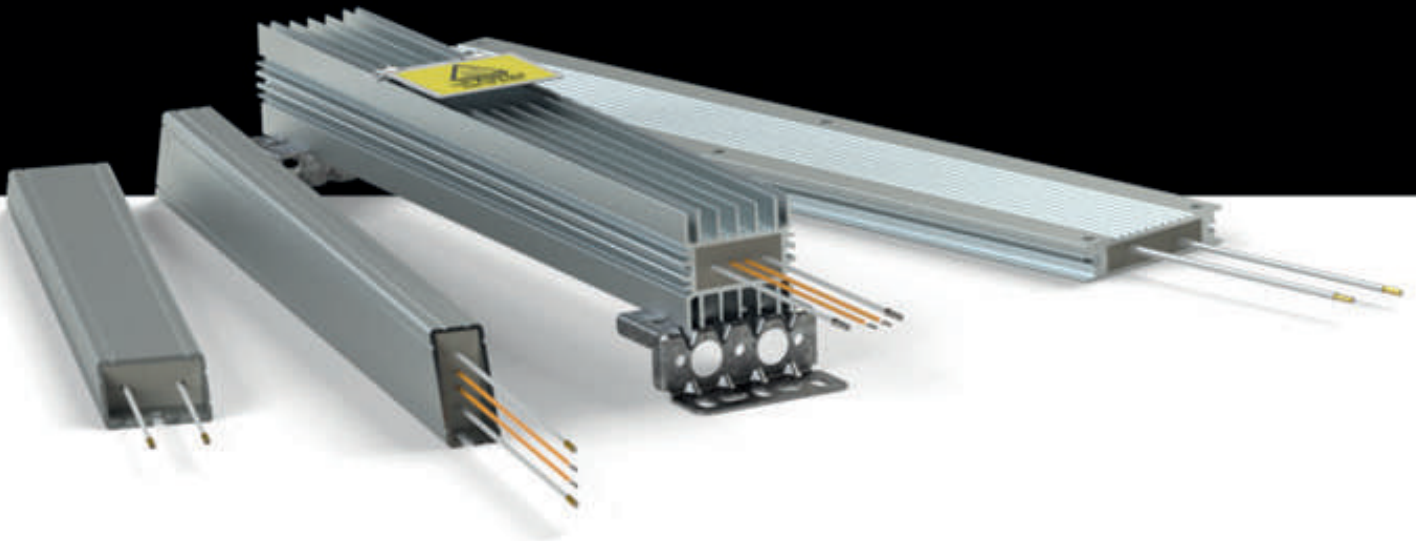




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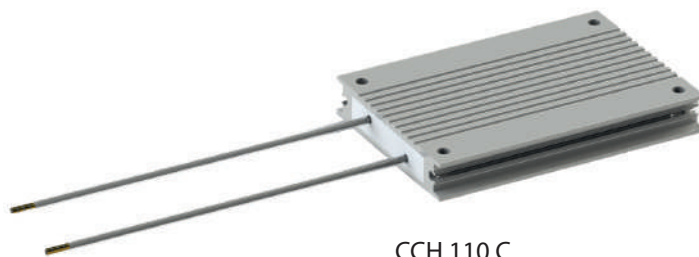
CCH / CAH / CAV / CAR / CCR

CCH without thermal switch

Type		Pn W @ 40°C	Temp max °C	R [Ω] min-max	Pulse load W, Temp. amb 40°C, cycle 120s				
					duty 1 second	duty 5 seconds	duty 10 seconds	duty 20 seconds	duty 40 seconds
CCH 110		100	260	2 - 1000	2500	1150	800	540	295
CCH 166		160	265	4 - 1200	5700	2380	1600	930	470
CCH 216		200	275	6 - 1500	10500	3760	2350	1180	590
CCH 270		260	280	9 - 1700	14200	5050	3080	1540	770
CCH 320		300	285	10 - 2000	18600	6320	3550	1780	890
CCH 420		390	295	13 - 2000	24700	8390	4590	2290	1160
CCH 520		480	305	16 - 2000	30300	9710	5760	2880	1440
CCH 620		570	315	20 - 2000	38100	11900	6890	3440	1720
CCH with internal thermal switch									
CCH 145 CT		80	210	2 - 1000	2540	1210	850	580	345
CCH 201 CT		120	215	4 - 1200	5780	2480	1690	920	460
CCH 251 CT		160	220	6 - 1500	10600	3940	2280	1140	570
CCH 305 CT		200	225	9 - 1700	14500	5220	2820	1410	700
CCH 355 CT		230	230	10 - 2000	19100	6550	3280	1640	820
CCH 455 CT		300	235	13 - 2000	25300	8310	4150	2080	1040
CCH 555 CT		370	245	16 - 2000	30900	10000	5170	2590	1290
CCH 655 CT		440	250	20 - 2000	38800	11800	5900	2950	1500


