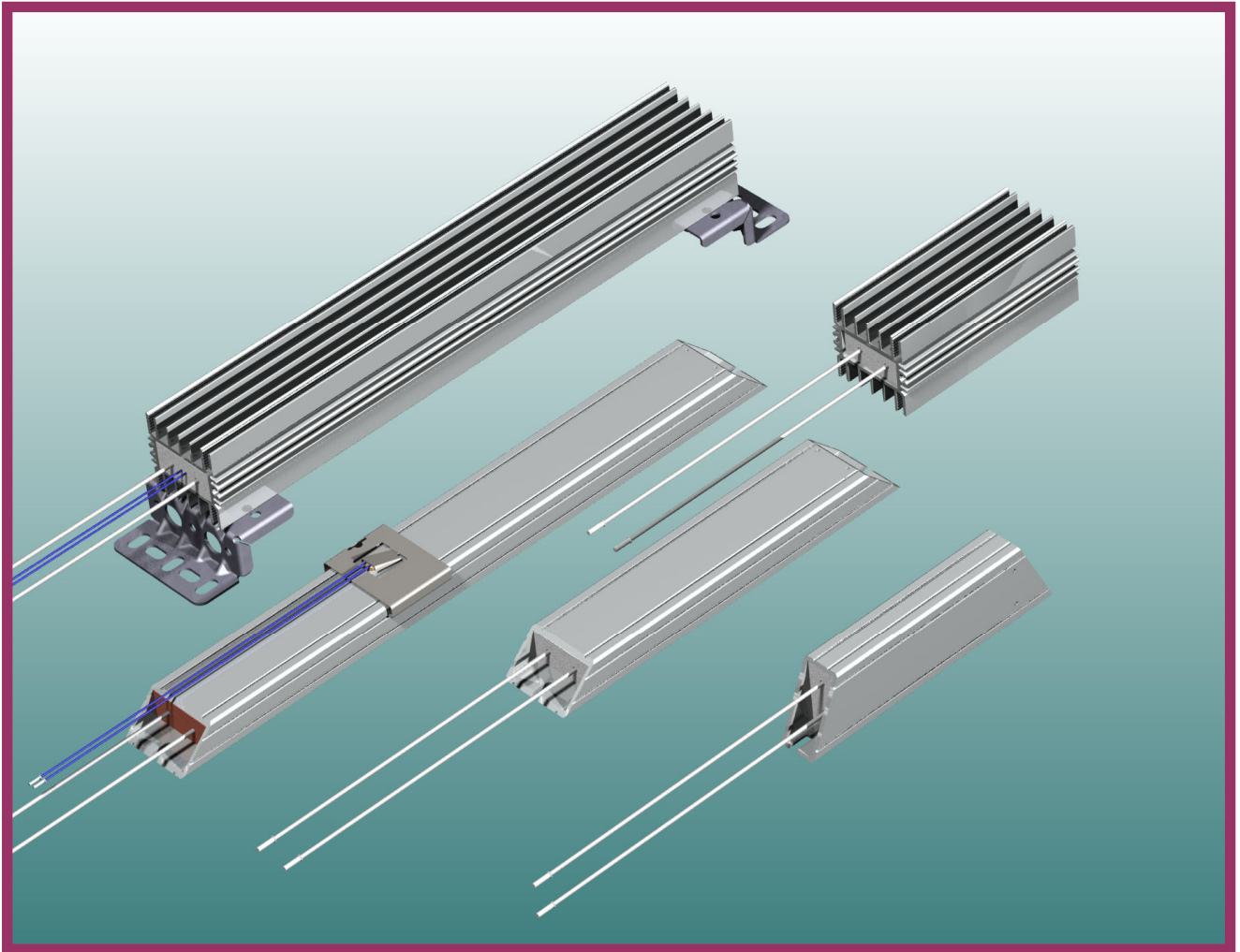


α ALPHA

CAH / CAV / CAR

ALUMINIUM HOUSED
COMPACT BRAKE RESISTORS



CAH, CAV and CAR belonging to our smallest range of **ALPHA ALUMINIUM HOUSED BRAKE RESISTORS** are insulated, compact resistors that are easily integrated in compact constructions. They are specially constructed for high pulse loads compared to the average load.

The resistors comply with IP50 giving electrical and thermal protection. The resistors are silicone free.

The power range is from 55W to 330W steady state load and pulse loads of 75 times compared to the nominal load in one second each 120s.

Danotherm has developed **thermal models** for all resistor types and resistor values. By using these models we are able to calculate the temperature rises in the resistor wire and on the surface for all possible load applications. We offer our assistance to our customers to find the optimum solution for any situation. All types can be offered with thermo watch. This range is generally approved to UL 508 (E 208678), please consult Danotherm.



Construction

The Alpha resistors are constructed as follows:

The resistor elements are wire wound elements wound on mica support sheets. For lower ohmic resistors the elements are helix wound supported in ceramic tubes.

The housing is an aluminium profile isolated with micanite sheets on all inner surfaces. The resistor elements are fixed symmetrical in the profiles by the mica construction. This ensures a symmetric expansion of the resistors and a maximum stability to high load impulses.

