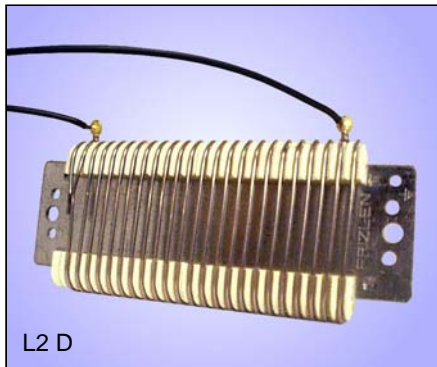




Type series L / LB

150 – 1110 W with connection at wires, lugs or screw clips

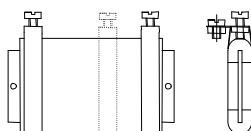
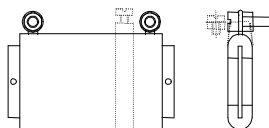
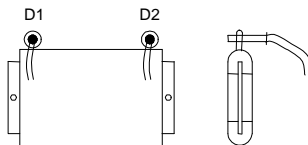


Wirewound lamina type fixed resistors, degree of protection IP 00 with ridged ceramic insulators from steatite. Standard version with straps from zinc plated steel in

2 widths: type series L.. (standard version)
type series LB.. (wide version)

Technologies

- particularly flat design
- suitable for integration
- assembled units possible
- various lengths and widths, therefore many specifications depending on requirement
- continuous dissipation up to 1110 W
- adjustable clips are available for both type series



Connection types and versions

We provide three versions with various connection types

- With wires, version L.. D and LB.. D
- With lugs and connecting screws, version L.. and LB..
- With screw clips, version L.. C and LB.. C

The last two can also be provided with adjustable clips

Version L.. D and LB.. D

lamina type fixed resistors with connection at 2 hard soldered wires. Standard version (if no other data): Silicone insulated wire (SIF), cross section 1,5 mm², length of wires D1 and D2 500 mm each. Suitable for all resistance values.

Version L.. and LB..

lamina type fixed resistors with 2 wire lugs as connection points, which are provided with M5 screw combinations for the connection. Only suitable for resistance wires from cross section 0,8 mm on!

Version L.. F and LB.. F

With one or several adjustable clips, that can be modified (F, 2F, 3F, 4F)
Example: LB5 2F- 21, wide lamina LB5 with 2 adjustable clips and 21 Ω.

Version L.. C and LB.. C

lamina type fixed resistor with 2 screw clips as end clips, that are prepared with M5 screw combinations for the connection. Suitable for all resistance values.

Version L.. C.F and LB.. C.F

With one or several adjustable clips, that can be modified (CF, C2F, C3F, C4F)
Example: L10 CF - 150, standard lamina L10 with 1 adjustable clip and 150 Ω.

Application

- brake resistor
- load resistor
- protection resistor

Special versions of the support strap

- from aluminium or stainless steel for a low noise and low inductance version
- from zinc plated perforated steel sheet for a better ventilation when incorporated horizontally or into units with forced ventilation.
- With special dimensions to perfectly suit the requirements of the application



Type series L / LB

Options to perform the connection wires for version L..D, LB..D

1. Insulation and cross section of wires

In standard version wires are silicone insulated (SIF) with a cross section of 1,5 mm², colour black
 Continuous temperature +180°C (for a short time 200°C)
 We can deliver the following variations with additional charge:

- Silicone insulated wire cross section 2,5 mm², colour black (only available for resistance wires from diameter 1,2mm on)
- Teflon insulated wire FEP (silicone free), cross section 1,5 mm², colour transparent, continuous temperature 205°C
- Teflon insulated wire FEP/UL, UL approved (UL 1330), cross section AWG14 (equal to 2,08 mm²), colour white with UL-print, continuous temperature 200°C
- silicone- and Teflon free wire name brand Radox 155, UL approved (UL 3298), cross section AWG14, colours yellow, red or blue, continuous temperature 155°C

2. Lengths of wires

In standard version wires D1 and D2 are both 500 mm long , but can be modified and provided in various lengths.

3. Equipment of the open wire endings (connection provided for the customer)

In standard version wires are not bared and not equipped with connection devices. For an additional charge we provide:

- lugs M4 or M5, blank or insulated with heat shrink tubing
- fast-on connections 6,3 x 0,8 straight or angled, blank or with enclosure
- conductor sleeves, blank
- bi- or multi-pole plugs for easy connection by the user

4. Resistor taps

For special applications we provide further connection wires as fixed taps.