Construction and salient properties

- UL approved
- Compact dimensions
- Nominal power range from 60W—1045W
- Energy levels from 2kJ-60J (5s duty, 120s cycle), depending on ohmic value
- Aluminium case housing for high IP rating
- IP50-IP65
- Nickel-Chrome 8020 alloy for low thermal drift
- Mica insulated for high dielectric strength
- MgO or SiO₂ filled for high thermal capacity/high power overload capability
- Low surface temperature
- Low noise level
- High vibration withstand capability
- Thermal relief expansion mounting feet (CAR type)
- Optional thermal switch for thermal protection
- Cable 300mm (AWG 18—AWG10) with sleeves or box connection up to 10mm²
- Customized to your needs and application (OEM versions available)




CCH 110 C

CAH/CAV/CAR cable connection


Type 	Pn W @ 40°C	Temp max °C	R [Ω] min-max	Pulse load W, Temp. amb 40°C, cycle 120s				
				duty 1 second	duty 5 seconds	duty 10 seconds	duty 20 seconds	duty 40 seconds
CAH / CAV 120 C	55	260	0.15 - 300	1070	410	320	240	170
CAH / CAV 150 C	65	260	0.3 - 600	2420	820	600	435	255
CAH / CAV 165 C	75	265	0.3 - 800	3630	1120	780	540	285
CAH / CAV 210 C	100	270	0.6 - 1200	7030	1800	1120	750	375
CAH / CAV 240 C	120	275	0.7 - 1500	9530	2350	1440	850	435
CAH / CAV 300 C	155	290	1 - 1200	12800	3150	1920	1100	550
CAH / CAV 360 C	190	305	1.2 - 2500	16700	4080	2460	1320	660
CAR 85 C	110	260	0.1 - 300	1090	420	330	250	180
CAR 115 C	155	265	0.25 - 600	2480	860	640	470	330
CAR 130 C	175	265	0.3 - 800	3750	1170	830	600	405
CAR 175 C	240	275	0.5 - 1200	7420	1910	1230	830	570
CAR 205 C	280	285	0.7 - 1400	10200	2540	1590	1050	700
CAR 265 C	367	300	1.0 - 2000	13800	3460	2140	1420	940
CAR 325 C	450	320	1.2 - 2500	18100	4460	2750	1810	1170

Cable and connection box with and without thermal switch


Type 	Pn W @ 40°C	Temp max °C	R [Ω] min-max	Pulse load W, Temp. amb 40°C, cycle 120s				
				duty 1 second	duty 5 seconds	duty 10 seconds	duty 20 seconds	duty 40 seconds
CAH / CAV 145 CT	42	230	0.15 - 300	1070	410	320	240	170
CAH / CAV 175 CT	50	230	0.3 - 600	2420	820	600	435	255
CAH / CAV 190 CT	57	230	0.3 - 800	3630	1120	780	540	285
CAH / CAV 235 CT	76	230	0.6 - 1200	7030	1800	1120	750	375
CAH / CAV 265 CT	92	240	0.7 - 1500	9530	2350	1440	850	435
CAH / CAV 325 CT	118	250	1 - 1200	12800	3150	1920	1100	550
CAH / CAV 385 CT	145	270	1.2 - 2500	16700	4080	2460	1320	660
CAR 110 CT/K/DT	100	260	0.1 - 300	1090	420	330	250	180
CAR 140 CT/K/DT	125	270	0.25 - 600	2480	860	640	470	330
CAR 155 CT/K/DT	130	272	0.3 - 800	3750	1170	830	600	405
CAR 200 CT/K/DT	165	265	0.5 - 1200	7420	1910	1230	830	570
CAR 230 CT/K/DT	190	265	0.7 - 1400	10200	2540	1590	1050	700
CAR 290 CT/K/DT	230	268	1.0 - 2000	13800	3460	2140	1420	940
CAR 350 CT/K/DT	275	270	1.2 - 2500	18100	4460	2750	1810	1170

Pulse ratings for short pulses depend on the ohm value. Resistors with lower resistance value have more wire than resistors with higher resistance values. The ratings in this table refer to resistors of about 40R.


CCR-V cable connection

Type 	Pn W @ 40°C	Temp max °C	R [Ω] min-max	Pulse load kW, Temp. amb 40°C, cycle 120s				
				duty 1 second	duty 5 seconds	duty 10 seconds	duty 20 seconds	duty 40 seconds
CCR-V 116 C	185	250	2 - 1000	2.2	1	0.7	0.5	0.4
CCR-V 172 C	260	250	4 - 1200	4.7	2.1	1.5	1	0.7
CCR-V 222 C	330	255	6 - 1500	7.1	3.1	2.2	1.5	1
CCR-V 276 C	400	260	9 - 1700	10.8	5.1	3.5	2.3	1.4
CCR-V 326 C	500	265	10 - 2000	18.1	7.4	4.9	3.1	1.7
CCR-V 426 C	635	275	13 - 2000	29.7	11.1	7	4.3	2.3
CCR-V 526 C	815	285	16 - 2000	30.6	12	7.7	4.8	2.9
CCR-V 626 C	1045	290	20 - 2000	46.3	16.3	10.2	6.2	3.7

