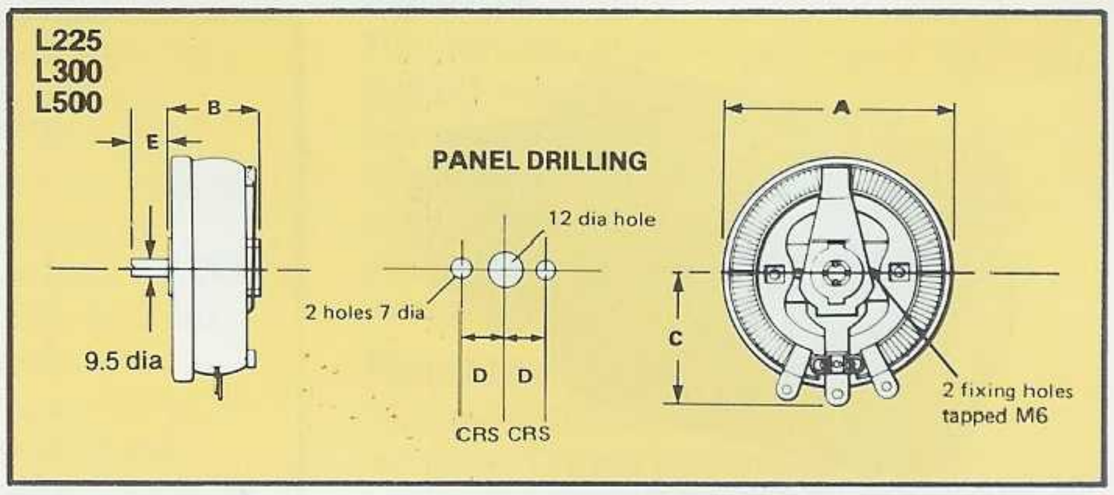
Knobs	902000	902550	902550	902700	902850	903625	903625	903625	904175	904175
0-100% Dial		180072	180072	180063	180064	180094	180094	180098	180110	180110
Plain Dial		180071	180071	180069	180070	180143	180143	180144	180145	180145
Pointer		540014	540014	540015	540016	540024	540024	540024	540030	540030

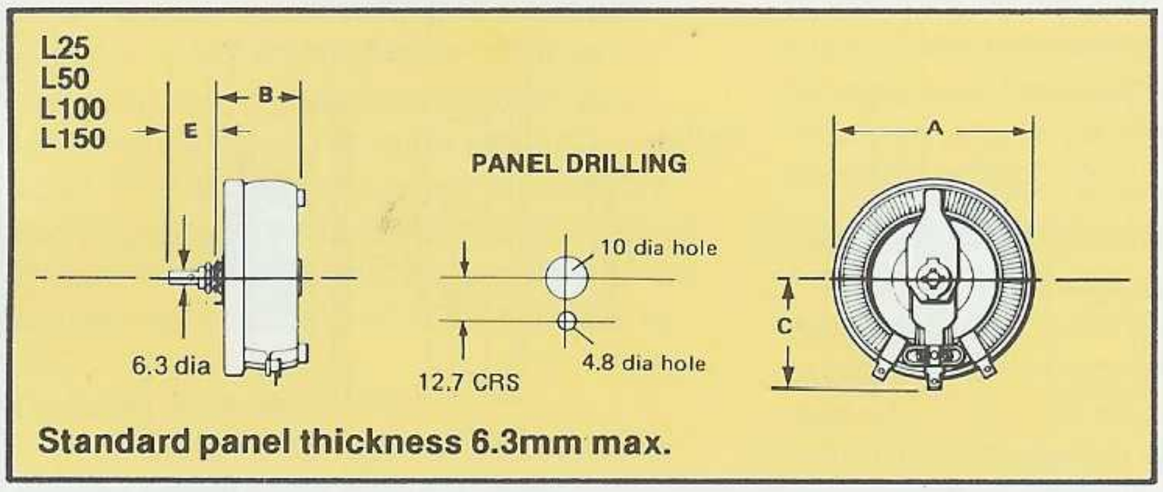
Single unit Bercostats are supplied without knob, dial and pointer unless otherwise specified.
All ganged Bercostats are supplied with knob as standard.

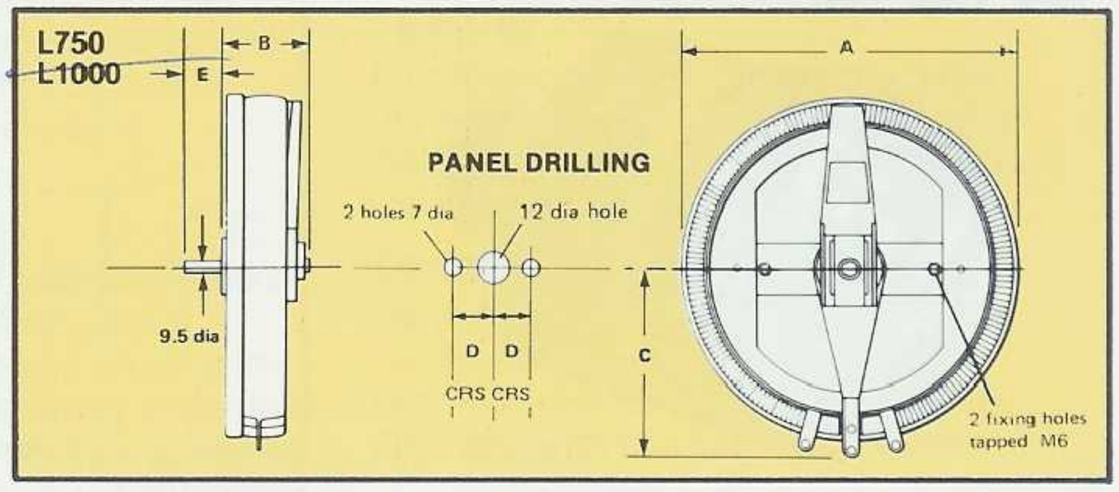
To Order: Specify model number, ohmic value, current thus:
L25,5 ohms, 2.2A (975513).

Dimensions









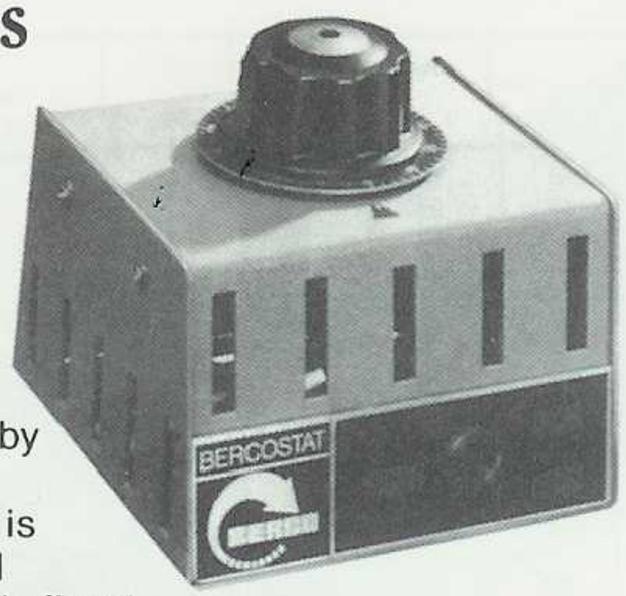
Spindles

Dimension E gives the standard spindle length from mounting face.

Special spindle lengths including rear extension, and spindles with flat, screwdriver slot or radial hole, can be supplied to order.

UNIT		L12	L25	L50	L100	L150	L225	L300	L500	L750	L1000
DIMENSIONS mm	A	22	40	59	79	102	127	152	203	254	305
	B	18	36	36	44	52	54	57	54	86	86
	C	15	25	39	47	57	76	87	110	140	165
	D						22	30	38	48	76
	E	16	25	25	28	28	28	28	28	32	32

Enclosed Models



'Bercostats' other than model L12 can be supplied in ventilated steel enclosures finished in an attractive textured acrylic enamel and complete with dial and collet fitting knob or handwheel. Cable entry is by rubber grommet.

The universal enclosure is suitable for bench or panel mounting. The 'Bercostat' is fitted to the inside of the top cover for front of panel or bench mounting, and to the inside of the bottom cover for back of panel mounting.

To order, add suffix 'E', e.g. L150-E, followed by ohmic value and rating. Alternatively the enclosure can be ordered as a separate kit.

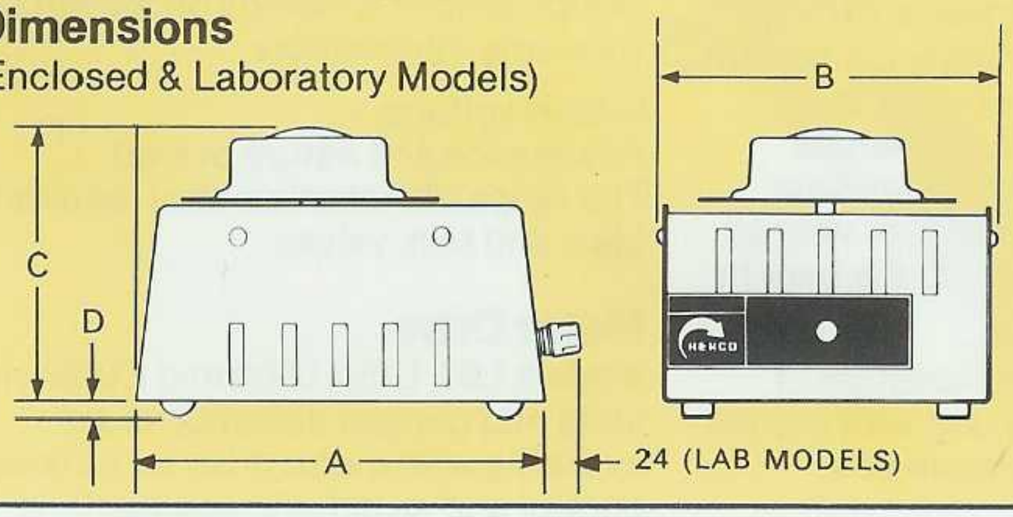
Laboratory Models

Laboratory series 'Bercostats' are available in all sizes except L12. These models are complete with dial and collet fitting knob or handwheel, and with the 'Bercostat' connections wired to three insulated terminals having concentric sockets suitable for 4 mm plugs. The enclosures are finished in an attractive textured acrylic enamel and fitted with four plastic mounting feet.

To order, add suffix 'LAB', e.g. L150-LAB, followed by ohmic value and rating.

* Models mounted in vertical plane with modified casing

Dimensions
(Enclosed & Laboratory Models)

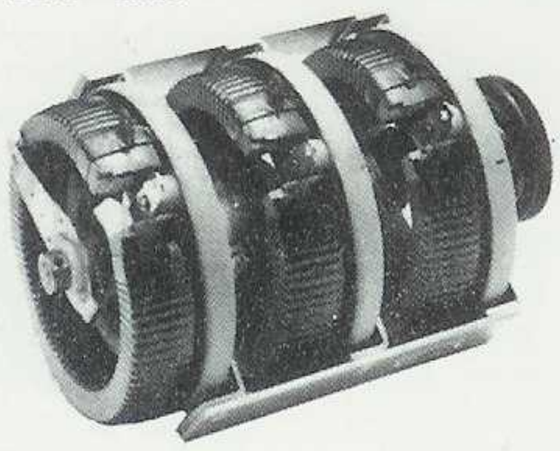


UNIT		L25-50	L100	L150	L225-L300	L500	L750* L1000*
DIMENSIONS mm	A	106	120	140	209	254	370
	B	102	112	132	171	222	420
	C	92.4	96.8	96.8	137.7	137.7	347
	D	3	3	3	6	6	13

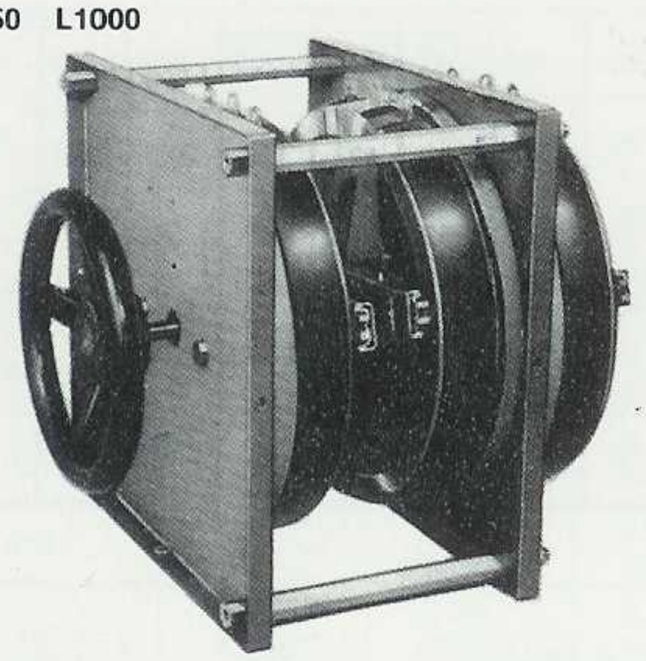
Ganged Models

L25 L50 L100 L150

L225 L300 L500

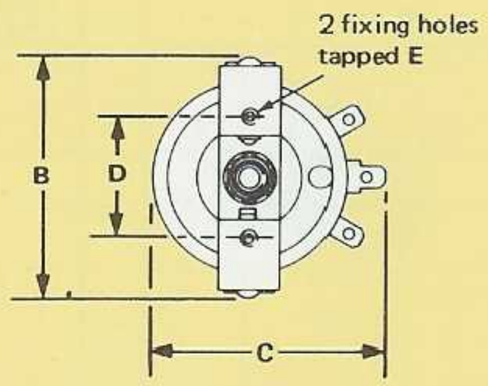


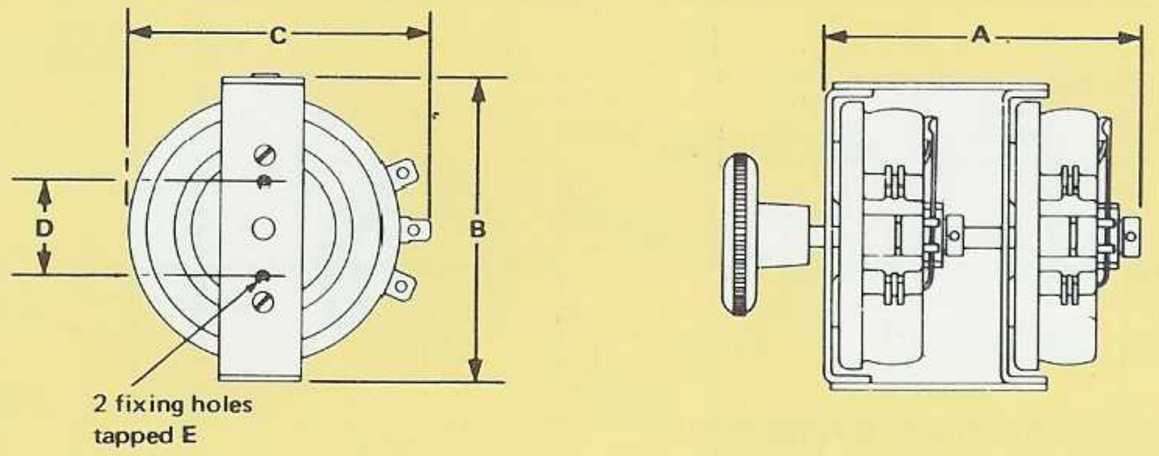
L750 L1000

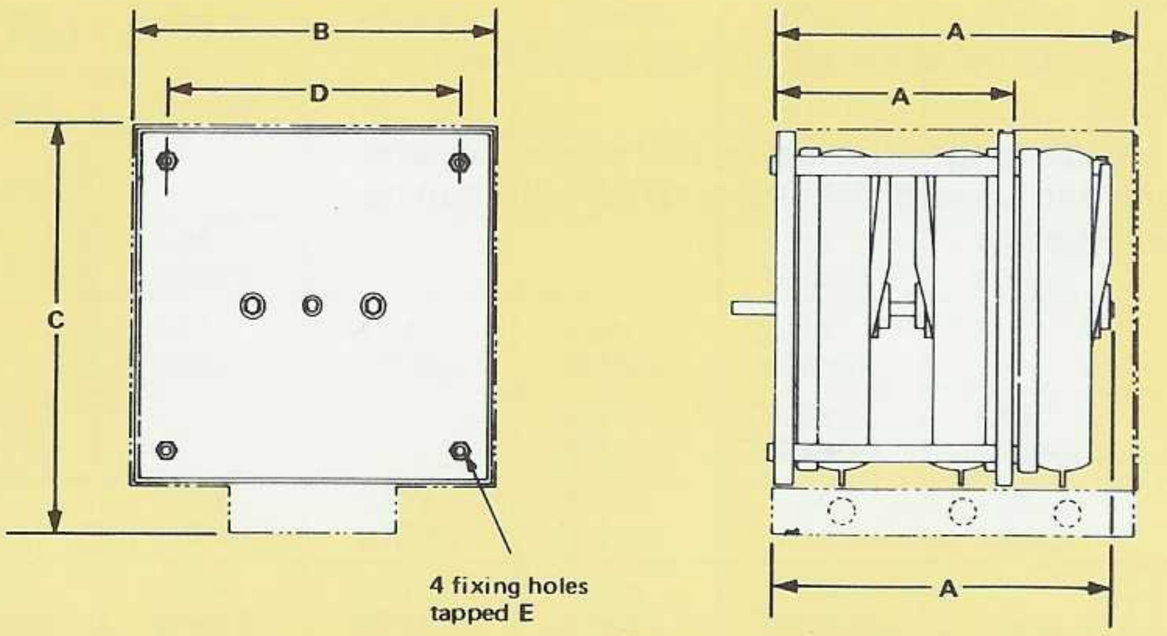


'Bercostats' other than L12 can be supplied as 2 or 3 ganged assemblies for simultaneous control of 2 or 3 circuits. Ganged assemblies are supplied complete with knob or handwheel depending on model.