5. How to order

If you want to modify our standard version please specify the connection wires as follows (example):

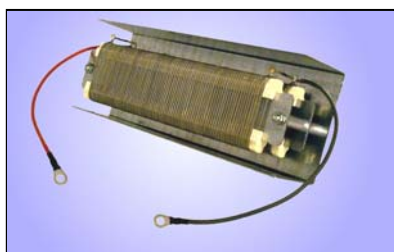
wire D1 : Radox 155 – Insulation, AWG 14, 300 mm long, yellow, with conductor end sleeve blank

wire D2 : Radox 155 – Insulation, AWG 14, 400 mm long, blue, with fast-on connection 6,3 x 0,8 blank, straight

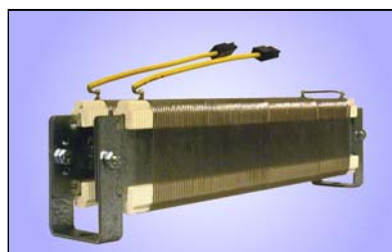
Combinations of several lamina type fixed resistors to form a unit

- Several laminas can be combined by brackets or threaded bolts to form units ready to connect and to integrate
- By a range of enclosures or partial enclosures we provide all kinds of ducts for better ventilation and screening against heat sensitive parts

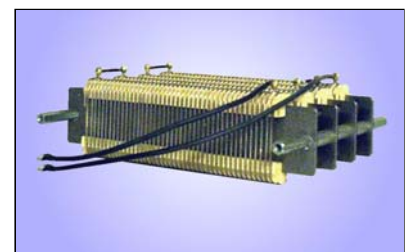
Examples of constructions



- Unit consisting of 2 paralleled laminas L4
- The laminas are combined by threaded bolts to a unit
- Three-side cover, can be used for mounting
- Wire connection and lugs M5 (with heat shrink tubing)



- Unit consisting of 2 laminas L4 connected in series
- The laminas are combined by brackets to a unit
- Wire connection with straight fast-on connection 6,3 x 0,8 in an enclosure



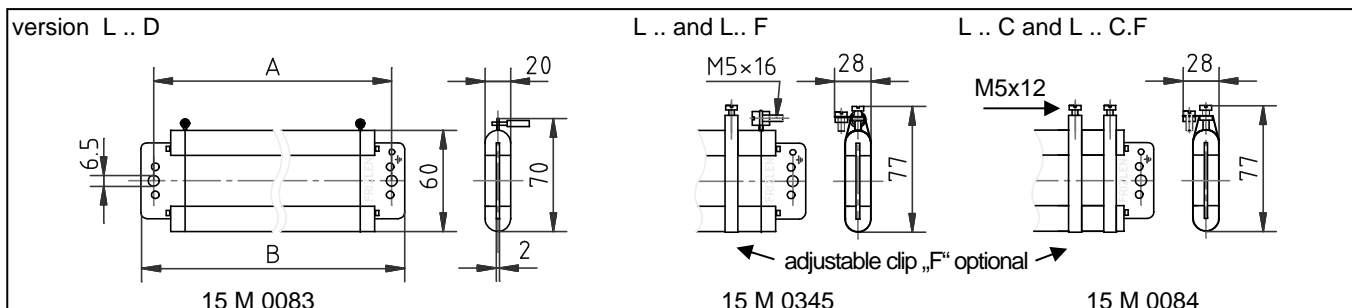
- Unit consisting of 4 laminas L3 connected in series
- The laminas are combined by threaded bolts to units
- Wire connection and lugs M4 (with heat shrink tubing)



Type series L

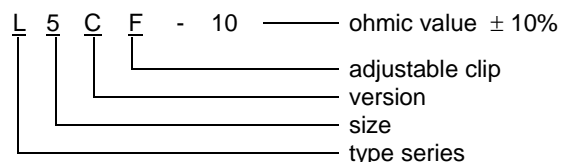
The selection of the windings below is based upon economical aspects. Other windings with an increased weight of the wire for better energy absorption capacity or different ohmic values on request. The given power in W refers to individual mounting, ventilation and unhindered access of air for 100% DCF (continuous dissipation). The power has to be reduced by the factor 1,21 when several laminae are combined or when integrated into an enclosure.