Cable connection with thermal switch

Type 	Pn W @ 40°C	Temp max °C	R [Ω] min-max	Pulse load kW, Temp. amb 40°C, cycle 120s				
				duty 1 second	duty 5 seconds	duty 10 seconds	duty 20 seconds	duty 40 seconds
CCR-V 135 CT	140	230	2 - 1000	2.2	1	0.7	0.5	0.4
CCR-V 191 CT	190	250	4 - 1200	4.7	2.1	1.5	1	0.7
CCR-V 241 CT	250	255	6 - 1500	7.1	3.2	2.2	1.5	0.9
CCR-V 295 CT	300	260	9 - 1700	13.8	5.9	3.9	2.2	1.1
CCR-V 345 CT	380	265	10 - 2000	18.3	7.5	4.9	2.8	1.4
CCR-V 445 CT	480	275	13 - 2000	29.7	11.1	7	3.5	1.8
CCR-V 545 CT	620	285	16 - 2000	17.8	7.1	4.7	2.9	1.9
CCR-V 645 CT	790	290	20 - 2000	40.6	15.9	10.5	6.6	4.1

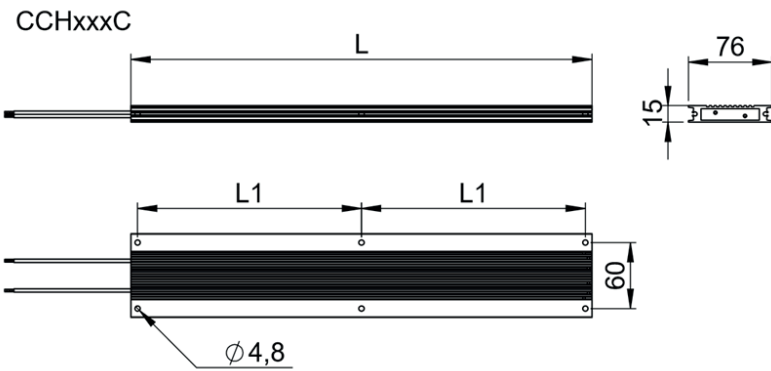
Box connection with thermal switch

Type 	Pn W @ 40°C	Temp max °C	R [Ω] min-max	Pulse load kW, Temp. amb 40°C, cycle 120s				
				duty 1 second	duty 5 seconds	duty 10 seconds	duty 20 seconds	duty 40 seconds
CCR-V 135 B/D T	140	230	2 - 1000	2.2	1	0.7	0.5	0.4
CCR-V 191 B/D T	190	250	4 - 1200	4.7	2.1	1.5	1	0.7
CCR-V 241 B/D T	250	255	6 - 1500	7.1	3.2	2.2	1.5	0.9
CCR-V 295 B/D T	300	260	9 - 1700	13.8	5.9	3.9	2.2	1.1
CCR-V 345 B/D T	380	265	10 - 2000	18.3	7.5	4.9	2.8	1.4
CCR-V 445 B/D T	480	275	13 - 2000	29.7	11.1	7	3.5	1.8
CCR-V 545 B/D T	620	285	16 - 2000	17.8	7.1	4.7	2.9	1.9
CCR-V 645 B/D T	790	290	20 - 2000	40.6	15.9	10.5	6.6	4.1