How to order
Add suffix G2 or G3 according to number of units in asembly to model code: thus: L100-G2, 100 ohms, 1A;350 ohms, 0.535A. Always specify individual unit nearest knob end first.







MODEL	A 2 GANG	A 3 GANG	B	C	D CRS	E HOLES TAPPED	ANGLE OF ROTATION
L25	95	149	62	45	38	M6	300°
L50	95	149	75	69	38	M6	300°
L100	114	175	94	88	51	M6	300°
L150	121	184	116	108	51	M6	300°
L225	141	217	146	140	44	M6	315°
L300	144	220	171	165	60	M6	315°
L500	141	217	222	212	76	M6	330°
Open L750	200	289	289	—	254	M8	330°
Enclosed	210	300	289	327	254	M8	330°
Open L1000	210	289	340	—	304	M8	330°
Enclosed	210	300	340	378	304	M8	330°

Accessories & Options

Many optional extra accessories and features are available for 'Bercostats' including:—

- Off position at either end of the winding
- 360° rotation
- Heavy duty front stop
- Adjustable stop
- Special tappings
- Spindle lock
- Cam-operated micro switches
- Knobs, dials and pointers

Graded Windings

When a 'Bercostat' is connected in series with a constant impedance load on a constant supply voltage, the current falls as the resistance in circuit is increased. Advantage of this can be taken by winding the 'Bercostat' with progressively smaller gauges of wire as the current falls thus gaining the benefit of minimum size.

All 'Bercostats' with the exception of L12 and L25 can be provided with graded windings of up to a maximum of 4 gauges of wire.

Subject to economic quantities being required, our engineers will be pleased to design graded windings on receipt of the following information:

Supply voltage
Resistance and nature of load
The range of current control required i.e. Max. and Min. values.

Motor Drive

Models L50, L150, L500 and L1000 single units and ganged assemblies are available with motor drive for remote control and automatic applications.

Hexagonal Tubular Fixed & Sliding Resistors

Hexagonal tubular resistors meet the demand for users requiring high dissipation capacities. Their robust construction readily lends them to many industrial and laboratory uses such as potential dividers, dummy loads, battery charging resistances, motor starting resistances and control gear generally. By combinations of single and multiple tube models a wide range of ratings and resistance values can be obtained.

Winding

The resistance winding is a nickel copper alloy having a negligible temperature coefficient so that the resistance value remains constant under load. The windings are terminated by nickel plated brass bands at both ends. Preset fixed resistance tapping can be achieved by means of either bands or clips.

Options include —

1. Graded windings for specialised sliding resistance applications. (Suitable gradings can be supplied on receipt of full details of ohmic value required, maximum and minimum currents and supply voltage).

2. Non-inductive windings for low magnetic field or high frequency applications. The range of resistance values available on each tube size for non-inductive windings is 25% of the indicated value with a 100% increase in current. This option is available for all sizes listed between 2 and 14 amps per tube.

Former

The solid drawn hexagonal steel tube former ensures good mechanical strength and rigidity and prevents unwinding in the event of burn-outs or damage. The tube is mounted in hexagonal end castings which inhibit the rotation of the tube. This tubular construction with ventilated end castings provides cooling surfaces on both the outside and inside of the winding and thus the highest possible rating can be accomodated on small tubes for a moderate temperatures rise. Models can be supplied enclosed if required where safety may be a consideration.

Sliding Resistors

Sliding resistances and potentiometers employ brush gear consisting of a substantial copper-graphite brush with pigtail connections held firmly in contact with the resistance wire by two pressure springs. The graphite provides sufficient lubrication to prevent wear on the wire at normal operating temperatures.

Ratings

The nominal dissipation capacity given to each resistor in the table gives a temperature rise on the surface of the winding of approximately 260°C. For ratings at alternative temperatures, please consult our Sales Engineers at Hoddesdon.

Resistance Tolerance

The standard tolerance is ±10% of nominal. Closer tolerances may be ordered on request.

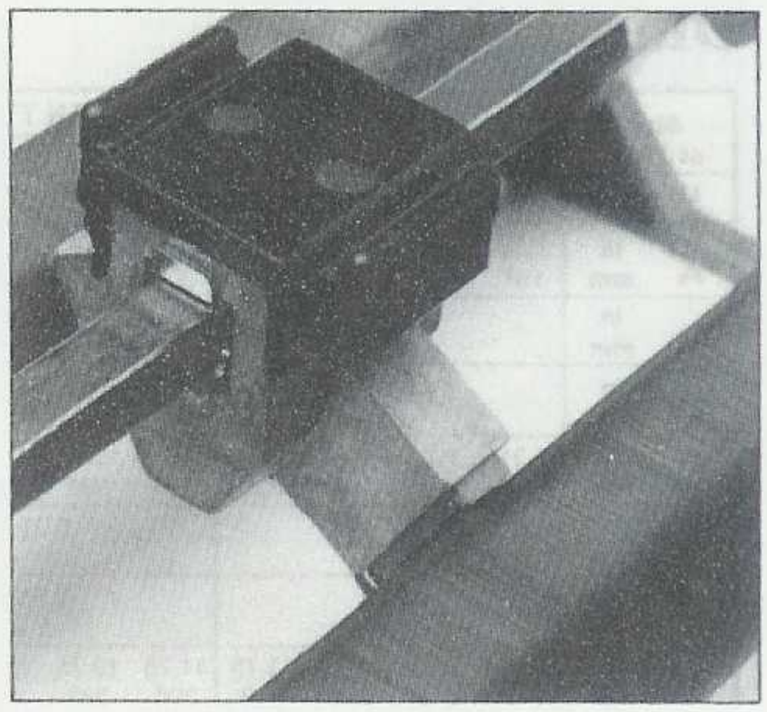
Testing

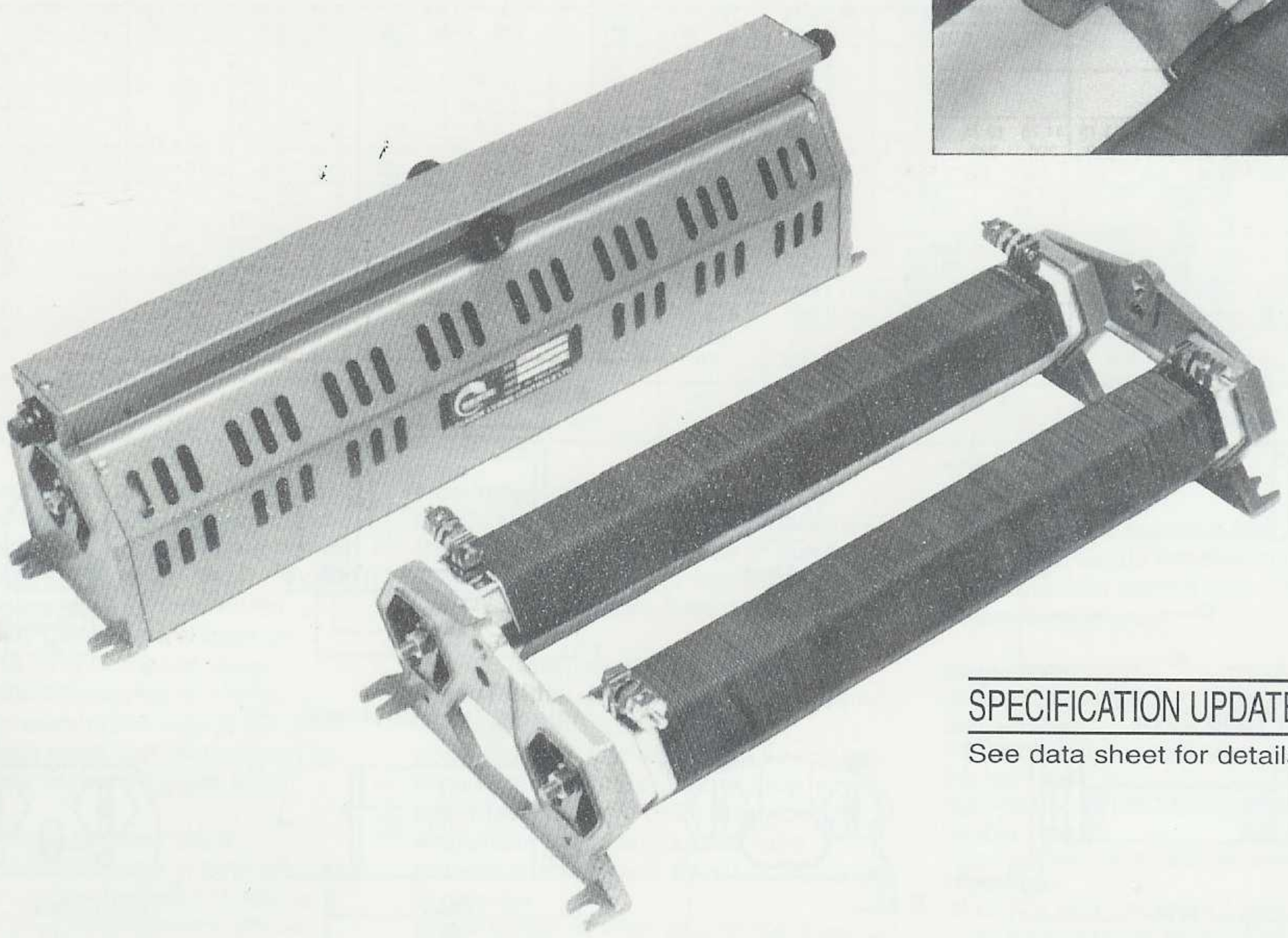
All hexagonal resistances are flash tested between windings and earth at 2000 volts RMS for 1 minute (maximum working voltage 500 volts).

Terminals

Open types have nickel plated brass bands 10mm wide with screw terminations. Enclosed versions are provided with insulated terminals.

When ordering specify: size, model number, ohmic value and rating. e.g. 6″ × 1½″/SEF/7.5/5.





SPECIFICATION UPDATE

See data sheet for details

Fixed Resistor Models

SPECIFICATION UPDATE
See data sheet for details

Ratings

The ohmic values printed below show the maximum obtainable with each gauge of wire and as a tapping band can be used to give the precise value required there is no advantage in specifying intermediate values.

The current ratings are the maximum for each gauge of wire and are based on the tubes being mounted vertically in free air. Should it be necessary to mount the tubes horizontally the maximum current should be reduced to 75% of the list value.

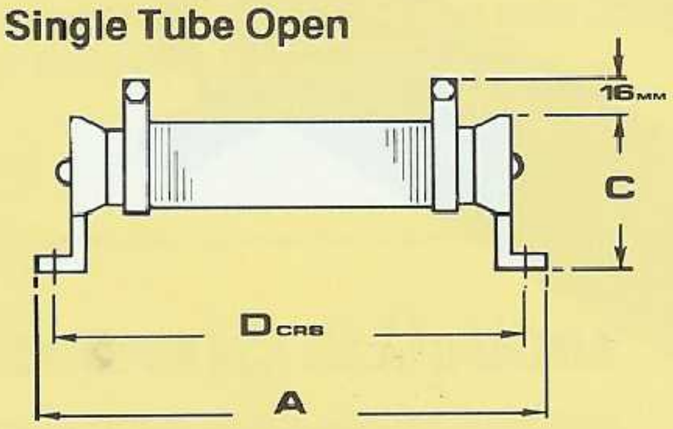
Maximum working voltage: 500 volts.

SIZE OF TUBE	1½ ins.				2 ins.				2½ ins.			
LENGTH	6	8	10	12	10	12	14	16	14	16	18	20
AMPS.					OHMS PER TUBE							
20	0.4	0.6	0.8	1	1.1	1.4	1.7	1.9	1.9	2.2	2.6	2.9
16	0.6	0.9	1.2	1.5	1.6	2	2.4	2.8	2.8	3.3	3.7	4.2
14	0.9	1.3	1.8	2.2	2.4	3.1	3.8	4.3	4.2	5	5.7	6.4
12	1.2	1.8	2.4	3	3.4	4.2	5	5.9	5.8	6.8	7.8	8.7
10	1.7	2.6	3.5	4.3	4.8	6	7.2	8.4	8.3	9.7	11	12.4
8.5	2.6	3.9	5.2	6.5	7.2	9	10.8	12.6	12.4	14.5	16.5	18.6
6.5	4.1	6.1	8.2	10.3	11.4	14.2	17	20	20	23	26	30
5	7.1	10.7	14.2	18	20	25	29	34	34	40	45	51
4	9.1	13.7	18	23	27	34	40	47	47	55	62	70
3.3	14	21	28	35	38	48	58	67	66	77	88	100
2.8	22	32	42	52	58	72	86	100	100	115	130	150
2	33	50	66	82	90	116	136	160	160	185	210	235
1.7	43	65	85	110	120	145	175	205	205	240	275	310
1.5	55	85	115	145	155	200	235	275	270	320	360	410
1.3	80	120	160	200	215	270	325	380	380	435	500	560
1.2	105	155	205	260	285	355	425	500	490	575	650	735
1	180	270	360	450	500	620	750	875	860	1000	1150	1300
0.6	240	360	480	600	655	820	985	1150	1150	1325	1500	1700
0.45	460	685	915	1140	1250	1575	1875	2200	2150	2550	2900	3250
0.3	800	1200	1600	2000	2125	2650	3200	3700	3675	4300	4900	5500

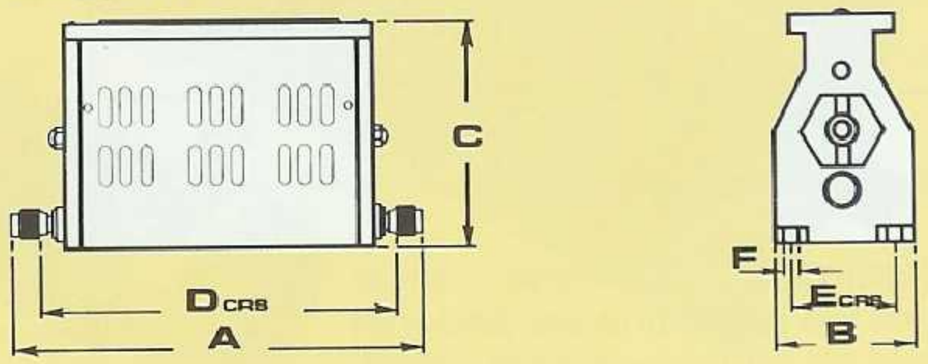
Dimensions

Size of Tube	OPEN TYPE												ENCLOSED TYPE											
	1½				2				2½				1½				2				2½			
Length	6	8	10	12	10	12	14	16	14	16	18	20	6	8	10	12	10	12	14	16	14	16	18	20
A in	7.75	9.75	11.75	13.75	12.13	14.13	16.13	18.13	16.13	18.13	20.13	22.13	9.13	11.13	13.13	15.13	13.13	15.13	17.13	19.13	17.13	19.13	21.13	23.12
A mm	197	248	298	349	308	359	410	461	410	461	512	562	232	283	334	385	334	385	435	486	435	486	536	588
B in	2.06				2.63				2.94				2.69				3.25				3.63			
B mm	52				67				75				68				83				92			
C in	2.59				3.09				3.38				4.19				4.69				5			
C mm	66				79				86				106				119				127			
D in	7.31	9.31	11.31	13.31	11.56	13.56	15.56	17.56	15.56	17.56	19.56	21.56	7.31	9.31	11.31	13.31	11.31	13.31	15.31	17.31	15.31	17.31	19.31	21.31
D mm	186	237	288	338	294	395	446	395	446	497	547	186	237	288	338	288	338	389	440	389	440	491	541	
E in	0.19				0.25				0.25				1.94				2.50				2.88			
E mm	5				6				6				49				64				73			
F in	0.19				0.25				0.25				0.19				0.25				0.25			
F mm	5				6				6				5				6				6			
G in	7.75	9.75	11.75	13.75	11.75	13.75	15.75	17.75	15.75	17.75	19.75	21.75	8.50	10.50	12.50	14.50	12.50	14.50	16.50	18.50	16.50	18.50	20.50	22.50
G mm	197	248	298	349	298	349	400	451	400	451	502	552	216	267	318	368	318	368	419	470	419	470	521	572
H in	5.56				6.62				7.25				6.19				7.19				7.75			
H mm	141				168				184				157				183				197			
J in	3.50				3.88				4.09				3.38				3.63				3.88			
J mm	89				99				104				86				97				99			
K in	7.31	9.31	11.31	13.31	11.31	13.31	15.31	17.31	15.31	17.31	19.31	21.31	5.50				6.44				7			
K mm	186	237	288	338	288	338	389	440	389	440	491	541	140				164				178			
L in	4.75				5.88				6.44															
L mm	121				149				164															