type		L2	L3	L4	L5	L6	L7	L8	L9	L10	
power [W] at 40°C and 100% ED		150	235	300	380	460	535	610	690	760	
Dimension A [mm]		140	210	260	340	390	445	520	560	620	
Dimension B [mm]		155	225	275	355	405	460	535	575	635	
alloy	type of resistor wire	pitch of ridged ceramic insulators [mm]	resistance values in Ω								
	∅ [mm]										
CrAl 25 5	0,5	2	54	84	115	145	176	207	237	268	299
CrAl 25 5	0,55	2	45	70	96	121	147	172	198	223	249
CrAl 25 5	0,6	2	38	60	81	102	124	145	167	188	210
CrAl 25 5	0,65	2	32	50	68	86	104	122	140	158	177
NiCr 30 20	0,6	2	28	43	58	73	90	104	120	135	150
NiCr 30 20	0,65	2	24	36	49	62	76	89	103	115	128
NiCr 30 20	0,7	2	20	31	43	54	66	77	89	100	111
NiCr 30 20	0,75	2	18	27	37	47	57	67	77	87	96
NiCr 30 20	0,8	2	16	24	33	41	50	59	68	76	85
CuNi 44	0,6	2	12	20	27	34	41	49	56	63	71
CuNi 44	0,65	2	11	17	23	29	35	42	48	54	60
CuNi 44	0,7	2	9,2	14	20	25	30	36	41	46	52
NiCr 30 20	0,9	3	8,0	13	17	22	26	31	36	40	45
NiCr 30 20	1,0	3	6,4	10	14	18	21	25	29	32	36
NiCr 30 20	1,1	3	5,4	8,4	12	15	18	21	24	27	30
NiCr 30 20	1,2	3	4,5	7,1	9,7	13	15	17	20	23	25
CuNi 44	0,9	3	3,8	5,9	8,1	10	12	14	16	19	21
CuNi 44	1,0	3	3,1	4,8	6,6	8,3	10	11	13	15	17
CuNi 44	1,1	3	2,5	4,0	5,4	6,9	8,3	9,8	11	12	14
CuNi 44	1,2	3	2,1	3,3	4,6	5,8	7,0	8,2	9,4	10	11
CuNi 44	1,3	3	1,9	2,9	4,0	5,0	6,1	7,1	8,2	9,2	10
CuNi 44	1,4	3	1,5	2,5	3,3	4,2	5,1	6,0	6,9	7,8	8,7
CuNi 44	1,3	4	1,4	2,2	3,0	3,8	4,6	5,4	6,2	7,0	7,8
CuNi 44	1,4	4	1,2	1,9	2,5	3,2	3,9	4,5	5,2	5,9	6,5
CuNi 44	1,5	4	1,0	1,6	2,2	2,8	3,4	4,0	4,5	5,1	5,7
CuNi 44	1,6	4	0,92	1,4	2,0	2,5	3,0	3,5	4,0	4,5	5,0
CuNi 44	1,7	4	0,83	1,3	1,8	2,2	2,7	3,1	3,6	4,1	4,5
CuNi 44	1,6	5	0,73	1,1	1,5	2,0	2,4	2,8	3,2	3,6	4,0
CuNi 44	1,7	5	0,65	1,0	1,4	1,8	2,1	2,5	2,9	3,2	3,6
CuNi 44	1,8	5	0,57	0,89	1,2	1,5	1,9	2,2	2,5	2,8	3,2
CuNi 44	1,9	5	0,52	0,81	1,1	1,4	1,7	2,0	2,3	2,6	2,9
CuNi 44	2,0	5	0,46	0,72	0,98	1,2	1,5	1,8	2,0	2,3	2,6



Example of dimensioning and selection of a special unit:

lamina type fixed resistor 380 W , resistance value 10 Ω,
with connection at screw clips, with an additional adjustable
clip: selected: L 5 CF – 10