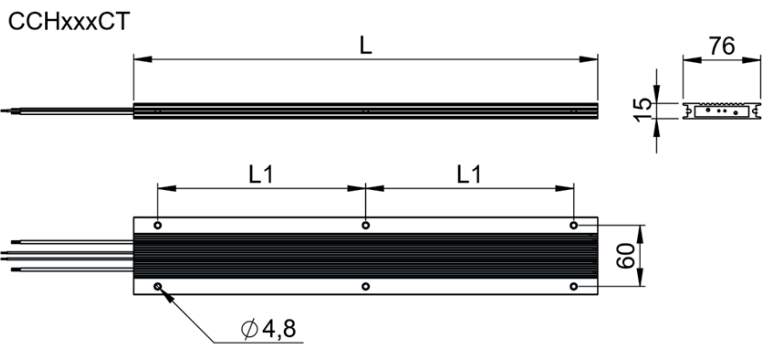
Temperature Coefficient:		100 ppm/K
Dielectric strength		3500 VAC @ 1 minute
Isolation Resistance:		> 20MΩ / case housing
Overload: @ 1 sec pulse / hour		10 - 100 x (depending on resistor)
Overload: @ 5 sec pulse / hour		4 - 25 x (depending on resistor)
Environmental:		- 40 °C / +70 °C
De-rating cable version		Linear: 40°C = Pn to 70°C = 0.85 * Pn
De-rating TW 200°C version		Linear: 40°C = Pn to 70°C = 0.65 * Pn
De-rating vertical mounting		no de-rating
De-rating horizontal mounting		0.8 * Pn
De-rating at high altitudes	1000 m	no de-rating
	1500 m	0.94 * Pn
	3000 m	0.82 * Pn
Mounting instructions		It is recommended to keep a distance of 200mm to the nearest object to prevent heating of a neighboring component.
		If two or more brake resistors are mounted next to each other the distance between these should be 400mm. If this is less then the nominal power needs to be de-rated.
Cooling		The nominal power of the resistors refers to cooling conditions with Free Natural Air Cooling.
Vibration		Acc. To EN 60068-2-6 frequency range 1 - 100Hz Acceleration / Amplitude
	1 - 13 Hz	± 1mm
	13 - 100 Hz	@ ± 0.7G
Corrosive resistance		Acc. IEC 60721-3-3/3K3 (C2 medium) 200 hours cyclic salt mist IEC 60068-2-52
Connection recommendations		To minimize EMC interference screened cables are recommended. in particular with any PWM brake pattern.
Resistance tolerance		± 10% (optional 5%)
Working voltage	Standard	UL: 600VAC / 850VDC ; IEC: 690VAC / 975VDC
Time constant for heating up resistor		1000s
Thermal switch (optional)	Thermal switch	130 / 160 / 180 / 200 °C. 2A. 250 VAC NC
Minimum voltage		2V
Minimum current		10mA
Rated current / voltage		2.5A @ 250VAC cos φ=1
Dielectric voltage		2000VAC (3500VAC between TS and R)
Temperature requirements on cables	IP 21	80°C
	IP 65	90°C

Mechanical drawings

CCH cable connection IP54

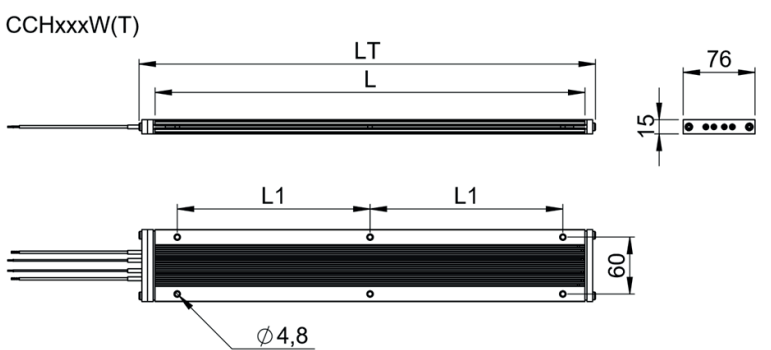


Type	L ± 2 mm	L1 ± 2 mm	Weight g
CCH 110	110	98	220
CCH 166	166	154	350
CCH 216	216	204	480
CCH 270	270	258	620
CCH 320	320	2x154	790
CCH 420	420	2x204	1050
CCH 520	520	2x241.5	1300
CCH 620	620	2x291.5	1550



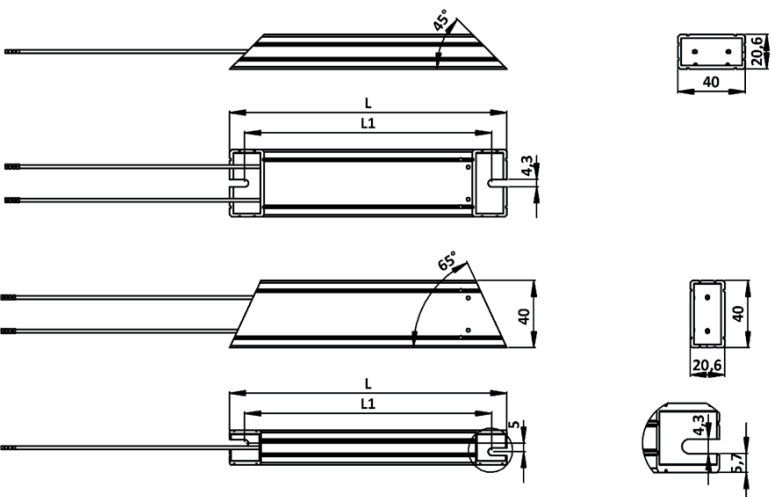
CCH with thermal switch, cable connection IP54

Type	L ± 2 mm	L1 ± 2 mm	Weight g
CCH 145 CT	145	98	270
CCH 201 CT	201	154	410
CCH 251 CT	251	204	540
CCH 305 CT	305	258	620
CCH 355 CT	355	2x154	850
CCH 455 CT	455	2x204	1110
CCH 555 CT	555	2x241.5	1360
CCH 655 CT	655	2x291.5	1610