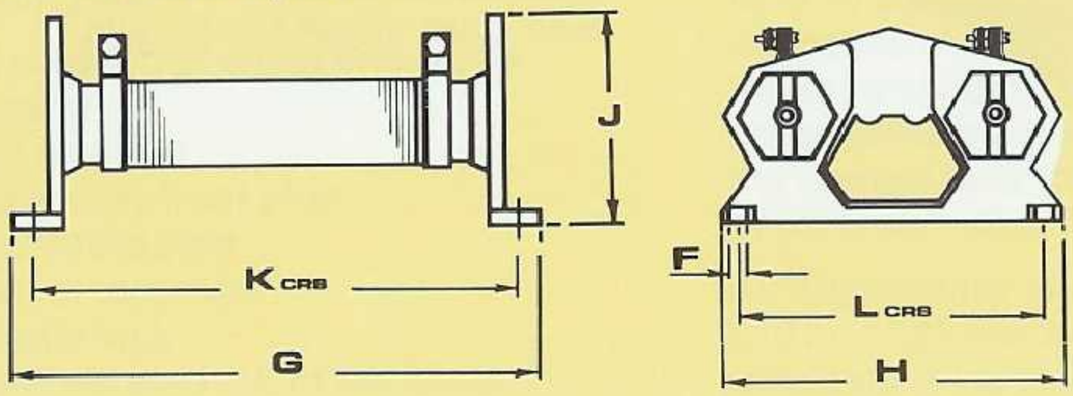
Single Tube Open



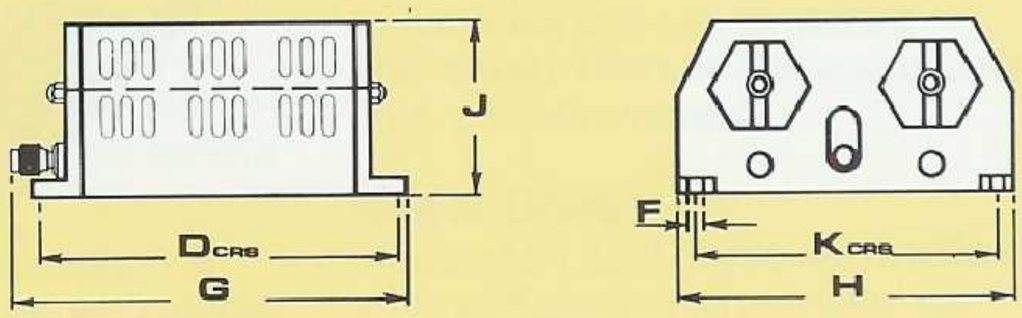
Single Tube Enclosed



Double Tube Open



Double Tube Enclosed



Sliding Resistor Models

SPECIFICATION UPDATE
See data sheet for details

Ratings — Single Tube Sliding Resistors

SIZE OF TUBE	1½ ins.				2 ins.				2½ ins.			
LENGTH	6	8	10	12	10	12	14	16	14	16	18	20
AMPS.	OHMS PER TUBE											
20	0.4	0.6	0.8	1	1.1	1.4	1.7	1.9	1.9	2.2	2.6	2.9
16	0.6	0.9	1.2	1.5	1.6	2	2.4	2.8	2.8	3.3	3.7	4.2
14	0.9	1.3	1.8	2.2	2.4	3.1	3.8	4.3	4.2	5	5.7	6.4
12	1.2	1.8	2.4	3	3.4	4.2	5	5.9	5.8	6.8	7.8	8.7
10	1.7	2.6	3.5	4.3	4.8	6	7.2	8.4	8.3	9.7	11	12.4
8.5	2.6	3.9	5.2	6.5	7.2	9	10.8	12.6	12.4	14.5	16.5	18.6
6.5	4.1	6.1	8.2	10.3	11.4	14.2	17	20	20	23	26	30
5	7.1	10.7	14.2	18	20	25	29	34	34	40	45	51
4	9.1	13.7	18	23	27	34	40	47	47	55	62	70
3.3	14	21	28	35	38	48	58	67	66	77	88	100
2.8	22	32	42	52	58	72	86	100	100	115	130	150
2	33	50	66	82	90	116	136	160	160	185	210	235
1.7	43	65	85	110	120	145	175	205	205	240	275	310
1.5	55	85	115	145	155	200	235	275	270	320	360	410
1.3	80	120	160	200	215	270	325	380	380	435	500	560
1.2	105	155	205	260	285	355	425	500	490	575	650	735
1	180	270	360	450	500	620	750	875	860	1000	1150	1300
0.6	240	360	480	600	655	820	985	1150	1150	1325	1500	1700
0.45	460	685	915	1140	1250	1575	1875	2200	2150	2550	2900	3250
0.3	800	1200	1600	2000	2125	2650	3200	3700	3675	4300	4900	5500

Double Tube Rheostats (Tubes connected in series)

20	0.8	1.2	1.6	2	2.2	2.8	3.4	3.8	3.8	4.4	5.2	5.8
16	1.2	1.8	2.4	3	3.2	4	4.8	5.6	5.6	6.6	7.4	8.4
14	1.8	2.6	3.6	4.4	4.8	6.2	7.6	8.6	8.4	10	11.4	12.8
12	2.4	3.6	4.8	6	6.8	8.4	10	11.8	11.6	13.6	15.6	17.4
10	3.4	5.2	7	8.6	9.6	12	14.4	16.8	16.6	19.4	22	24
8.5	5.2	7.8	10.4	13	14.4	18	21	25	24	29	33	37
6.5	8.2	12.2	16.4	20	22	28	34	40	40	46	52	60
5	14.2	21	28	36	40	50	58	68	68	80	90	102
4	18.2	27	36	46	54	68	80	94	94	110	124	140
3.3	28	42	56	70	76	96	116	134	132	154	176	200
2.8	44	64	84	104	116	114	172	200	200	230	260	300
2	66	100	132	164	180	232	272	320	320	370	420	470
1.7	86	130	170	220	240	290	350	410	410	480	550	620
1.5	110	170	230	290	310	400	470	550	540	640	720	820
1.3	160	240	320	400	430	540	650	760	760	870	1000	1120
1.2	210	310	410	520	570	710	850	1000	980	1150	1310	1470
1	360	540	720	900	1000	1240	1500	1750	1720	2000	2300	2600
0.6	480	720	960	1200	1310	1640	1970	2300	2300	2650	3000	3400
0.45	920	1370	1830	2280	2500	3150	3750	4400	4300	5100	5800	6500
0.3	1600	2400	3200	4000	4250	5300	6400	7400	7350	8600	9800	11000

Double Tube Potentiometers (Tubes connected in parallel)

40	0.2	0.3	0.4	0.5	0.55	0.7	0.85	0.95	0.95	1.1	1.3	1.45
32	0.3	0.45	0.6	0.75	0.8	1	1.2	1.4	1.48	1.65	1.85	2.1
28	0.45	0.65	0.9	1.1	1.2	1.5	1.9	2.1	2.1	2.2	2.85	3.2
24	0.6	0.9	1.2	1.5	1.7	2.1	2.5	2.9	2.9	3.4	3.9	4.3
20	0.85	1.3	1.75	2.1	2.4	3	3.6	4.2	4.1	4.8	5.5	6.2
17	1.3	1.95	2.6	3.2	3.6	4.5	5.4	6.3	6.2	7.2	8.25	9.3
13	2.0	3.0	4.1	5.1	5.7	7.1	8.5	10	10	11.5	13	15
10	3.5	5.3	7.1	9	10	12.5	14.5	17	17	20	22.5	25.5
8	4.5	6.8	9	11.5	13.5	17	20	23.5	23.5	27	31	35
6.6	7	10.5	14	17.5	19	24	29	33.5	33	38	44	50
5.6	11	16	21	26	29	36	43	50	50	57	65	75
4	16.5	25	33	41	45	58	68	80	80	92	105	117
3.4	21	32	42	55	60	72	87	102	102	120	137	155
3	27	42	57	72	77	100	117	137	135	160	180	205
2.6	40	60	80	100	107	135	162	190	190	217	250	280
2.4	52	77	102	130	142	177	212	250	245	287	325	367
2	90	135	180	225	250	310	375	437	430	500	575	650
1.2	120	180	240	300	327	410	492	575	575	662	750	850
.9	230	342	457	570	625	787	937	1100	1075	1275	1450	1625
.6	400	600	800	1000	1062	1325	1600	1850	1837	2150	2450	2750

The above ratings are continuous and are based on the tubes being mounted vertically in free air with the hot portion of the winding above the brush. Should it be necessary to mount the tubes horizontally the current should be reduced to 75% of the list value.
The standard tolerance is ±10%.
Maximum working voltage is 500 volts for standard units, but models can be supplied for higher voltages when specified.
Graded windings often show considerable economy in both size and price and can be designed to follow special laws. Our engineers will be pleased to put forward suitable gradings on request.

Non-inductive windings reduce the ohmic values to 25% of those shown in the list with 100% increase in current. This type of winding is available on all sizes listed between 2 and14 amps. per tube.
Double tube rheostats type DO, DLSM, DBOB, DE and DEL are supplied with the tubes in series unless potentiometer connection is specified. When potentiometer connection is specified all single units are supplied with 3 terminals, but double tube potentiometers must have the windings in parallel.
Motor driven models can be supplied, details on request.

How to order

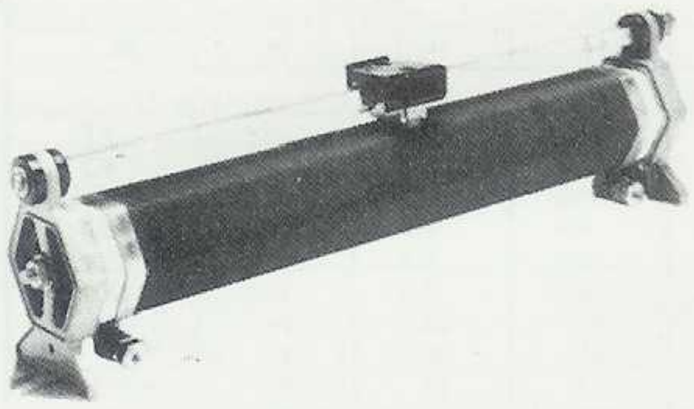
Select the type required from those illustrated. Quote the size, type, ohms and amps and state if rheostat or potentiometer, e.g:

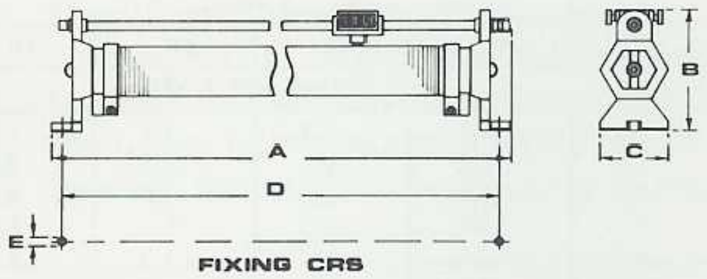
Single Tube
Rheostat 12 x 2 SBOB, 116 ohms 2 amps.
Single Tube
Potentiometer 12 x 2 SBOB, 1.6 ohms 2 amps.
Double Tube
Rheostat 12 x 2 DBOB, 232 ohms, 2 amps.
Double Tube
Potentiometer 12 x 2 DBOB, 58 ohms 4 amps.
Triple Tube
12 x 2 SOLBG3, 116 ohms 2 amps each tube.
Triple tube units can be supplied series or parallel connected or with tubes electrically independent.

Dimensions and Options

SPECIFICATION UPDATE
See data sheet for details

Type S.O.

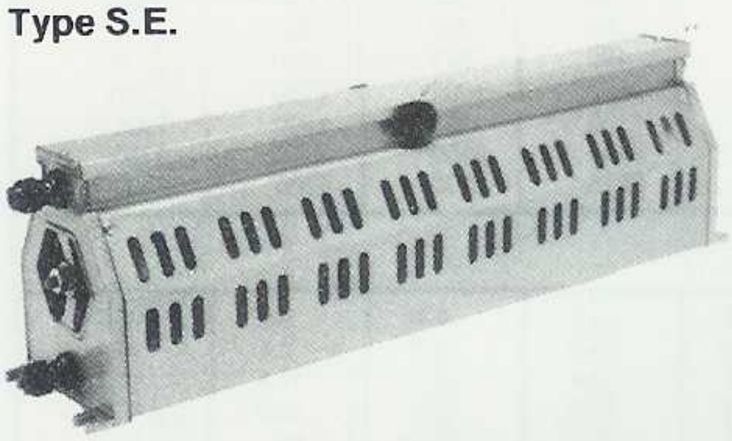


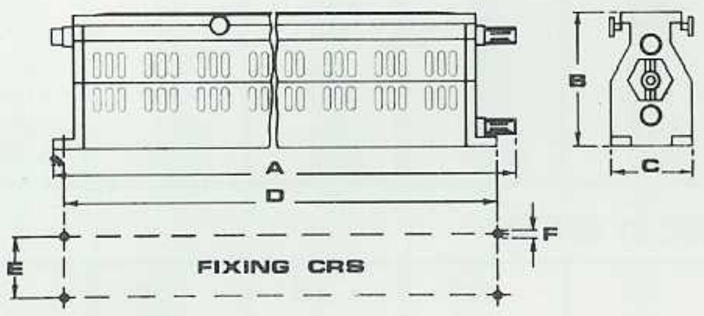


Fitted with three terminals for rheostat or potentiometer connection, as standard.
Nickel plated 4mm socket terminals can be fitted if specified.
Ideal for general laboratory work where high voltages are not employed.

Size Hex Tube	Length	A	B	C	D	E
1½	6	8	$3\frac{5}{8}$	$2\frac{1}{16}$	$7\frac{5}{16}$	$\frac{3}{16}$
	8	10	,,	,,	$9\frac{5}{16}$	,,
	10	12	,,	,,	$11\frac{5}{16}$	,,
	12	14	,,	,,	$13\frac{5}{16}$	,,
2	10	$12\frac{3}{16}$	$4\frac{1}{8}$	$2\frac{9}{16}$	$11\frac{9}{16}$	$\frac{1}{4}$
	12	$14\frac{3}{16}$	,,	,,	$13\frac{9}{16}$	,,
	14	$16\frac{3}{16}$	,,	,,	$15\frac{9}{16}$	,,
	16	$18\frac{3}{16}$	,,	,,	$17\frac{9}{16}$	,,
2½	14	$16\frac{3}{16}$	$4\frac{7}{16}$	$2\frac{15}{16}$	$15\frac{9}{16}$	$\frac{1}{4}$
	16	$18\frac{3}{16}$	,,	,,	$17\frac{9}{16}$	,,
	18	$20\frac{3}{16}$	,,	,,	$19\frac{9}{16}$	,,
	20	$22\frac{3}{16}$	,,	,,	$21\frac{9}{16}$	,,

Type S.E.

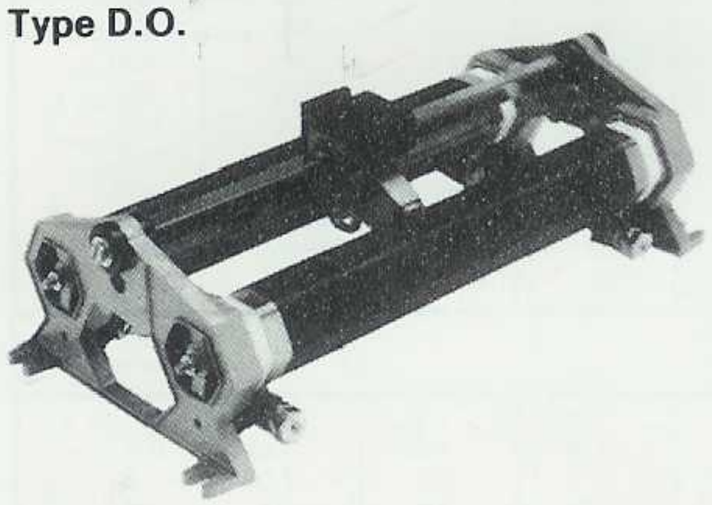


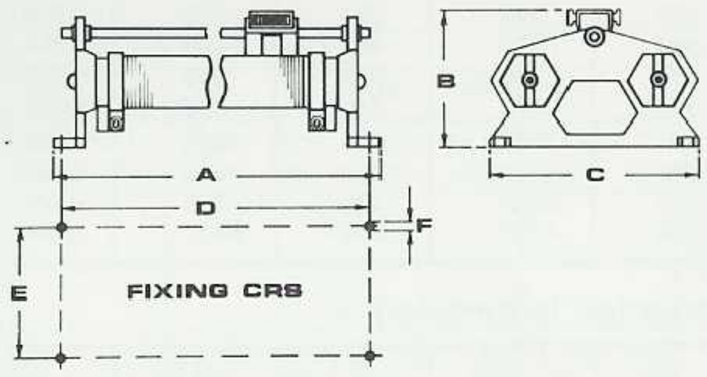


Two terminals are fitted at one end only, as shown, for series resistance connection. A third terminal will be fitted at the other end at customer's request, or if a potentiometer is called for. With the cable entry model the three connections are always supplied.
Suitable for dimming lamps, speed control of motors, etc. This model can be mounted on machines operated by unskilled workers on account of the complete protection given by the cover. Fitted with insulated 4 mm socket terminations.

Size Hex Tube	Length	A	B	C	D	E	F
1½	6	8	$4\frac{3}{16}$	$2\frac{1}{16}$	$7\frac{5}{16}$	$1\frac{5}{16}$	$\frac{3}{16}$
	8	$10\frac{1}{4}$	,,	,,	$9\frac{5}{16}$	,,	,,
	10	$12\frac{1}{4}$	,,	,,	$11\frac{5}{16}$	,,	,,
	12	$14\frac{1}{4}$	,,	,,	$13\frac{5}{16}$	,,	
2	10	$12\frac{1}{4}$	$4\frac{1}{16}$	$3\frac{1}{4}$	$11\frac{5}{16}$	$2\frac{1}{2}$	$\frac{1}{4}$
	12	$14\frac{1}{4}$	,,	,,	$13\frac{5}{16}$	,,	,,
	14	$16\frac{1}{4}$	,,	,,	$15\frac{5}{16}$	,,	,,
	16	$18\frac{1}{4}$	,,	,,	$17\frac{5}{16}$	,,	,,
2½	14	$16\frac{1}{4}$	5	$3\frac{5}{8}$	$15\frac{5}{16}$	$2\frac{7}{8}$	$\frac{1}{4}$
	16	$18\frac{1}{4}$	,,	,,	$17\frac{5}{16}$	,,	,,
	18	$20\frac{1}{4}$	,,	,,	$19\frac{5}{16}$	,,	,,
	20	$22\frac{1}{4}$	,,	,,	$21\frac{5}{16}$	,,	,,

Type D.O.