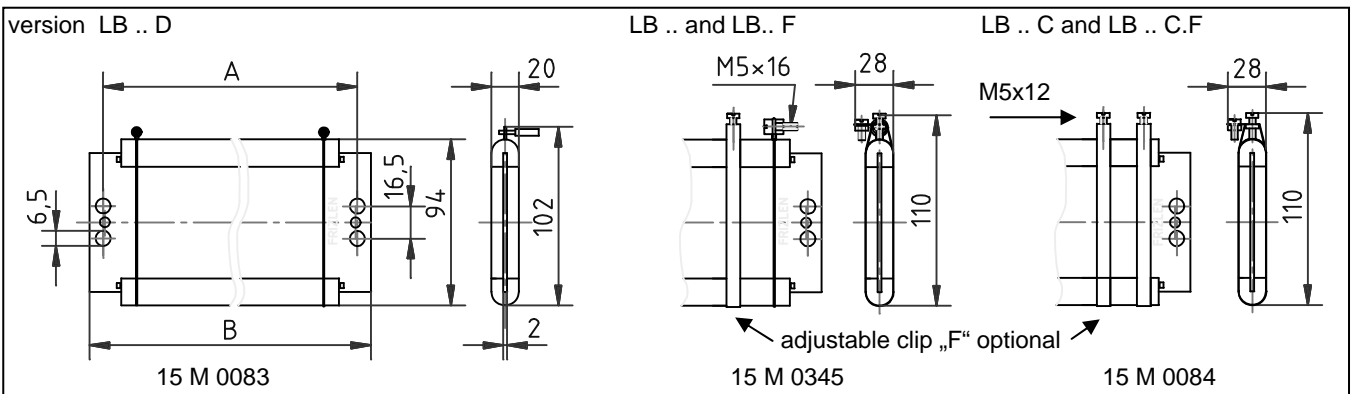




Type series LB

The selection of the windings below is based upon economical aspects. Other windings with an increased weight of the wire for better energy absorption capacity or different ohmic values on request. The given power in W refers to individual mounting, ventilation and unhindered access of air for 100% DCF (continuous dissipation). The power has to be reduced for the factor 1,21 when several laminae are combined or when integrated into an enclosure.

type			LB2	LB3	LB4	LB5	LB6	LB7	LB8	LB9	LB10
power [W] at 40°C and 100% ED			220	345	445	555	665	785	895	1000	1110
dimension A [mm]			140	200	260	320	380	440	500	560	620
dimension B [mm]			155	215	275	335	395	455	515	575	635
alloy	Type of resistor wire		resistance values in Ω								
	Ø [mm]	pitch of ridged ceramic insulators [mm]									
CrAl 25 5	0,8	3	21	32	44	56	68	80	92	103	115
CrAl 25 5	0,9	3	16	26	35	44	53	63	72	81	91
CrAl 25 5	1,0	3	13	21	28	36	43	51	59	66	74
NiCr 30 20	0,9	3	12	18	25	32	39	45	52	59	66
NiCr 30 20	1,0	3	9,5	15	20	26	31	37	42	47	53
NiCr 30 20	1,1	3	7,8	13	17	21	26	30	35	39	44
NiCr 30 20	1,2	3	6,6	11	14	18	22	25	29	33	37
CuNi 44	0,9	3	5,5	8,7	11	15	18	21	24	28	31
CuNi 44	1,0	3	4,4	7,0	9,5	12	14	17	20	22	25
CuNi 44	1,1	3	3,7	5,8	7,9	10	12	14	16	18	21
CuNi 44	1,2	3	3,1	4,9	6,7	8,4	10	12	13	15	17
CuNi 44	1,3	3	2,7	4,2	5,8	7,3	8,9	10	12	13	15
CuNi 44	1,4	3	2,3	3,6	4,9	6,2	7,5	8,8	10	11	12
CuNi 44	1,3	4	2,1	3,2	4,4	5,6	6,7	7,9	9,0	10	11
CuNi 44	1,4	4	1,8	2,7	3,7	4,7	5,7	6,6	7,6	8,6	9,6
CuNi 44	1,5	4	1,5	2,4	3,2	4,1	4,9	5,8	6,6	7,5	8,3
CuNi 44	1,6	4	1,3	2,1	2,9	3,6	4,4	5,1	5,9	6,6	7,4
CuNi 44	1,7	4	1,2	1,9	2,6	3,3	3,9	4,6	5,3	6,0	6,6
CuNi 44	1,6	5	1,0	1,7	2,3	2,9	3,4	4,0	4,6	5,8	5,8
CuNi 44	1,7	5	0,95	1,5	2,0	2,6	3,1	3,7	4,2	4,7	5,3
CuNi 44	1,8	5	0,83	1,3	1,8	2,3	2,7	3,2	3,7	4,2	4,6
CuNi 44	1,9	5	0,76	1,1	1,6	2,1	2,5	2,9	3,4	3,8	4,2
CuNi 44	2,0	5	0,67	1,0	1,4	1,8	2,2	2,6	3,0	3,4	3,7



Example of dimensioning and selection of a special unit:

lamina type fixed resistor 1000 W ,resistance value 15 Ω, with connection at 2 hard soldered joint wires of following lengths: wire D1 = 800 mm and wire D2 = 1000 mm, version with silicone insulated wire, cross section 1,5 mm² selected: LB 9 D – 15, wire D1: 800; wire D2: 1000