CCH with thermal switch, cable connection IP65

Type	L ± 2 mm	L1 ± 2 mm	Weight g
CCH 145 W(T)	145	98	270
CCH 201 W(T)	201	154	410
CCH 251 W(T)	251	204	540
CCH 305 W(T)	305	258	620
CCH 355 W(T)	355	2x154	850
CCH 455 W(T)	455	2x204	1110
CCH 555 W(T)	555	2x241.5	1360
CCH 655 W(T)	655	2x291.5	1610



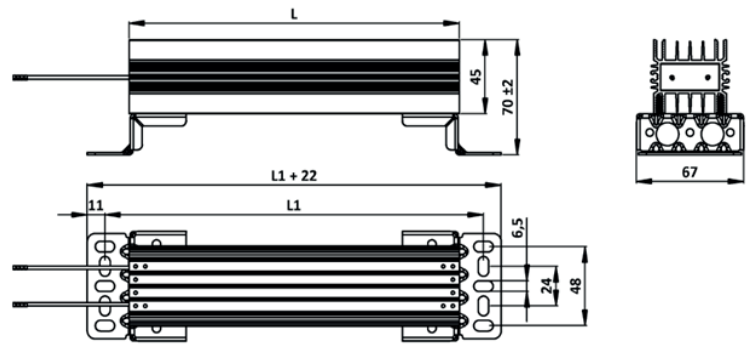
CCH cable connection IP54

Type	L ± 2 mm	L1 ± 2 mm	Weight g
CAH / CAV 120 C	120	102	160
CAH / CAV 150 C	150	132	185
CAH / CAV 165 C	165	147	220
CAH / CAV 210 C	210	192	315
CAH / CAV 240 C	240	222	370
CAH / CAV 300 C	300	282	460
CAH / CAV 360 C	360	342	550
with thermal switch (T)			
CAH / CAV 145 CT	145	127	130
CAH / CAV 175 CT	175	157	160
CAH / CAV 190 CT	190	172	190
CAH / CAV 235 CT	235	217	280
CAH / CAV 265 CT	265	247	335
CAH / CAV 325 CT	325	307	425
CAH / CAV 385 CT	385	367	515

CAR cable connection IP54

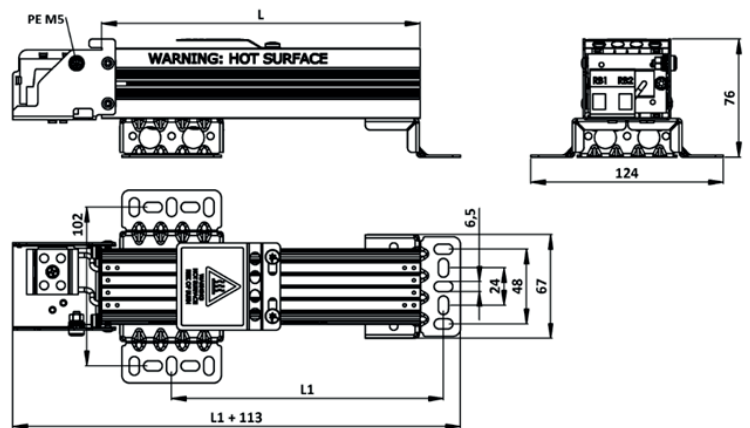
Mechanical drawings

Type	L ± 2 mm	L1 ± 2 mm	Weight g
CAR 85 C	85	115	200
CAR 115 C	115	145	280
CAR 130 C	130	160	300
CAR 175 C	175	205	380
CAR 205 C	205	235	530
CAR 265 C	265	295	600
CAR 325 C	325	355	740
with thermal switch (T)			
CAR 110 CT	110	140	155
CAR 140 CT	140	170	230
CAR 155 CT	155	185	250
CAR 200 CT	200	230	335
CAR 230 CT	230	260	470
CAR 290 CT	290	320	550
CAR 350 CT	350	380	685



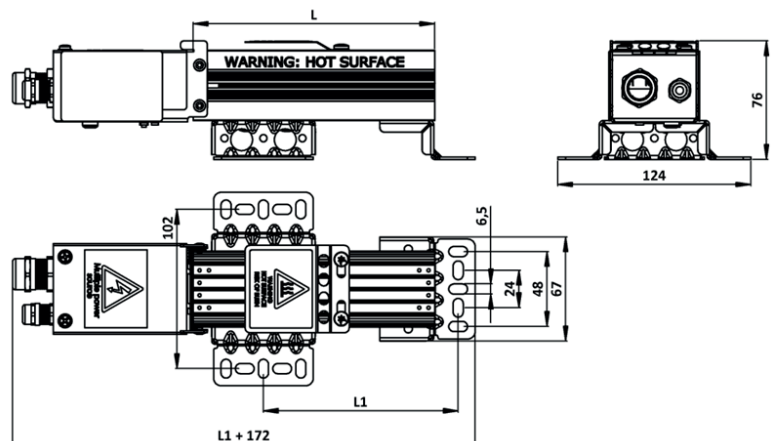
CAR box connection IP00/IP20/IP21

Type	L ± 2 mm	L1 ± 2 mm	Weight g
CAR 115 K/-D	115	85	450/650
CAR 130 K/-D	130	100	470/700
CAR 175 K/-D	175	145	550/750
CAR 205 K/-D	205	175	700/900
CAR 265 K/-D	265	235	800/950
CAR 325 K/-D	325	195	900/1100