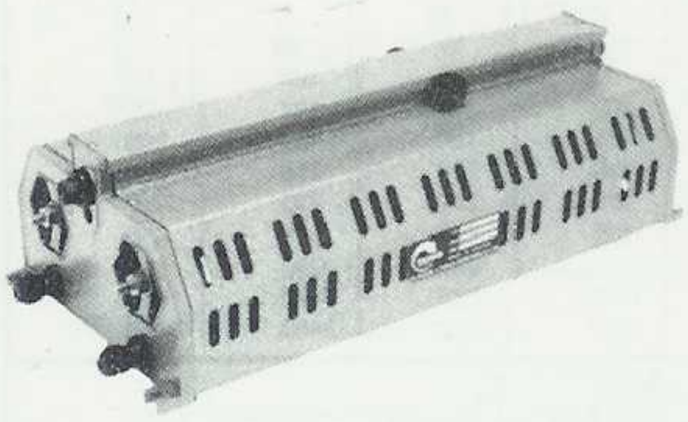


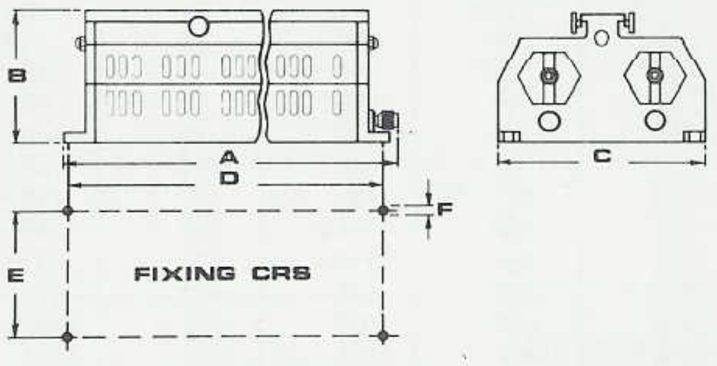
Standard model is fitted with terminals at the ends of windings only.

If required for potentiometer use, the tubes must be connected in parallel and a terminal would be fitted to the slider bar at customer's request.
For ratings too high for the single tube model.

Size Hex Tube	Length	A	B	C	D	E	F
1½	6	$7\frac{7}{8}$	$3\frac{7}{8}$	$5\frac{9}{16}$	$7\frac{5}{16}$	$4\frac{3}{4}$	$\frac{3}{16}$
	8	$9\frac{7}{8}$	,,	,,	$9\frac{5}{16}$	,,	,,
	10	$11\frac{7}{8}$	,,	,,	$11\frac{5}{16}$	,,	,,
	12	$13\frac{7}{8}$	,,	,,	$13\frac{5}{16}$	,,	,,
2	10	$11\frac{7}{8}$	$4\frac{1}{4}$	$6\frac{5}{8}$	$11\frac{5}{16}$	$5\frac{7}{8}$	$\frac{1}{4}$
	12	$13\frac{7}{8}$	,,	,,	$13\frac{5}{16}$	,,	,,
	14	$15\frac{7}{8}$	,,	,,	$15\frac{5}{16}$	,,	,,
	16	$17\frac{7}{8}$	,,	,,	$17\frac{5}{16}$	,,	,,
2½	14	$15\frac{7}{8}$	$4\frac{1}{2}$	$7\frac{3}{16}$	$15\frac{5}{16}$	$6\frac{7}{16}$	$\frac{1}{4}$
	16	$17\frac{7}{8}$	,,	,,	$17\frac{5}{16}$	,,	,,
	18	$19\frac{7}{8}$	,,	,,	$19\frac{5}{16}$	,,	,,
	20	$21\frac{7}{8}$	,,	,,	$21\frac{5}{16}$	,,	,,

Type D.E.



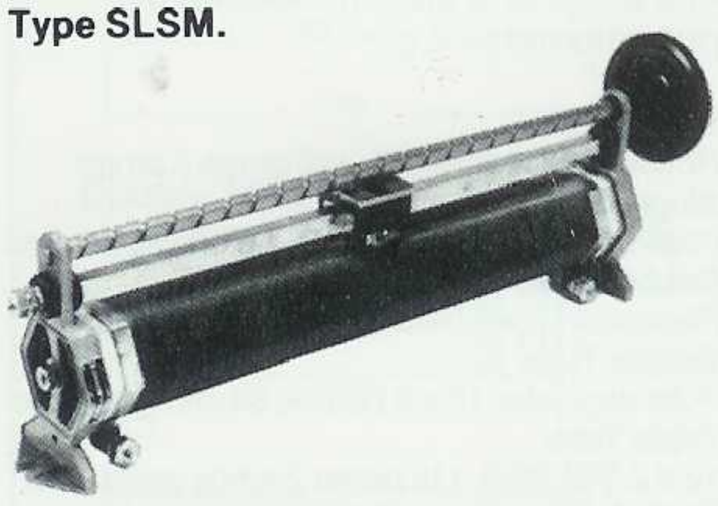


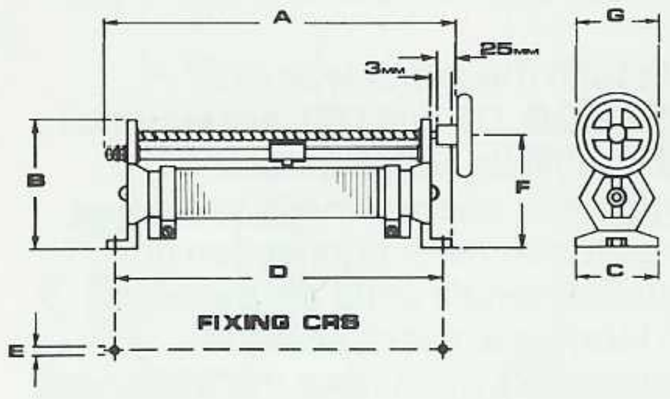
For large dimmers and for ratings too high to be accommodated on the single tube model. Fitted with insulated 4mm socket terminals.

The tubes must be connected in parallel for potentiometer use.
Two terminals are fitted at one end only and connected to the tubes. If a potentiometer is required, a third terminal will be fitted connected to the slide bar and the other terminals will be at each end.

Size Hex Tube	Length	A	B	C	D	E	F
1½	6	$8\frac{1}{4}$	$4\frac{5}{16}$	$6\frac{3}{16}$	$7\frac{5}{16}$	$5\frac{1}{2}$	$\frac{3}{16}$
	8	$10\frac{1}{4}$	,,	,,	$9\frac{5}{16}$	,,	,,
	10	$12\frac{1}{4}$	,,	,,	$11\frac{5}{16}$	,,	,,
	12	$14\frac{1}{4}$	,,	,,	$13\frac{5}{16}$	,,	,,
2	10	$12\frac{1}{4}$	$4\frac{7}{8}$	$7\frac{3}{16}$	$11\frac{5}{16}$	$6\frac{7}{16}$	$\frac{1}{4}$
	12	$14\frac{1}{4}$	,,	,,	$13\frac{5}{16}$	,,	,,
	14	$16\frac{1}{4}$	,,	,,	$15\frac{5}{16}$	,,	,,
	16	$18\frac{1}{4}$	,,	,,	$17\frac{5}{16}$	,,	,,
2½	14	$16\frac{1}{4}$	$4\frac{1}{16}$	$7\frac{3}{4}$	$15\frac{5}{16}$	7	$\frac{1}{4}$
	16	$18\frac{1}{4}$	,,	,,	$17\frac{5}{16}$	,,	,,
	18	$20\frac{1}{4}$	,,	,,	$19\frac{5}{16}$	,,	,,
	20	$22\frac{1}{4}$	,,	,,	$21\frac{5}{16}$	,,	,,

Type SLSM.





The lead screw action gives more accurate and closer control than the plain finger grip.

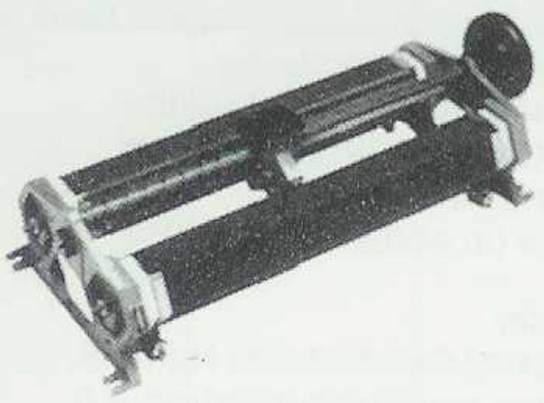
Fitted with three terminals for rheostat or potentiometer connection. The standard lead screw has a pitch of $\frac{1}{8}$".

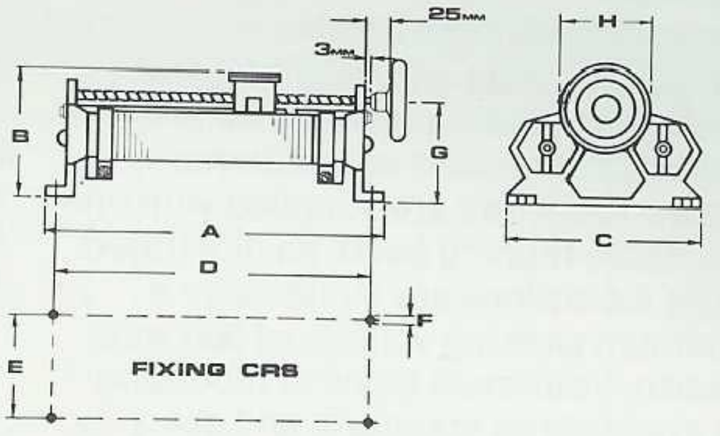
Size Hex Tube	Length	A	B	C	D	E	F	G
1½	6	8	$4\frac{3}{8}$	$2\frac{1}{16}$	$7\frac{5}{16}$	$\frac{3}{16}$	$3\frac{13}{16}$	3
	8	10	,,	,,	$9\frac{5}{16}$	,,	,,	,,
	10	12	,,	,,	$11\frac{5}{16}$	,,	,,	,,
	12	14	,,	,,	$13\frac{5}{16}$	,,	,,	,,
2	10	$12\frac{3}{16}$	$4\frac{7}{8}$	$2\frac{9}{16}$	$11\frac{9}{16}$	$\frac{1}{4}$	$4\frac{5}{16}$	3
	12	$14\frac{3}{16}$	,,	,,	$13\frac{9}{16}$	,,	,,	,,
	14	$16\frac{3}{16}$	,,	,,	$15\frac{9}{16}$	,,	,,	,,
	16	$18\frac{3}{16}$	,,	,,	$17\frac{9}{16}$	,,	,,	,,
2½	14	$16\frac{3}{16}$	$5\frac{1}{8}$	$2\frac{15}{16}$	$15\frac{9}{16}$	$\frac{1}{4}$	$4\frac{5}{8}$	$4\frac{1}{2}$
	16	$18\frac{3}{16}$	,,	,,	$17\frac{9}{16}$	,,	,,	,,
	18	$20\frac{3}{16}$	,,	,,	$19\frac{9}{16}$	,,	,,	,,
	20	$22\frac{3}{16}$	,,	,,	$21\frac{9}{16}$	,,	,,	,,

SPECIFICATION UPDATE

See data sheet for details

Type DLSM.



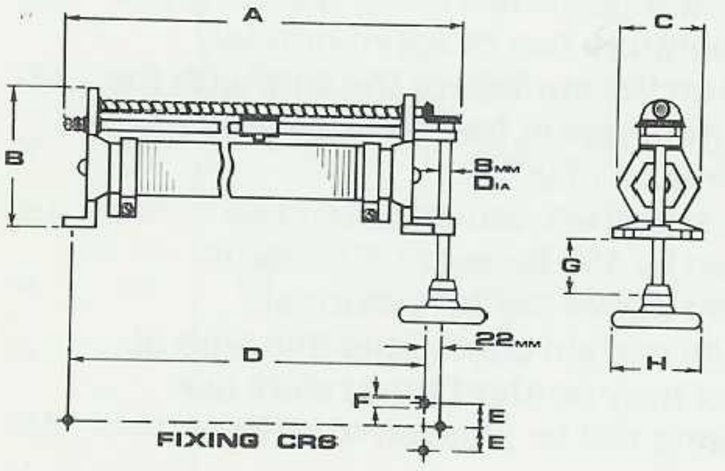


Size Hex Tube	Length	A	B	C	D	E	F	G	H
1½	6	7 7/8	3 7/8	5 9/16	7 5/16	4 3/4	3/16	3 1/16	3
	8	9 7/8	,,	,,	9 5/16	,,	,,	,,	,,
	10	11 7/8	,,	,,	11 5/16	,,	,,	,,	,,
	12	13 7/8	,,	,,	13 5/16	,,	,,	,,	,,
2	10	11 7/8	4 1/4	6 5/8	11 5/16	5 7/8	1/4	3 7/16	3
	12	13 7/8	,,	,,	13 5/16	,,	,,	,,	,,
	14	15 7/8	,,	,,	15 5/16	,,	,,	,,	,,
	16	17 7/8	,,	,,	17 5/16	,,	,,	,,	,,
2½	14	15 7/8	4 15/32	7 3/16	15 5/16	6 7/16	1/4	3 21/32	4 1/2
	16	17 7/8	,,	,,	17 5/16	,,	,,	,,	,,
	18	19 7/8	,,	,,	19 5/16	,,	,,	,,	,,
	20	21 7/8	,,	,,	21 5/16	,,	,,	,,	,,

Type SBOB.

For back-of-board mounting with front-of-board operation.

G is spindle length from mounting face.
H is hand wheel diameter.
Three terminals are fitted for series resistance or potentiometer connections. Lead screws and hand wheels are provided as for Type SLSM.
Standard bevel gears have ratio 1-1 only.

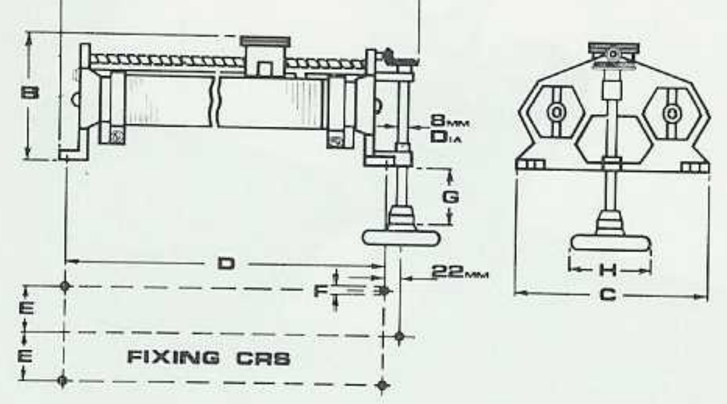


Size Hex Tube	Length	A	B	C	D	E	F	G	H
1½	6	9 1/4	4 3/8	2 1/16	7 3/4	1 1/16	3/16	2 1/4"	3
	8	11 1/4	,,	,,	9 3/4	,,	,,		
	10	13 1/4	,,	,,	11 3/4	,,	,,		
	12	15 1/4	,,	,,	13 3/4	,,	,,		
2	10	13 1/4	4 7/8	2 9/16	11 7/8	1 3/16	1/4	2 1/4"	3
	12	15 1/4	,,	,,	13 7/8	,,	,,		
	14	17 1/4	,,	,,	15 7/8	,,	,,		
	16	19 1/4	,,	,,	17 7/8	,,	,,		
2½	14	17 1/4	5 1/8	2 15/16	15 7/8	1 5/16	1/4	2 1/4"	4 1/2
	16	19 1/4	,,	,,	17 7/8	,,	,,		
	18	21 1/4	,,	,,	19 7/8	,,	,,		
	20	23 1/4	,,	,,	21 7/8	,,	,,		

Type DBOB

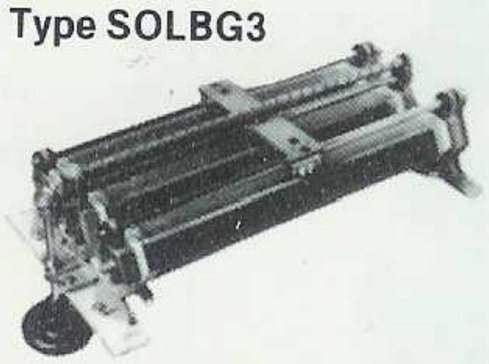
Similar to SBOB, but double tube mounting.

G is spindle length from mounting face.
H is hand wheel diameter.
Terminals as for Type DOB, lead screws and bevel gears as for Type SBOB.



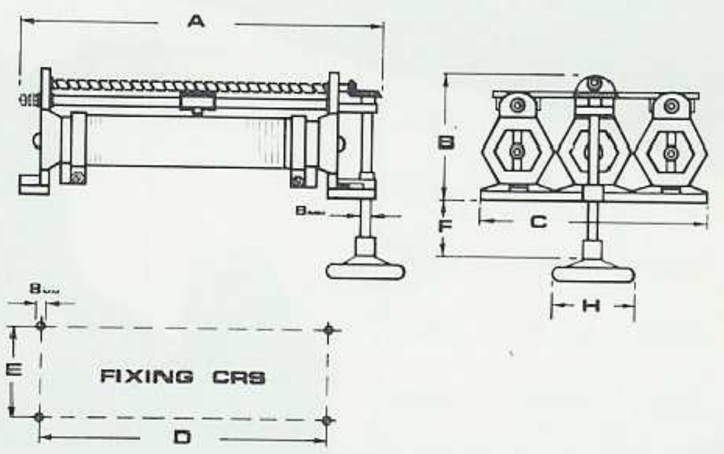
Size Hex Tube	Length	A	B	C	D	E	F	G	H
6 1½	6	9 1/4	3 7/8	5 9/16	7 5/16	2 3/8	3/16	2 1/4"	3
	8	11 1/4	,,	,,	9 5/16	,,	,,		
	10	13 1/4	,,	,,	11 5/16	,,	,,		
	12	15 1/4	,,	,,	13 5/16	,,	,,		
2	10	13 1/4	4 1/4	6 5/8	11 5/16	2 15/16	1/4	2 1/4"	3
	12	15 1/4	,,	,,	13 5/16	,,	,,		
	14	17 1/4	,,	,,	15 5/16	,,	,,		
	16	19 1/4	,,	,,	17 5/16	,,	,,		
2½	14	17 1/4	4 15/32	7 3/16	15 5/16	7 7/32	1/4	2 1/4"	4 1/2
	16	19 1/4	,,	,,	17 5/16	,,	,,		
	18	21 1/4	,,	,,	19 5/16	,,	,,		
	20	23 1/4	,,	,,	21 5/16	,,	,,		

Type SOLBG3



F is spindle length from mounting face.

Terminals provided at both ends of each tube and each slider bar, the tube being electrically independent. Lead screw pitch, hand wheels and bevel gears as for type SLSM.
Triple tube model which can be used as a three-phase regulator or for the simultaneous control of three separate circuits. Alternatively, for heavier ratings than can be accommodated on the Type DBOB.



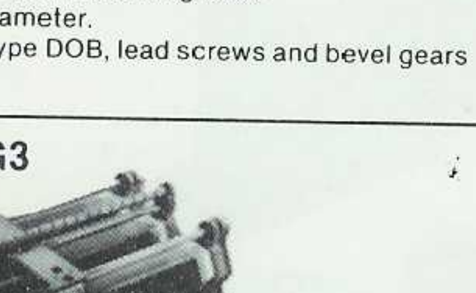
Size Hex Tube	Length	A	B	C	D	E	F	H
1½	6	9 1/4	4 5/8	8	6 3/4	7 1/4	2 1/4"	3
	8	11 1/4	,,	,,	8 3/4			
	10	13 1/4	,,	,,	10 3/4			
	12	15 1/4	,,	,,	12 3/4			
2	10	13 1/4	5 1/8	9 1/2	11 1/16	8 3/4	2 1/4"	3
	12	15 1/4	,,	,,	13 1/16			
	14	17 1/4	,,	,,	15 1/16			
	16	19 1/4	,,	,,	17 1/16			
2½	14	17 1/4	5 3/8	10 1/2	15 1/16	9 3/4	2 1/4"	4 1/2
	16	19 1/4	,,	,,	17 1/16			
	18	21 1/4	,,	,,	19 1/16			
	20	23 1/4	,,	,,	21 1/16			

Connection Details

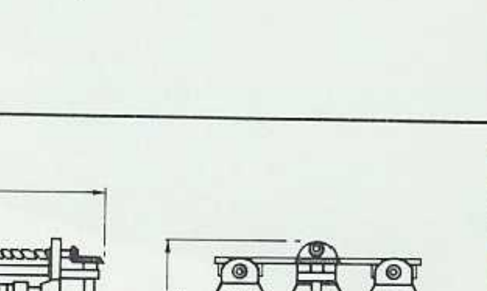
Single tube, series connected.

Single tube, potentiometer connected.

Double tube, series connected.



Double tube, series connected (one winding only).



Double tube, parallel connected

Double tube, potentiometer connected (parallel windings).

Berco® RA Fixed and Preset Resistors

These resistors are particularly suitable as preset series resistors, or potential dividers. The units are close wound on robust ceramic formers, with either iron free oxidised nickel copper wire to B.S. 115, having a low temperature coefficient, or nickel chromium for higher values, shown below the line in the table.

The maximum electrical stability is obtained by the use of a close winding of oxidised wire because:—

(a) The oxide provides an excellent dielectric at all working temperatures.

(b) The process of oxidisation being carried out during manufacture, the wire is rendered resistant to further oxidisation during use.

(c) A close winding allows the largest section wire to be used, and prevents movement of the turns.

Terminals
Electro-tinned brass bands with screws, nuts and washers. The bands incorporate provision for a soldered connection or additional screws. Resistors are supplied with one adjustable tapping band, as illustrated.

The mountings are suitable for a maximum working voltage of 500 volts to earth. Four main types of mounting are available as standard, and are represented in the dimension drawings.

An alternative type of tapping band, *incorporating a knurled thumb screw, as* illustrated, can be supplied as an option.

The ratings shown in the tables, gives a temperature rise of approximately 300°C on the surface of the wire with the tubes mounted in free air in an ambient temperature of 20°C.

The specified ratings should be reduced by 1% for every 3°C rise in ambient above the 20°C normal.

Under certain conditions this type of resistor may be short time rated; our engineers will be pleased to advise.

The ohmic values printed in the tables, are the maximum obtainable with each gauge of wire and as the tapping band can be used to give precise values, there is no advantage is specifying intermediate values. The tabulated values are for tubes fitted with one tapping band as illustrated.

Tolerance on ohmic value ±10%.

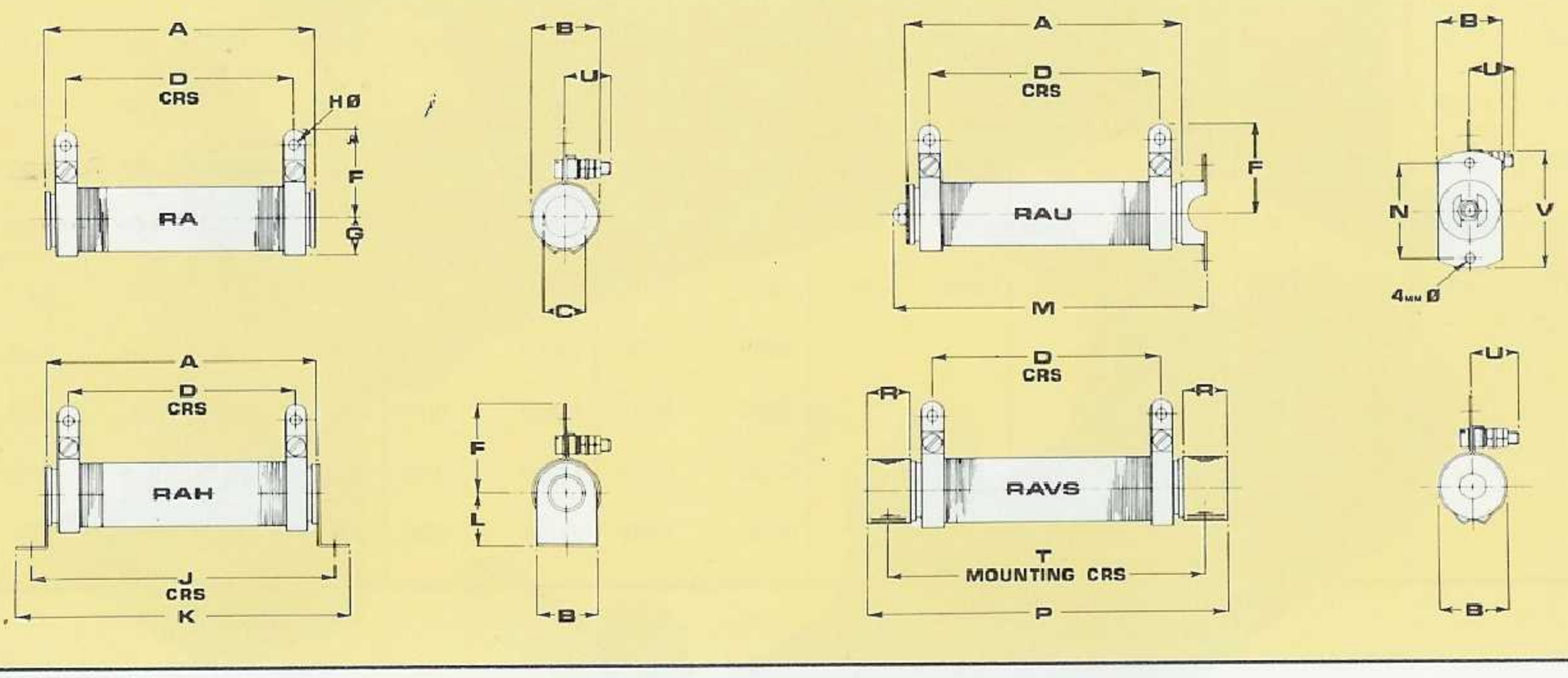
How to order
Specify Rating Code, Model Number, Ohmic Value and Current Rating. e.g. *K6/RAH/140 ohms/1.11 amps.*

Ratings

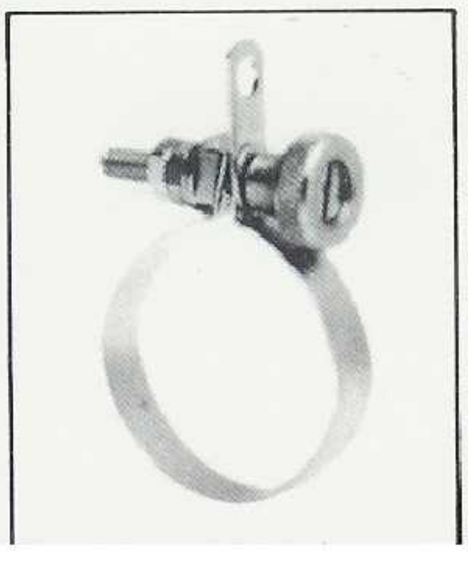
K0 Rating 20 WATTS		K1 Rating 30 WATTS		K2 Rating 40 WATTS		K3 Rating 60 WATTS		K4 Rating 90 WATTS		K5 Rating 130 WATTS		K6 Rating 180 WATTS		K7 Rating 90 WATTS		K8 Rating 45 WATTS		K9 Rating 60 WATTS	
R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I
0.33	7.0	0.85	5.4	2.35	4.1	1.29	6.8	2.9	5.6	1.06	10.5	1.65	10.5	0.59	11.6				
0.5	5.6	1.16	4.6	3.6	3.3	2.21	5.2	4.9	4.3	1.5	9.1	2.35	8.6	0.855	9.6	0.16	14.5	0.334	12.5
0.7	4.7	1.66	3.85	5.1	2.8	3.05	4.4	6.77	3.7	2.26	7.4	3.52	7.0	1.28	7.6	0.235	12.0	0.47	10.6
1.09	3.8	2.48	3.15	7.7	2.4	4.3	3.7	9.56	3.0	3.6	5.8	5.6	5.6	2.0	6.3	0.345	9.8	0.71	8.6
1.7	3.0	3.9	2.5	12	1.8	6.45	3.0	14.4	2.5	6.15	4.5	9.66	4.25	3.46	4.8	0.55	7.8	1.12	6.8
2.17	2.7	5.15	2.2	15.7	1.6	10.3	2.4	22.8	1.95	8.5	3.8	13.3	3.62	4.8	4.1	0.92	6.1	1.94	5.16
2.9	2.3	6.8	1.9	21	1.35	13.3	2.1	29.6	1.75	12.1	3.2	18.8	3.05	6.8	3.4	1.28	5.1	2.67	4.4
4.0	2.0	9.26	1.6	28.6	1.1	17.6	1.8	39.3	1.5	18	2.6	28.2	2.5	10.1	2.8	1.85	4.3	3.78	3.7
5.28	1.7	12.3	1.4	38	1.0	24.3	1.6	54	1.3	28.5	2.1	44.7	2.0	16.1	2.22	2.98	3.4	5.65	3.0
7.17	1.5	16.9	1.2	52	0.87	32	1.35	71	1.1	37.2	1.83	58	1.73	21	1.95	4.42	2.8	9.0	2.4
9.3	1.3	21.5	1.05	66.5	0.77	43.5	1.17	98	0.96	49.7	1.58	77.5	1.5	28	1.69	5.8	2.4	11.7	2.1
12.2	1.14	28.5	0.9	87.5	0.67	56	1.0	124	0.85	68	1.35	91	1.38	38	1.45	7.67	2.1	15.6	1.82
14.5	1.0	34.1	0.85	105	0.61	74	0.9	165	0.73	89.5	1.18	140	1.11	50	1.26	10.4	1.8	21.4	1.55
18.4	0.9	43	0.75	133	0.54	88.5	0.83	197	0.67	123	1.03	191	0.95	69	1.08	13.8	1.57	28.2	1.35
23.5	0.8	54.5	0.67	168	0.48	113	0.73	250	0.6	157	0.89	245	0.84	88	0.95	18.9	1.34	38.5	1.16
30.5	0.7	70	0.6	216	0.43	142	0.65	316	0.53	217	0.75	324	0.73	116	0.83	24.3	1.18	49.3	1.02
39.6	0.63	92	0.52	282	0.37	183	0.57	406	0.47	248	0.71	387	0.67	139	0.76	32.2	1.03	65	0.89
53.5	0.54	125	0.45	382	0.32	249	0.49	530	0.41	315	0.63	490	0.6	180	0.67	38.3	0.94	77.6	0.82
74.2	0.46	173	0.38	530	0.27	324	0.43	720	0.35	398	0.56	627	0.53	258	0.55	48.7	0.84	98.6	0.72
109	0.38	252	0.31	780	0.22	450	0.36	1000	0.3	510	0.49	794	0.47	286	0.53	61.3	0.74	125	0.64
167	0.31	385	0.25	1190	0.18	656	0.3	1460	0.25	670	0.43	1045	0.41	375	0.46	79	0.66	161	0.57
213	0.27	490	0.22	1510	0.16	1000	0.23	2230	0.2	894	0.37	1410	0.35	570	0.4	104	0.57	211	0.49
						1275	0.21	2840	0.18	1260	0.314	1965	0.3	708	0.34	140	0.49	285	0.425
230	0.24	595	0.20	1645	0.15	1550	0.19	3450	0.15	1835	0.26	2870	0.25	1030	0.28	195	0.42	396	0.36
354	0.19	915	0.16	2520	0.12	2480	0.15	5280	0.13	2810	0.21	4380	0.2	1580	0.23	284	0.35	578	0.3
450	0.17	1160	0.14	3220	0.11	3020	0.14	6725	0.11	3580	0.186	5575	0.18	2000	0.2	435	0.28	885	0.24
588	0.15	1520	0.13	4220	0.09	3950	0.12	8790	0.10							553	0.25	1125	0.214
775	0.13	2000	0.11	5550	0.08	5180	0.10	11500	0.09	4330	0.17	6740	0.16	2420	0.18	757	0.21	1460	0.187
										6660	0.137	10350	0.13	3720	0.14	1160	0.17	2240	0.15
										8460	0.121	13200	0.11	4760	0.12	1480	0.15	2850	0.13
										11030	0.113	17200	0.10	6200	0.11	1930	0.15	3740	0.12
										14750	0.092	22750	0.09	8160	0.10	2550	0.11	4930	0.10

Dimensions

Dimensions	Size Tolerance	K0	K1	K2	K3	K4	K5	K6	K7	K8	K9
in. A	±.0625"	1.31	2	4	3.5	6.5	6	8.5	4	2	2.75
mm	±1.6 mm	33.3	51	102	89	165	152	216	102	51	70
in. B	Max	0.81	0.81	0.81	0.94	0.94	1.31	1.31	1.31	1.31	1.31
mm	Max	21 1	21	21	24	24	33.3	33.3	33.3	33.3	33.3
in. C	±.02"/—0	0.38	0.38	0.38	0.5	0.5	0.75	0.75	0.75	0.75	0.75
mm	±.5/-0	8.41	8.4	8.4	13	13	19	19	19	19	19
in. D	±0.3"	0.87	1.56	3.56	3	6	5.37	7.87	3.37	1.5	2.25
mm	±0.8 mm	22 1	40	90	76	152	137	200	85	38	57
in. E	±0.1"	0.19	0.19	0.19	0.25	0.25	0.38	0.38	0.38	0.25	0.25
mm	±0.25 mm	4.71	4.7	4.7	6.35	6.35	9.6	9.6	9.6	9.6	9.65
in. F	Max	0.94	0.94	0.94	1.19	1.19	1.5	1.5	1.5	1.5	1.5
mm	Max	24	24	24	30	30	38	38	38	38	38
in. G	Max	0.41	0.41	0.41	0.5	0.5	0.69	0.69	0.69	0.69	0.69
mm	Max	10	10	10	13	13	17.5	17.5	17.5	17.5	17.5
in. H		0.12	0.12	0.12	0.15	0.194	0.194	0.194	0.15	0.15	0.15
mm		3.6	3.6	3.6	4.4	4.4	5.2	5.2	5.2	4.4	4.4
in. J		1.75	2.44	4.44	4.19	7.06	6.625	9.125	4.625	2.625	3.375
mm		45	62	113	107	180	168	232	117	67	86
in. K	±.0625"	2.125	2.81	4.81	4.44	7.81	7.06	9.56	5.06	3.06	3.81
mm	±1.6 mm	54	72	122	113	199	180	243	129	78	96
in. L	±.01"	0.75	0.75	0.75	0.81	0.81	1.06	1.06	1.06	1.06	1.06
mm	±0.25 mm	19	19	19	21	21	27	27	27	27	27
in. M	±.0625"	1.94	2.625	4.625	4.125	7.125	6.56	9.06	4.56	2.56	3.31
mm	±1.6 mm	49	67	117	105	182	163	230	116	65	84
in. N		1.0	1.0	1.0	1.25	1.25	1.625	1.625	1.625	1.625	1.625
mm		25.4	25.4	25.4	32	32	41	41	41	41	41
in. P	±.0625"	2.31	3	5	4.69	7.69	7.19	9.69	5.19	3.19	4.625
mm	±1.6 mm	59	76	127	119	195	182	246	132	81	117
in. R	±.01"	0.5	0.5	0.5	0.63	0.63	0.63	0.63	0.63	0.63	0.63
mm	±0.25 mm	13	13	13	16	16	16	16	16	16	16
in. S		0.56	0.56	0.56	0.81	0.81	1.06	1.06	1.06	1.06	1.06
mm		14	14	14	21	21	27	27	27	27	27
in. T		1.875	2.56	4.56	4.25	7.25	6.75	9.25	4.75	2.75	3.5
mm		48	65	116	108	184	172	235	121	70	89
in. U		0.63	0.63	0.63	0.75	0.75	0.88	0.88	0.88	0.75	0.75
mm		16	16	16	19	19	22	22	22	19	19
in. V		1.25	1.25	1.25	1.5	1.5	2	2	2	2	2
mm		32	32	32	38	38	51	51	51	51	51

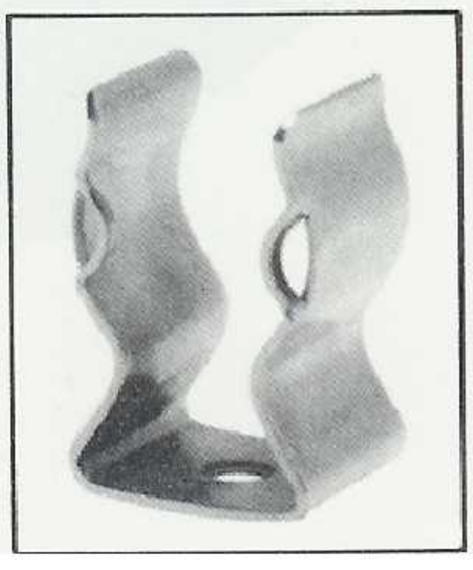


Accessories



Alternative Tapping Band

Part No.	Used on Size
SA59	K1
SA60	K2
SA61	K3, K4
SA62	K5, K6, K7
SA63	K8, K9



Type VS Mounting Clip

Part No.	Used on Size
CL17	K0-K2
CL18	K3-K4
CL19	K5-K9

Berco Mica Card Resistors

Specification

This range of mica card resistors is manufactured in 8 sizes and, owing to the natural flexibility of the mica, is particularly suited to conditions of severe mechanical vibration and shock and also for mounting on machine structures where rapid change of vibration frequency occurs.