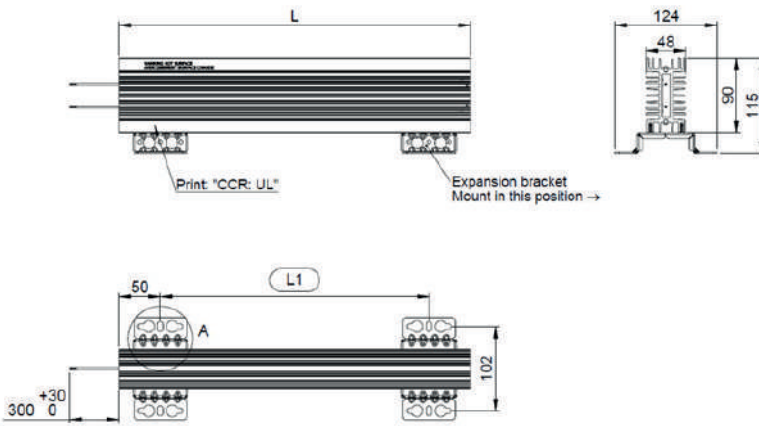
CAR with thermal switch, box connection IP00/IP20/IP21

Type	L ± 2 mm	L1 ± 2 mm	Weight g
CAR 140 KT/-DT	140	110	510/720
CAR 155 KT/-DT	155	125	540/760
CAR 200 KT/-DT	200	170	610/810
CAR 230 KT/-DT	230	200	760/960
CAR 290 KT/-DT	290	260	860/1010
CAR 350 KT/-DT	350	320	970/1160



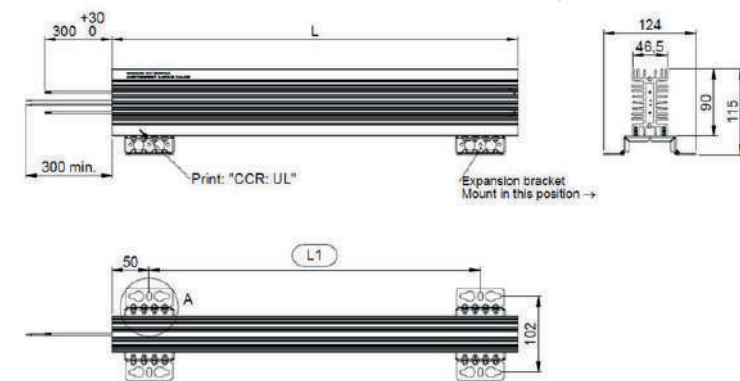
Mechanical drawings

CCR xxx C, cable connection IP54



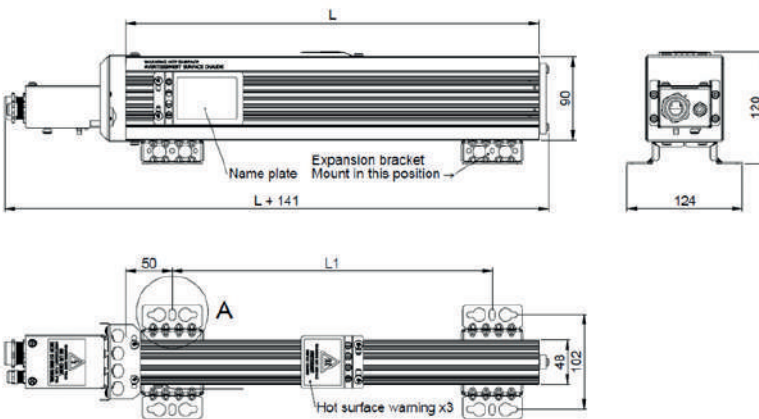
Type	L ± 2 mm	L1 ± 2 mm	Weight g
CCR-V 116 C	116	-	0.85
CCR-V 172 C	172	72	1.15
CCR-V 222 C	222	122	1.35
CCR-V 276 C	276	176	1.65
CCR-V 326 C	326	226	1.95
CCR-V 426 C	426	326	2.45
CCR-V 526 C	526	426	2.95
CCR-V 626 C	626	526	3.45