For certain applications a rigid mica former may be utilised.

Mounting

Two standard mountings cover most applications. These are type B with slotted end contacts for use with mounting clips as illustrated, or type C with the winding terminated by an eyelet suitable for a 2BA or M5 screw and having an insulated eyelet for mounting.

The latter type of fixing is particularly suited for applications where a number of units are to be mounted in banks as they are very economical in space and fixing.

Former

High quality mica to give good mounting insulation.

Characteristics

Wire

Best quality iron free, nickel copper resistance wire to B.S. 115 for standard values. High values in shaded area of table, wound in nickel chromium wire. Low values in shaded area of table wound in nickel copper tape.

Tolerance

± 10% Standard. Closer tolerances can be supplied on request.

Tapping clip CL 69, as shown separately, can be supplied as an alternative to the standard band.

Technical Data

All flat mica card type resistors should be mounted horizontally on edge so as to obtain the lowest temperature rise. Vertical mounting results in peak temperature at a point about one third of the resistor length from the top, due to the rising heat from the lower part of the winding. For vertical mounting the wattage ratings given in the list should be reduced by 30%.

Air Blast Cooling

These resistors are ideal for air blast cooling, having a very thin edge section and large cooling surface. Uprating of more than four times may be obtained under suitable conditions. Our engineers will be pleased to advise.

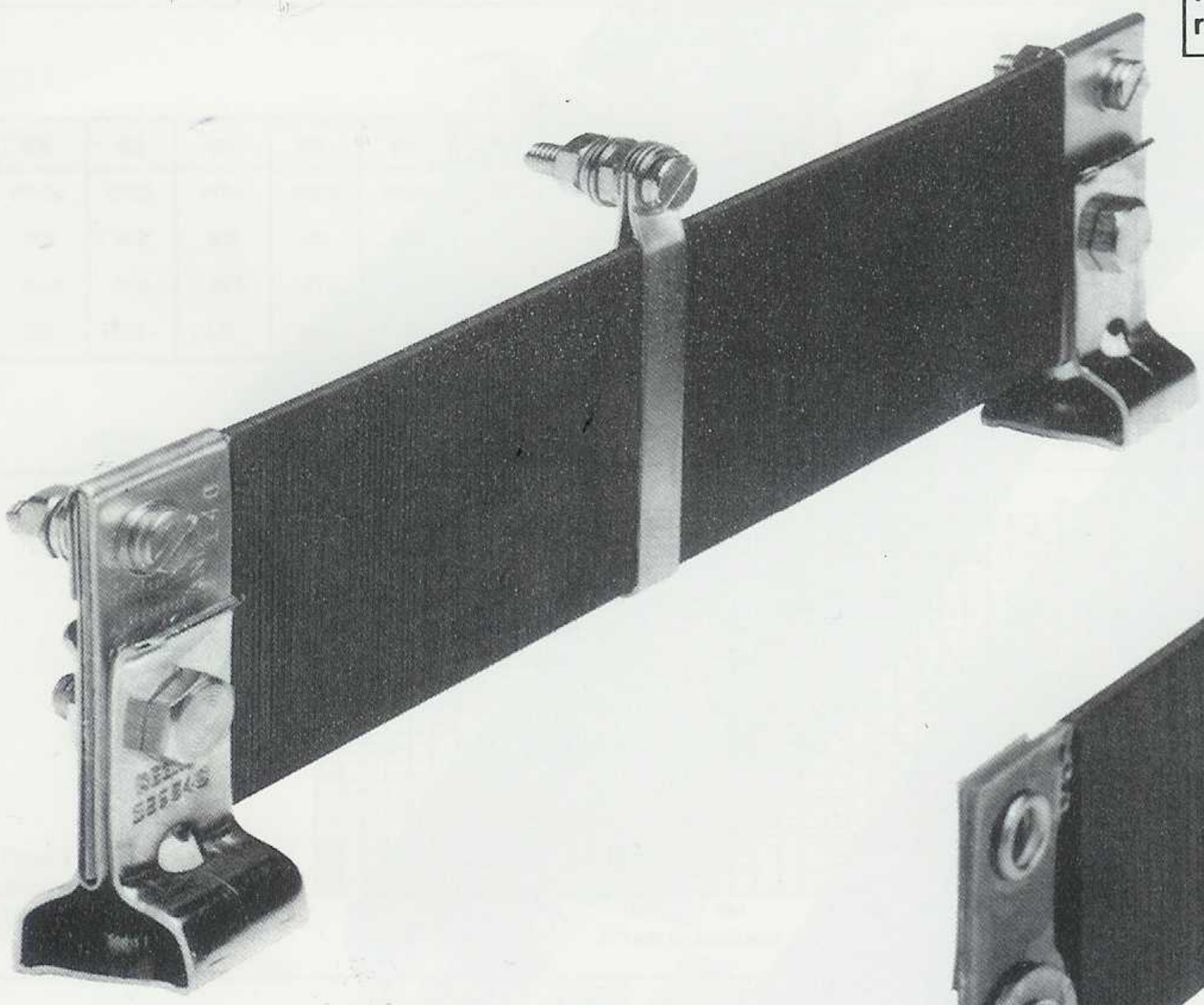
Ratings at high ambient temperatures

If the ambient temperature is higher than 20°C the rating must be reduced to prevent the final temperature reaching too high a figure. Our engineers will be glad to recommend suitable sizes for given ratings under any working conditions, if the relevant particulars are supplied.

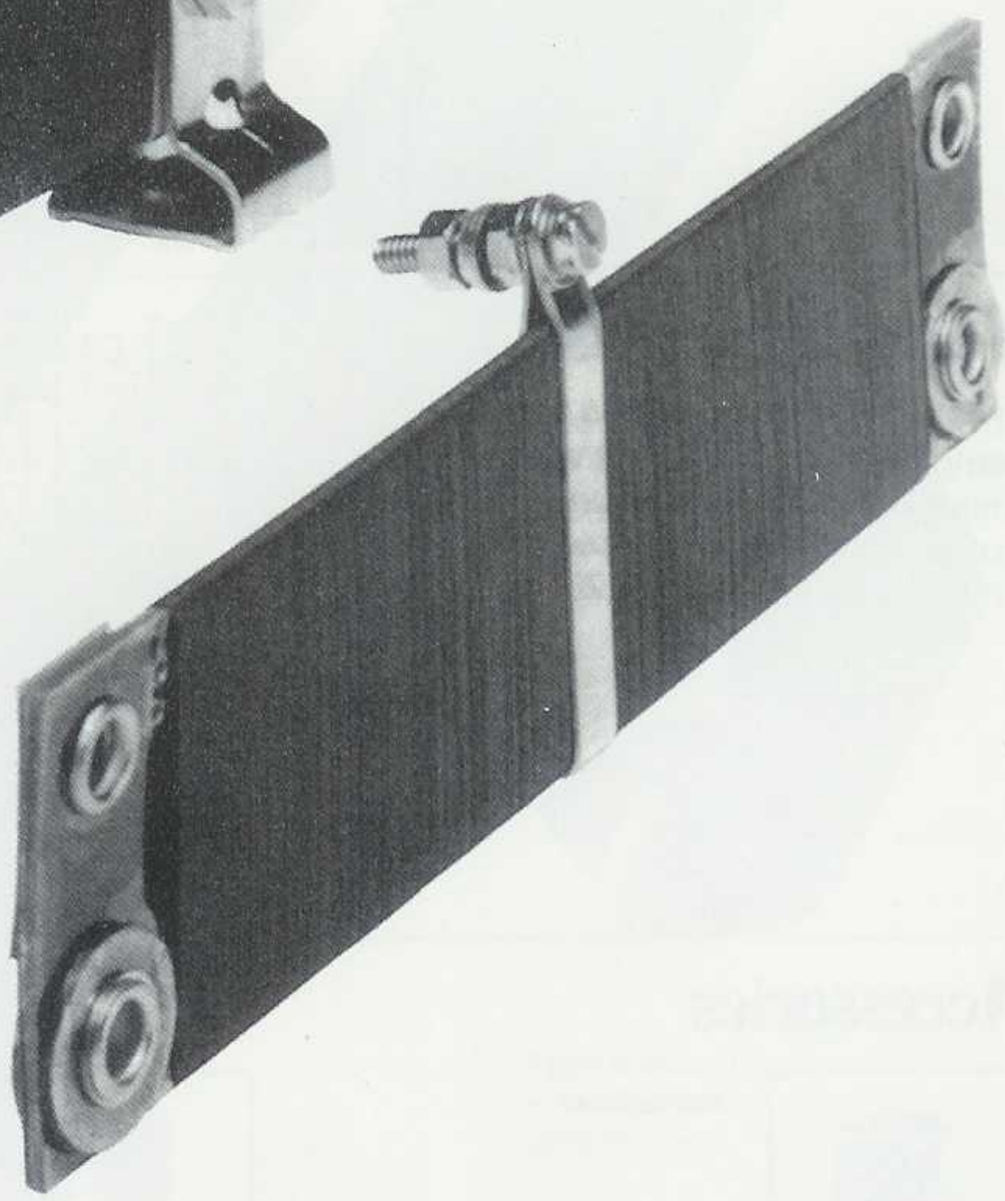
Mica card resistors mounted in groups

This form of resistor is particularly suitable for mounting in groups to form units of high wattage dissipation, but when they are so mounted the rating of each card must be reduced owing to the radiation between adjacent surfaces. The following table gives the percent of nominal watts rating for various distances between resistors.

Distance between resistors	1″	1½″	2″
Percentage of normal rating	80%	85%	90%



Type B



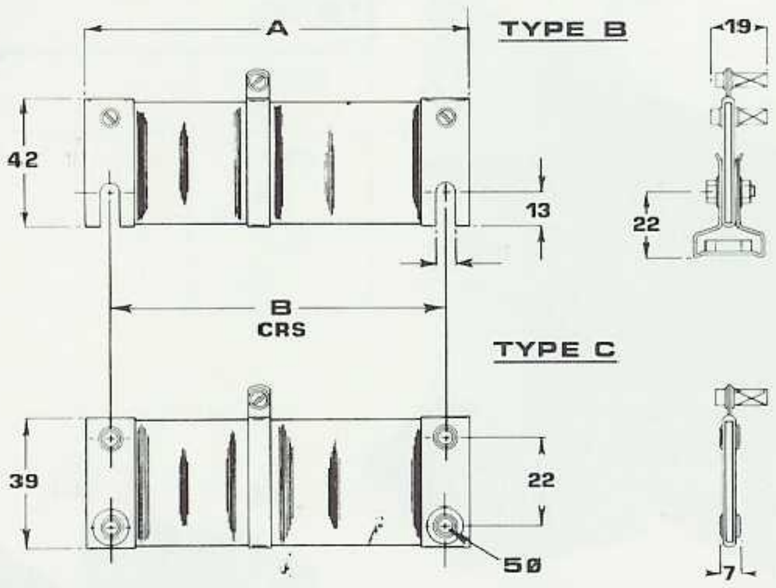
Type C

Ratings

45 WATTS		60 WATTS		80 WATTS		100 WATTS		140 WATTS		180 WATTS		220 WATTS		260 WATTS	
R	I	R	I	R	I	R	I	R	I	R	I	R	I	R	I
0.465	9.2	0.8	8.5	1.15	8.3	1.72	7.6	2.48	7.5	3.18	7.52	3.88	7.5	4.63	7.5
0.583	8.2	1.0	7.6	1.45	7.4	2.15	6.8	3.09	6.7	3.96	6.75	4.85	6.75	5.77	6.7
0.7	7.5	1.2	7.0	1.7	6.9	2.58	6.25	3.72	6.1	4.76	6.15	5.8	6.15	6.95	6.1
0.91	6.75	1.5	6.3	2.1	6.2	3.22	5.6	4.63	5.5	5.93	5.5	7.25	5.5	8.65	5.5
1.16	5.8	2.0	5.4	2.7	5.4	4.3	4.8	6.18	4.75	7.93	4.75	9.7	4.75	11.58	4.75
1.8	4.9	3.0	4.5	4.27	4.32	6.0	4.1	8.0	4.1	10	4.08	13	4.07	15	4.05
2.64	4.1	4.4	3.7	6.0	3.6	8.0	3.42	12	3.4	15	3.4	19	3.4	22	3.4
4.0	3.38	6.5	3.04	9.0	2.96	12	2.82	18	2.8	23	2.8	28	2.8	33	2.78
6.0	2.72	10	2.4	14	2.36	20	2.24	28	2.22	36	2.22	44	2.22	53	2.2
8.0	2.37	13	2.12	18	2.07	25	1.97	36	1.96	47	1.96	57	1.95	68	1.95
10	2.05	17	1.84	25	1.79	34	1.7	63	1.69	77	1.69	77	1.69	91	1.69
15.	1.75	24	1.56	34	1.52	47	1.45	67	1.45	87	1.44	106	1.44	126	1.43
19	1.53	32	1.36	45	1.33	62	1.26	88	1.26	114	1.25	140	1.25	165	1.25
26	1.3	44	1.16	62	1.13	86	1.08	122	1.07	157	1.07	193	1.07	227	1.07
34	1.15	57	1.02	80	1.0	110	0.95	156	0.95	202	0.94	247	0.94	292	0.94
45	1.0	75	0.89	105	0.87	145	0.83	205	0.82	265	0.82	325	0.82	385	0.82
53	0.92	90	0.82	125	0.8	173	0.76	245	0.75	316	0.75	388	0.75	460	0.75
68	0.81	113	0.73	159	0.71	220	0.67	310	0.67	400	0.67	490	0.67	580	0.67
85	0.73	141	0.65	198	0.63	274	0.6	385	0.58	500	0.6	615	0.6	725	0.6
107	0.65	178	0.58	250	0.56	345	0.54	487	0.53	630	0.53	773	0.53	915	0.53
143	0.56	237	0.5	333	0.49	460	0.47	650	0.46	840	0.46	1030	0.46	1215	0.46
187	0.49	312	0.44	432	0.43	600	0.41	850	0.4	1100	0.4	1350	0.4	1600	0.4
254	0.42	425	0.375	588	0.37	820	0.35	1160	0.35	1500	0.34	1840	0.345	2180	0.345
365	0.35	608	0.31	845	0.31	1170	0.29	1660	0.29	2150	0.29	2640	0.29	3120	0.29
563	0.28	940	0.25	1300	0.25	1810	0.235	2650	0.23	3300	0.23	4060	0.234	4800	0.23
711	0.25	1190	0.224	1650	0.22	2300	0.21	3250	0.21	4200	0.21	5150	0.206	6100	0.206
712.2	0.222	1326	0.198	1941	0.194	2761	0.184	3986	0.183	5206	0.183	6446	0.182	7656	0.182
1099	0.179	2038	0.16	2988	0.156	4240	0.148	6133	0.147	8028	0.147	9898	0.147	11788	0.147
1399	0.158	2600	0.141	3800	0.138	5400	0.131	7800	0.131	10200	0.13	12600	0.13	15000	0.13
1825	0.139	3405	0.124	4980	0.121	7055	0.115	10191	0.114	13330	0.114	16480	0.114	19620	0.114
2410	0.121	4470	0.108	6560	0.105	9310	0.1	13460	0.1	17590	0.099	21710	0.099	25890	0.099

The ratings given above are for continuous duty, giving a temperature rise of approximately 300°C on the surface of the winding in an ambient temperature of 20°C with free ventilation. The ohmic values shown in the table are for cards with one tapping band as illustrated.

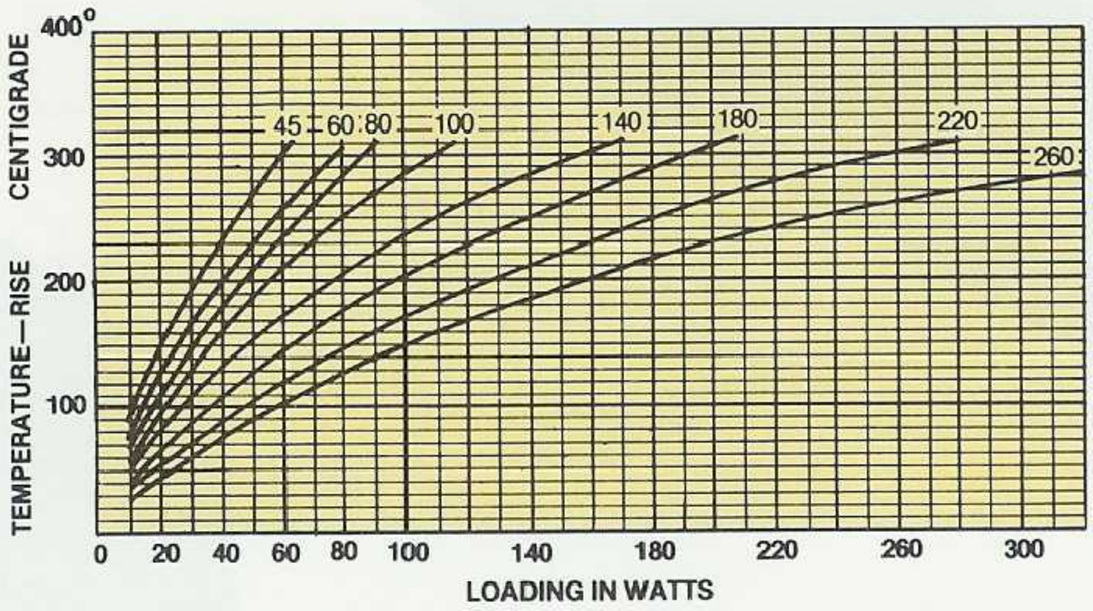
Dimensions



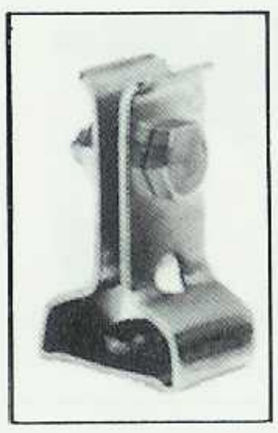
WATTS	45	60	80	100	140	180	220	260
A in.	2.375	3.125	3.875	4.875	6.375	7.875	9.375	10.875
A mm.	60	80	99	124	162	200	238	276
B in.	1.75	2.5	3.25	4.25	5.75	7.25	8.75	10.25
B mm.	45	64	83	108	146	184	222	260

Temperature rise

The following curve gives the temperature rise against watts dissipated for cards mounted horizontally on edge in free air in an ambient temperature of 20°C.

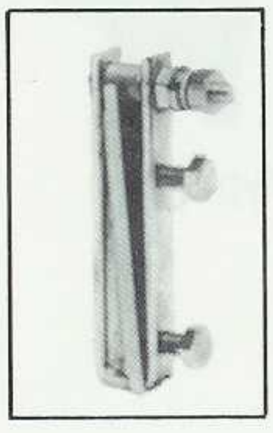


Accessories



Part No. CL37

Mounting clip for Type B with 2BA tapped hole



Part No. CL69

Alternative tapping clip for types B & C

Berco 'J' Coil Resistors

This well proven design of grid resistance consists of a helix of edge wound resistance strip, mounted on porcelain insulators, which in turn are located on a steel support, provided with two alternative mountings. The maximum surface area of the resistance material is exposed to the cooling air to give the maximum dissipation of heat and thus the highest possible rating.

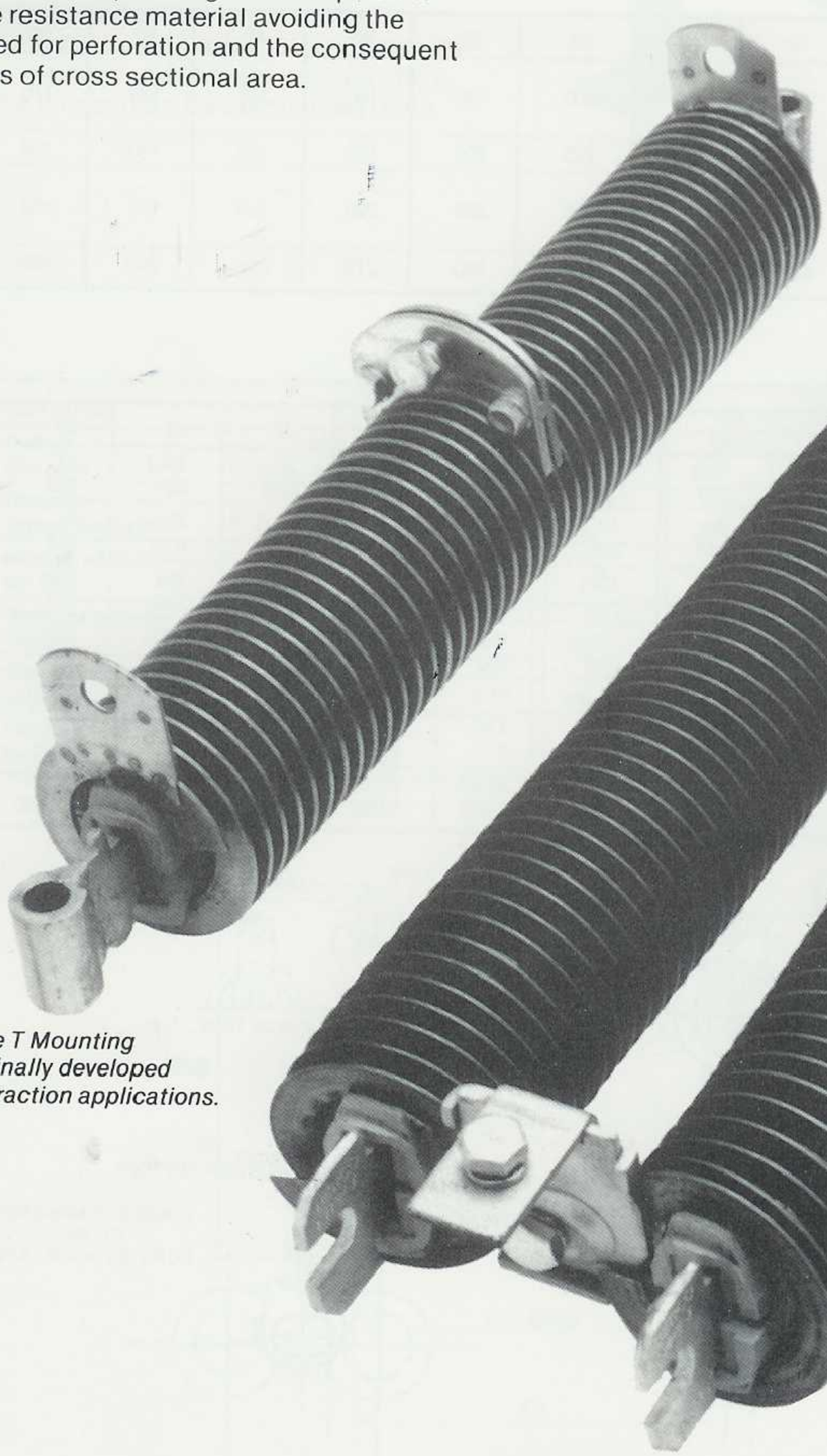
The connections of the resistance winding are made by stainless steel lugs, welded directly to the resistance strip. This method avoids perforation and eliminates the formation of hot spots.

Alternative types of connector are available, which allow the user to adjust the resistance value in situ to the requirements of the particular application. These consist of a rigid plated steel pressing which clips on to the resistance material avoiding the need for perforation and the consequent loss of cross sectional area.

Tapping connector, part number CO.432, is used for bringing out connections and tapping from single units, and double connector, part number CO.326, is so designed that when the resistors are mounted on 2¾" centres, adjacent units can be connected together to provide series or parallel circuits. In this way tappings can be set in any position on the coils and banks of resistors for motor starters, crane controllers, and traction purposes, can be built up in very simple form. These resistors are particularly suited for heavy industrial duty and conditions of severe vibration and shock. They have proved highly successful in traction and welding control gear, and meet high shock test requirements.

Grid Coils provide:—

1. A high rate of heat transfer to the surrounding area, due to the shape and disposition of the conductor.
2. Good space factor.
3. Simple robust construction avoiding the use of organic insulating materials.
4. An easy way in which terminals and tappings can be fitted and adjusted by the user.
5. Facility for series and parallel connections, without additional wiring or conductors.
6. The unit construction enables banks of resistors to be built up in an easy form.



Type T Mounting originally developed for traction applications.

Type S Mounting showing single and double adjustable tapping connectors.

Type S Mounting with standard terminal lugs

Ratings

Continuous Current Ratings in Free Air for Temperature Rise of °C					D.C. OHMS ± 10 %								
Lloyds 200	265	280	BSS 587 375	* 450	J1	J2	J3	J4	J5	J6	J7	J8	J9
57	67	69	85	96	0.0302	0.065	0.103	0.139	0.176	0.212	0.248	0.284	0.332
51	62	64	78	90	0.0408	0.0902	0.144	0.196	0.247	0.298	0.349	0.4	0.451
37	45	47	59	68	0.052	0.118	0.183	0.25	0.32	0.38	0.44	0.5	0.56
34	43	44	56	65	0.071	0.16	0.251	0.341	0.43	0.519	0.608	0.697	0.786
28	33	35	43	49	0.098	0.222	0.345	0.468	0.617	0.712	0.807	0.902	0.997
23	27	29	36	43	0.13	0.304	0.467	0.623	0.788	0.95	1.11	1.27	1.43
20	24	25	32	37	0.171	0.386	0.602	0.816	1.03	1.24	1.46	1.67	1.885
17	21	22	27	32	0.232	0.5	0.79	1.07	1.35	1.68	1.96	2.34	2.55
15	17	19	24	28	0.348	0.75	1.18	1.6	2.02	2.52	2.94	3.5	3.82
12	15	16	21	24	0.461	1.045	1.62	2.2	2.78	3.35	3.94	4.51	5.08

*Maximum continuous recommended operating temperature.
J7, J8, J9 are recommended for static equipment.

Intermittent Ratings

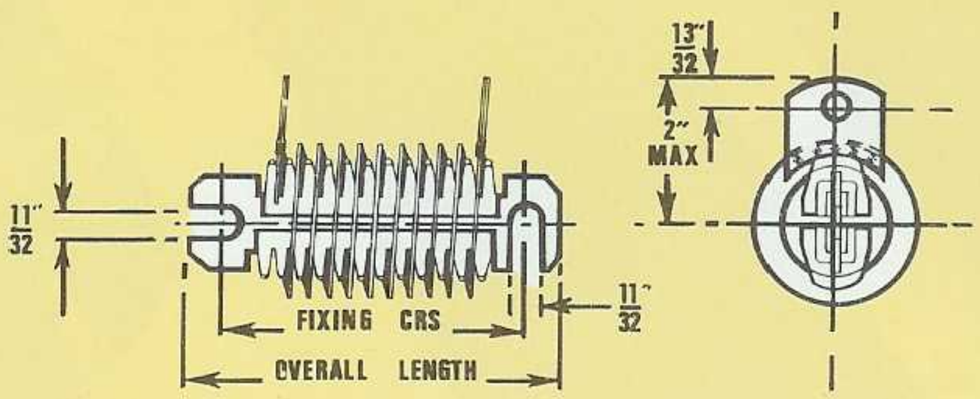
The high thermal capacity and excellent ventilation enables the ratings to be considerably increased where the loading is intermittent and of short duration. The table below gives the current ratings for various times in four total duty cycles, expressed as a percentage of the continuous current to give the same temperature.

Duty Cycle	Time in Seconds	5	10	15	20	25	30	40	50	60
1½ Minutes B.S. 587 40 Starts/Hr.	Percentage of Normal Current Rating	330	270	235	200	180	160	135	120	110
3 Minutes		335	290	255	225	200	180	158	140	130
4 Minutes B.S. 587 15 Starts/Hr.		400	390	335	285	255	228	200	180	165
15 Minutes		500	420	350	310	290	270	255	240	220

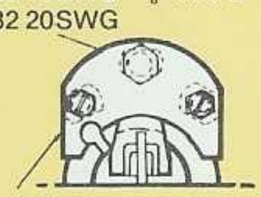
Dimensions

Model Size			J1	J2	J3	J4	J5	J6	J7	J8	J9
Type S	Overall Length	in	4 5/8	7 1/2	10 7/16	13 5/16	16 1/4	19 1/8	22 1/16	24 15/16	27 7/8
		mm	117.5	190	265	348	406	486	554	631	708
	Fixing Centres	in	3 3/4	6 5/8	9 9/16	12 7/16	15 3/8	18 1/4	21 3/16	24 1/16	27
		mm	95.4	168.5	243	316	391	464	538	612	686
Type T	Overall Length	in	5 3/16	8 1/8	11 1/16	13 15/16	16 7/8	19 3/4	22 11/16	25 5/8	28 9/16
		mm	132	206	281	354	429	502	576	652	725
	Fixing Centres	in	4 5/8	7 1/2	10 7/16	13 5/16	16 1/4	19 1/8	22 1/16	24 15/16	27 7/8
		mm	117.5	190	265	348	406	486	554	631	708
Total Effective Turns			9.5	21.5	33.5	45.5	57.5	69.5	81.5	93.5	105.5
Max. Weight Excluding Tapping Connectors		lbs	0.94	1.94	2.69	3.56	4.63	5.44	6.25	7.125	8
		kg	0.425	0.88	1.22	1.62	2.1	2.46	2.84	3.24	3.67
Length of Tape		ft	4.25	9.14	14.45	19.58	24.65	29.75	34.65	39.95	45.95
		M	1.295	2.780	4.400	5.960	7.520	9.060	10.500	12.200	13.750

Standard Type 'S' mounting

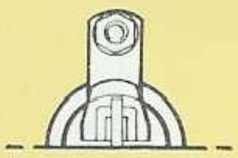


CO 631 16SWG
CO 432 18SWG ⅜" TAPE
CO 632 20SWG



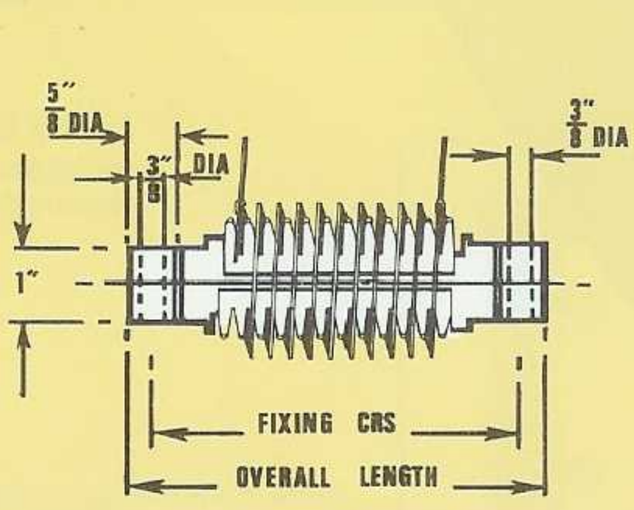
CO 766 16SWG
CO 767 18SWG ½" TAPE
CO 768 20SWG