CCR xxx CT, cable connection IP54 with thermal switch



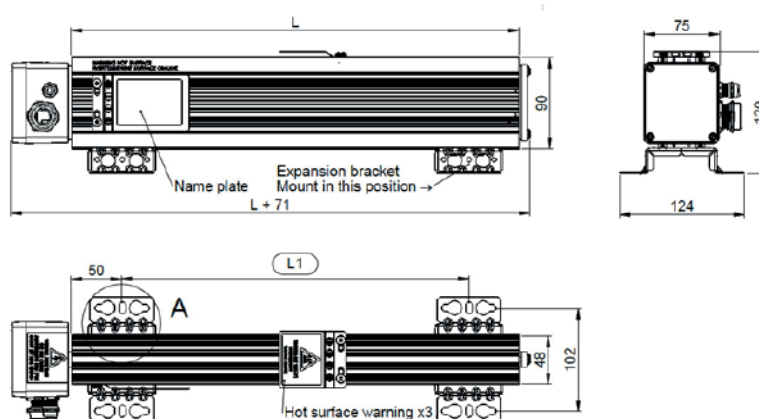
Type	L ± 2 mm	L1 ± 2 mm	Weight g
CCR-V 145 CT	145	-	0.95
CCR-V 201 CT	201	91	1.25
CCR-V 251 CT	251	141	1.45
CCR-V 305 CT	305	195	1.75
CCR-V 355 CT	355	245	2.05
CCR-V 455 CT	455	345	2.55
CCR-V 555 CT	555	445	3.05
CCR-V 655 CT	655	545	3.55

CCR-V xxx DT, box connection IP20/IP21 with thermal switch

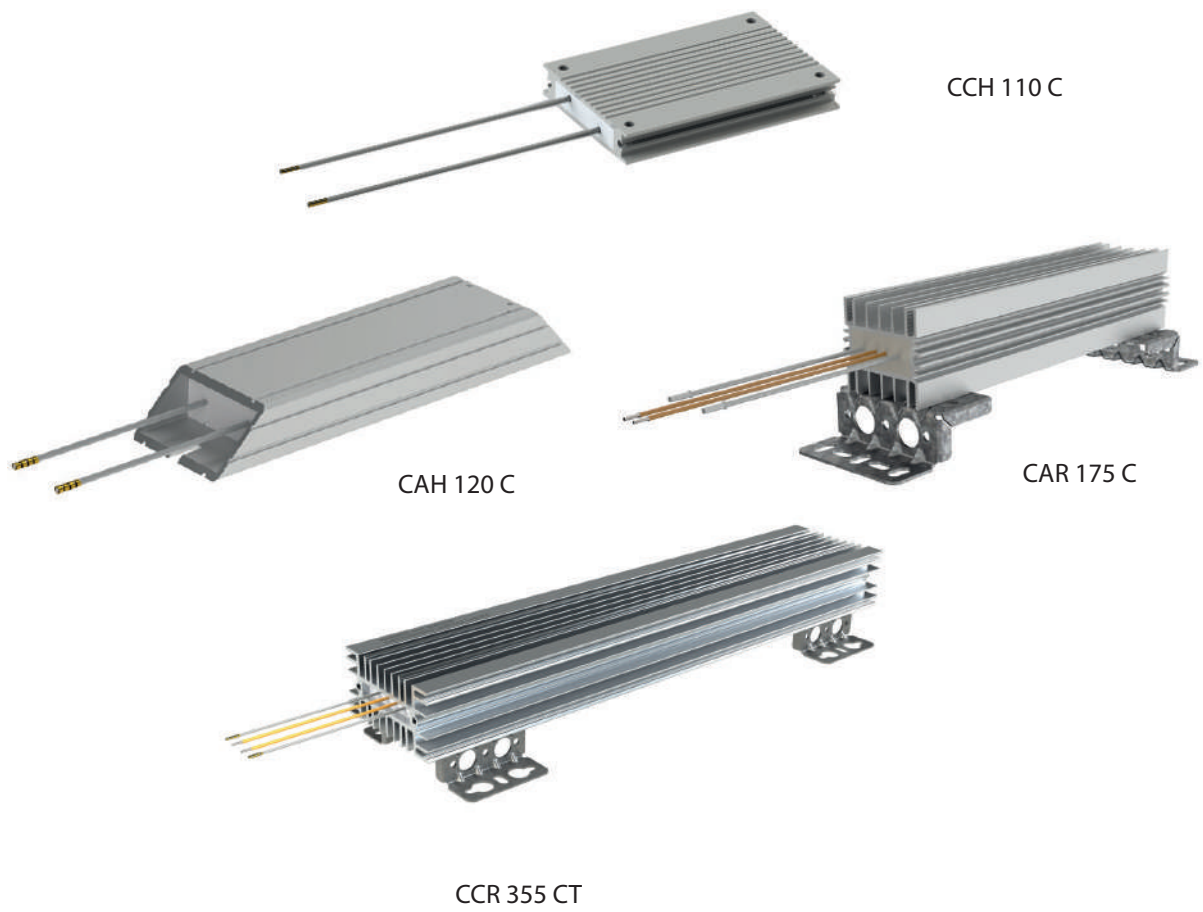


Type	L ± 2 mm	L1 ± 2 mm	Weight g
CCR-V 145 DT	145	-	1.45
CCR-V 201 DT	201	91	1.75
CCR-V 251 DT	251	141	1.95
CCR-V 305 DT	305	195	2.25
CCR-V 355 DT	355	245	2.55
CCR-V 445 DT	455	345	3.05
CCR-V 555 DT	555	445	3.55
CCR-V 665 DT	655	545	4.05