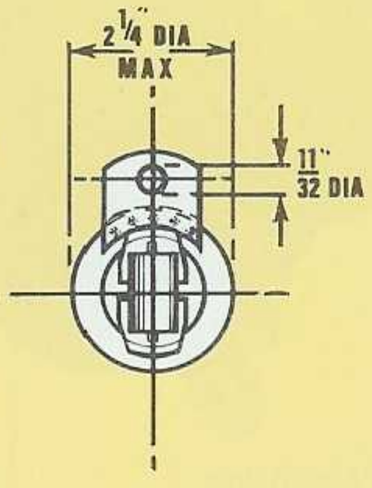
SA 282
ADJUSTABLE CONNECTOR



¼" WIDE TAPE

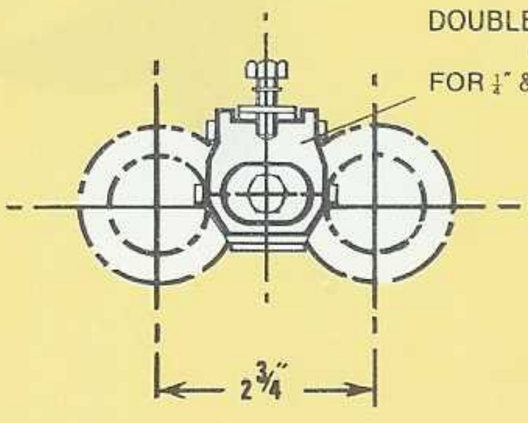
Standard Type 'T' mounting





ALTERNATIVE ADJUSTABLE CONNECTORS

DOUBLE CONNECTOR
CO 326
FOR ¼" & ⅜" WIDE TAPE

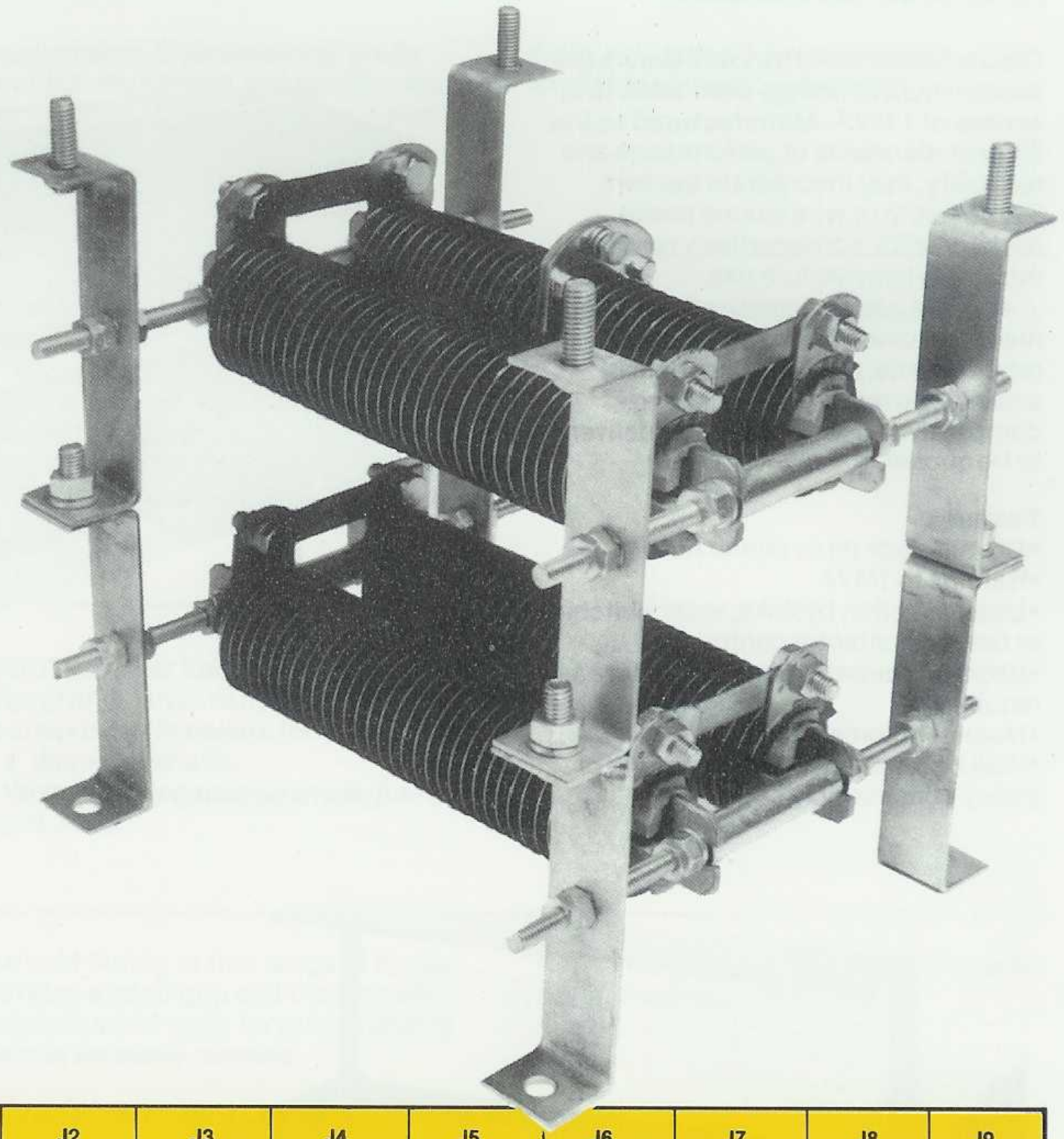


'J' Banks

A systematic approach has been developed to the construction of multiple 'J-Coil' assemblies. The construction, called 'J-Banks', utilises a standard bracket with a welded stud in one end and a clear hole in the other. The bracket is so made that the stud of one will mate with the hole in another. Thus brackets may be stacked.

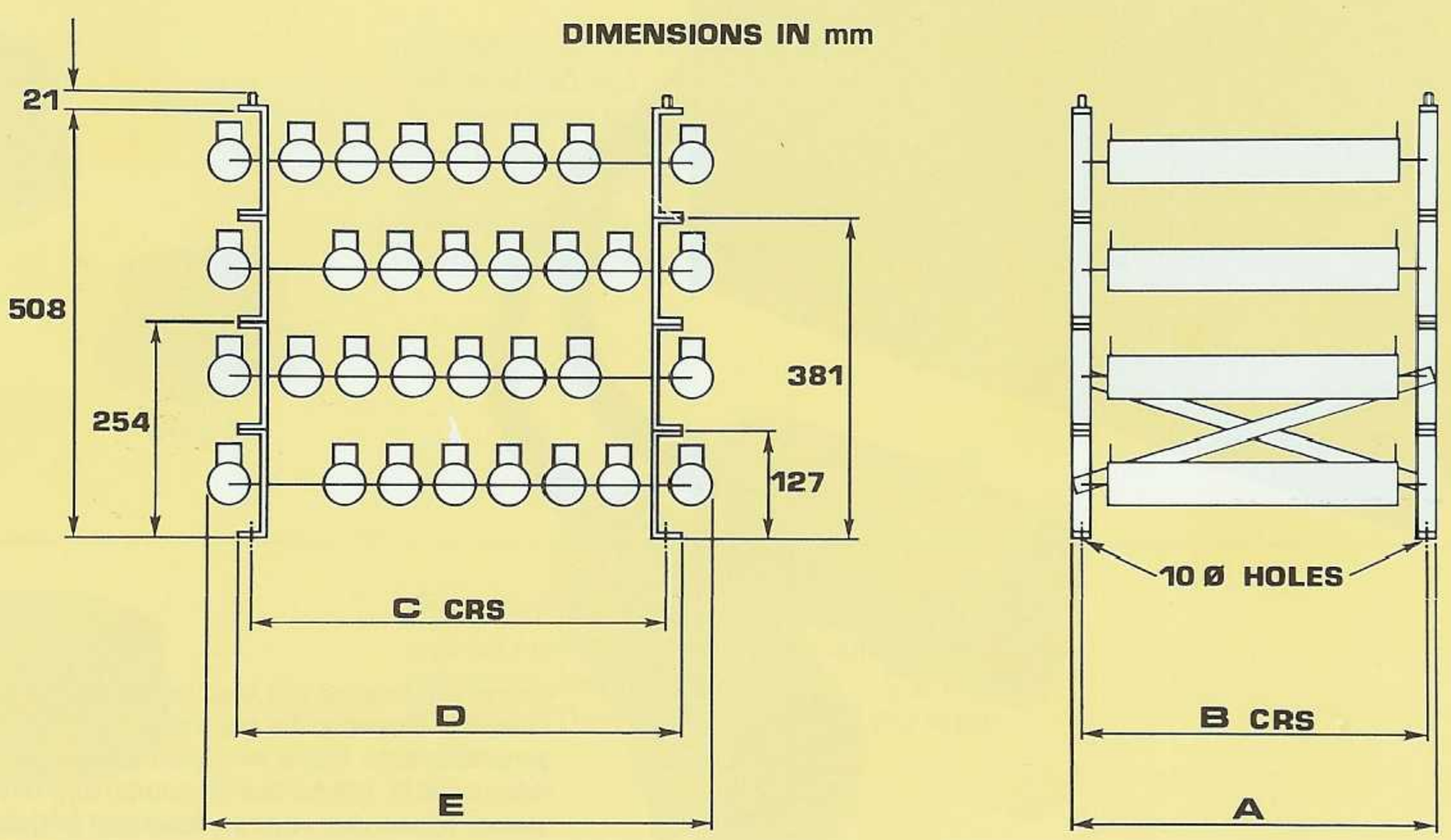
The general construction is shown in the photograph and in the drawing below. We recommend a maximum number of six 'J-Coils' between supports as shown.

'J-Banks' may be floor standing or wall mounting and can be supplied with drop-on overall covers which locate on the studs fitted to the uppermost brackets. 'J-Banks' construction may be adapted with minimum trouble to meet special requirements. The assembly of 'J-Coils' into 'J-Banks' is a very economical proposition rendering customer assembly unnecessary. All components are stocked and delivery normally take little longer than for unmounted units.



Size of Coil			J1	J2	J3	J4	J5	J6	J7	J8	J9
Overall Distance	A	in	5	7.875	10.813	13.688	16.625	19.5	22.438	25.313	28.25
		mm	127	200	275	348	423	496	570	643	718
Distance across Centres	B	in	3.75	6.625	9.563	12.438	15.375	18.25	21.188	24.063	27
		mm	95	168	243	316	391	464	538	612	686
Number of Coils per Tier			1	2	3	4	5	6	7	8	
Distance across Centres	C	in		8.188	10.938	13.688	16.438	19.188	19.188	19.188	
		mm		208	278	348	418	487	487	487	
Overall Distance across Frame	D	in		9.438	12.188	14.938	17.688	20.438	20.438	20.438	
		mm		239	309	380	450	520	520	520	
Overall Distance for 7 & 8 only	E	in							21.875	23.313	
		mm							556	592	

DIMENSIONS IN mm



Load Banks

Claude Lyons resistive Load Banks are custom-built in ratings from 1kVA to in excess of 1 MVA. Manufactured to the highest standards of performance and reliability, they incorporate our own Berco® strip or wire-wound power resistor units, conservatively rated for moderate temperature rise.

All units are designed and specified to meet customer's individual requirements, our wide experience extending over 50 years enabling competitive prices and prompt deliveries to be quoted.

Features

- DC, single or three-phase AC
- Ratings to 1MVA
- Load selection by links, local switching or remote contactor control
- Voltage, current, frequency meters as required
- Natural or forced air cooled
- Wall or bench mounting, portable or trolley construction

A typical load bank, rated at 50kW.

One of an order of 173 load banks for British Telecom. Intended for testing portable motor generator sets, these switchable load banks, rated at 6kW, are forced air cooled and have meters to monitor voltage, load and frequency of the generating sets.

Control and Indicator Accessories

Knobs and Handwheels

The Berco range of knobs and handwheels are moulded in high impact strength thermo-setting plastic. They are designed specifically to meet the requirements of professional grade electrical equipment and provide non-slip mounting by either collet or grub screw fixing. For specific details of available fixings, contact the Sales Office at Hoddesdon.

Note: All shaft diameters are als available to metric standards.

N 367 **N 260**

These knobs are suitable for use on closely grouped controls. The underside is recessed to enable the knobs to fit over the conventional potentiometer mounting bush and nut. Available with base diameters of $\frac{3}{4}$" (19mm) or $\frac{15}{16}$" (24mm) N 367 and N 260 are designed to fit $\frac{1}{8}$" and $\frac{1}{4}$" shafts respectively.

Note: Only available with collet mounting.

N 363

This 3" diameter knob has a serrated edge giving particularly good grip. It can be supplied with collets for either $\frac{1}{4}$", $\frac{5}{16}$" or $\frac{3}{8}$" diameter shafts.

When ordering specify shaft diameter, e.g. N 363/$\frac{1}{4}$.

Note: Also available for alternat screw fixing.

N 295

N 230

N 229

N 228

The bold fluting of this range of knobs provides a good grip and the smooth contours avoid traps for dust enabling them to be easily cleaned.

Knobs N 228, N 229 and N 230 have grip diameters of $1\frac{1}{2}$" (38mm), $1\frac{7}{8}$" (48mm) and $2\frac{1}{2}$" (64mm) and can be supplied with collets for $\frac{1}{4}$", $\frac{5}{16}$" or $\frac{3}{8}$" diameter shafts.

Knob N 295 has a $3\frac{3}{4}$" (95mm) grip diameter and is available for $\frac{3}{8}$" or $\frac{1}{2}$" diameter shafts only.

When ordering specify shaft diameter, e.g. N 228/$\frac{1}{4}$".

Note: This range of knobs is ava collet mounting only.

RKN 3

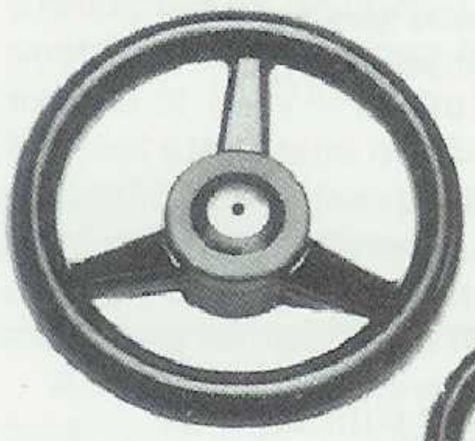
RKN 2

RKN 1

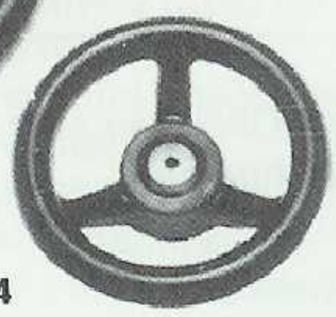
RK series knobs are similar to the N 228, 230 and 295 but are specifically designed for dual grub screw fixing only. Available for $1\frac{1}{2}$" (38mm), $2\frac{1}{2}$" (64mm) and $3\frac{3}{4}$" (95mm) grip diameters the RK series has a moulded arrow on the lip dispensing with the need for a pointer.

N 547

The N 547 has a serrated edge providing a good positive grip and is available for collet mounting on shafts of $\frac{1}{4}$", $\frac{5}{16}$" and $\frac{3}{8}$" diameter. The base diameter of the knob is $2\frac{3}{8}$".



N 359



N 354

N 354 and N 395 handwheels have been designed for high mechanical strength and are suitable for many types of industrial equipment and test gear. .
N 354 is a $4\frac{1}{2}$" (114mm) diameter knob and can be supplied with collets for $\frac{1}{4}$", $\frac{5}{16}$" or $\frac{3}{8}$" diameter shafts. N 359 has a $6\frac{1}{2}$" (165mm) grip diamter and is suitable for $\frac{5}{16}$", $\frac{3}{8}$" or $\frac{1}{2}$" collets.

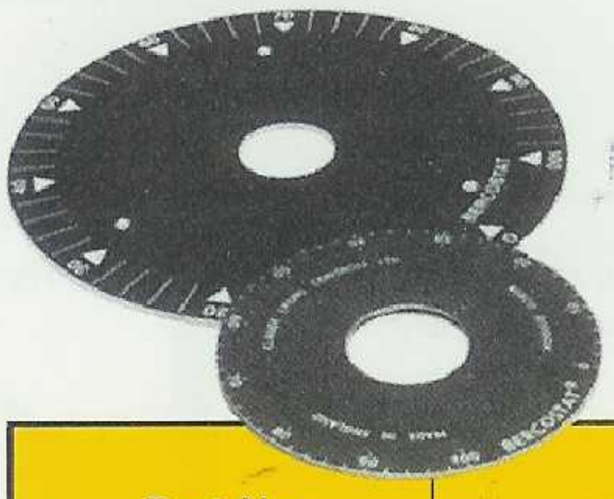
When ordering specify shaft diameter, e.g. N 354/$\frac{1}{4}$".

Note: handwheels of this size can also be supplied for grub screw fixing.

Pointers

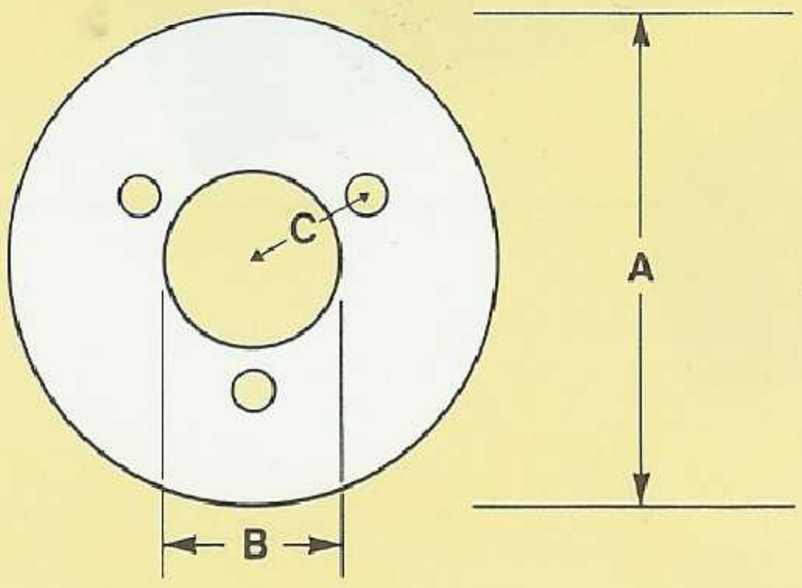
Various standard pointers are available to suit specific knobs and dials. Contact the Sales Office for details.

Dials



Berco dials are manufactured from hard aluminium sheet and can be finished with reversed out anodised lettering, etching or silk screening. Dials are available for mounting directly on to a knob with countersunk self-tapping screws or for fixed chassis mounting. Double sided clockwise/anti-clockwise lettering is available on some models.

Part No.	Dimensions			Engraving	Angle
	A	B	C		
DI 71	$2\frac{1}{8}$"	$\frac{3}{4}$"	$\frac{9}{16}$"	—	—
DI 72	$2\frac{1}{8}$"	$\frac{3}{4}$"	$\frac{9}{16}$"	0-100 100-0	300°
DI 69	$2\frac{3}{4}$"	$1\frac{1}{8}$"	$\frac{3}{4}$"	—	—
DI 63	$2\frac{3}{4}$"	$1\frac{1}{8}$"	$\frac{3}{4}$"	1-100 100-0	300°
DI 70	$3\frac{1}{2}$"	$1\frac{1}{8}$"	$\frac{3}{4}$"	—	—
DI 64	$3\frac{1}{2}$"	$1\frac{1}{8}$"	$\frac{3}{4}$"	0-100 100-0	300°
DI 94	$5\frac{3}{4}$"	$\frac{1}{2}$"	2"	0-100	315°
DI 98	$5\frac{3}{4}$"	$\frac{1}{2}$"	2"	0-100	330°



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