CCR-V xxx BT, box connection IP54 with thermal switch

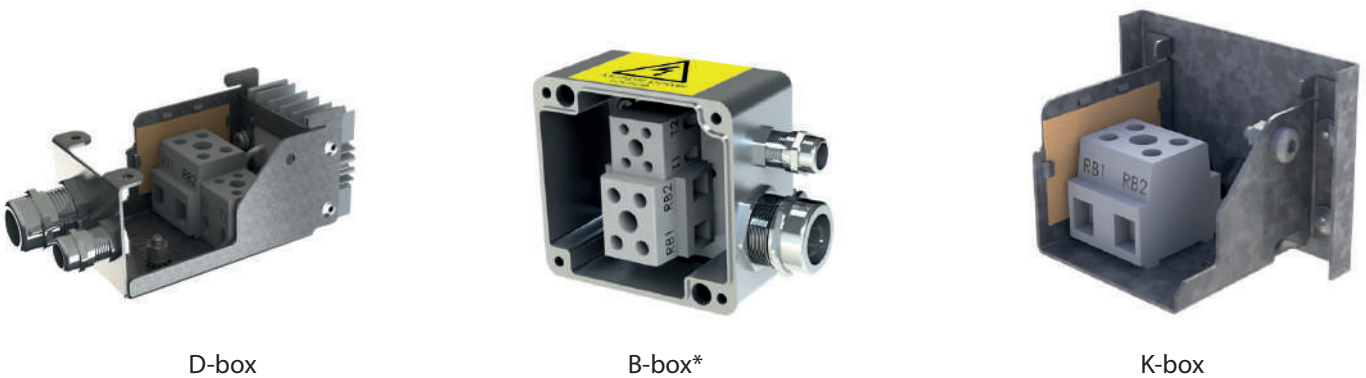


Type	L ± 2 mm	L1 ± 2 mm	Weight g
CCR-V 145 BT	145	-	1.46
CCR-V 201 BT	201	91	1.76
CCR-V 251 BT	251	141	1.96
CCR-V 305 BT	305	195	2.26
CCR-V 355 BT	355	245	2.56
CCR-V 455 BT	455	345	3.06
CCR-V 555 BT	555	445	3.56
CCR-V 655 BT	655	545	4.06



Connection box	IP rating	Cable gland	Clamping mm	Braid mm	Connection	TS gland	Clamping mm	Connection mm ²
D-box	IP21	M25	9-16.6	7.5	0.75-10	M12	3-7	0.5-4
K-box	IP00	-	-	-	0.75-10	-	-	0.5-4
B-box*	IP65	M25	9-16.6	7.5	0.75-10	M12	3-7	0.5-4

Connection boxes (optional)



* Only for CCR type available

Ingress Protection

The Ingress Protection rating (IP) value depends on the resistor and on the connection style. The basic IP rating for resistors is IP50 but by the addition of gaskets, they can be increased to IP54 or IP65 which is also possible for resistors with flying leads. For resistors with connection box type B, the maximal IP value is 65. Resistors with connection boxes D and G have an IP21 rating when mounted vertically and IP20 when mounted horizontally.

IP values and their type-tests are well defined; for instance "IP65" means dust cannot penetrate the box or if dust occurs internally, it will not influence the electrical properties. It should be able to withstand water jets from any direction with a certain pressure during 3 minutes; however, it does not mean that it can withstand continuous rain. If the resistor is used outdoors, then it should be protected against direct rain.

IP65 rated resistors can be cleaned with a high pressure hose, but this can only be done when the resistor has cooled down to the ambient temperature, otherwise the water will cool the housing causing a partial vacuum inside, drawing in water.

Danotherm offers standard solutions for one to four cases combined into one compact configuration with pulse-withstand capability of 1MW (5MJ) and also OEM versions with a maximum of 20 resistors. Depending on the electrical connection, the IP-class ranges from IP00 to IP65. Connections can be via a terminal box, DIN-rail terminals or cable lugs. These resistor types are also offered in high voltage versions and with higher ohmic values.

The salient features of Alpha resistors are that they have:

- Small dimensions
- Cool surfaces in operation
- High pulse load capabilities
- High vibration capabilities
- No external electrically-live parts
- High IP classes
- Intrinsically safe capabilities (on request)
- Low noise levels

Ω NIBE

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