The resistor with the fixed resistor element is filled with quartz sand. This construction ensures a minimum change of temperature on the resistor surface even if the resistor element reaches its maximum temperature during a pulse load.

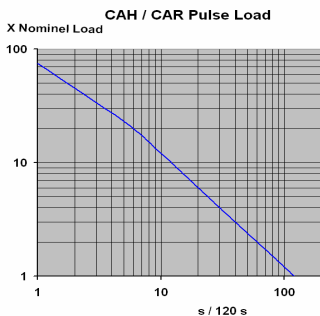
The resistors are approved to UL 508 for USA and Canada. All thermal data in this data sheet comply with UL 508 (no further reduction is required)

The standard cables are 300 mm AWG 16/14 Style 1659 PTFE for 600V types and Style 10724 for 1000V types, nature colour. We can supply cables in specified lengths, colours and mounted with cable shoes or connectors. If screw terminals are required please see special data sheet. (CAR-DT/CAR-KT)

If higher protection classes are required please use our CCR, CBR or CBT resistors. The highest protection class is IP65 / Type 4X, and the power range is up to 6 kW.

PULSE LOAD

The curves show the pulse load ability compared to the nominal load for the resistors under the following conditions: The load is a periodic pulse load with a constant period time of 120 sec and a pulse width from one second to 100 sec.



For further optimization DANOTHERM offers individual thermal electric circuit models for all types and ohm values. With these models the temperature of the resistor wire and resistor surface during any pulse load conditions can be simulated with a standard software like P-Spice. Alternatively Danotherm offers to make thermal simulation for our customers

Ratings:

Type CAH(K) / CAV(K)	PN W @40°C Approved UL508 *	Max Surface temp. °C @40°C	Pulse Load in 1 s each 120s. P1/120 W @40°C	Pulse Load in 5 s each 120 s. P5/120 W @40°C	Pulse Load in 10s each 120 s. P10/120 kW @40°C	Pulse Load in 40 s each 120 s P40/120 kW @40°C	Time Const. sec. (Steady state)	R Ω ±5%, ±10%
CAH / CAV 120 H C	55	230	2500	890	500	170	1000	0.2 – 20
CAH / CAV 150 C	65	230	3000	1050	600	200	1000	0.5 – 900
CAH / CAV 165 C	75	230	3500	1250	750	250	1000	1.0 – 1000
CAH / CAV 210 C	100	230	5500	1900	1100	310	1000	6.0 – 1000
CAH / CAV 240 C	120	240	6600	2300	1350	350	1000	9.0 – 1000
CAH / CAV 300 C	155	250	12000	3350	1850	410	1000	12 – 1000
CAH / CAV 360 C	190	270	14000	4350	2350	550	1000	15 – 1000
CAR 85 H C	100	260	6000	1700	950	260	1000	0.2 – 20
CAR 115 C	135	270	8100	2290	1280	350	1000	0.5 – 900
CAR 130 C	155	272	9300	2630	1470	400	1000	1.0 – 1000
CAR 175 C	195	265	11700	3310	1850	500	1000	6.0 – 1000
CAR 205 C	225	265	13500	3830	2140	580	1000	9.0 – 1000
CAR 265 C	285	268	17100	4840	2700	740	1000	12 – 1000
CAR 325 C	350	270	21000	5950	3320	910	1000	15 – 1000

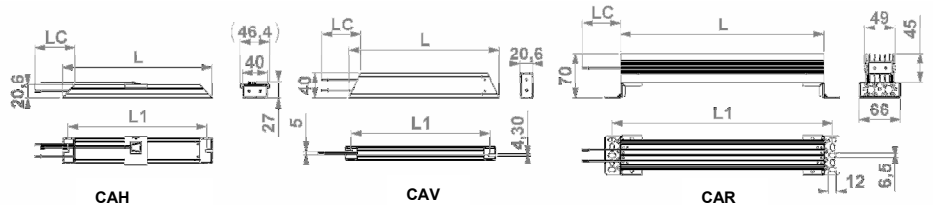
Pulse Ratings for short pulses depend on the ohmic value. (Resistors with lower resistance have more resistor wire than resistors with higher resistance). The ratings in this table refer to resistors of about 40 OHMS.

General Specifications	
Temperature Coefficient:	<±100ppm
Dielectric strength:	3500VAC 1 minute
Working Voltage:	UL: 600VAC; (K)1000V / CE: 690VAC; 1100VDC
Isolation Resistance:	> 20 MΩ
Overload:	10-12 x in10 sec; 50 - 75 x in 1 s
Environmental:	-40 °C – 90 °C
De-rating :	Linear: 40°C = P _N to 90°C = 0.75*P _N
Thermo watch, CAH and CAV:	External, mounted with bracket or internal in +25mm long housings: 200°C (Optional: 130°C/160°C/180°C), 2A, 250VAC
Thermo watch CAR	Internal in +25mm long housings: 200°C (Optional 130°C/160°C/180°C), 2A, 250VAC
Approvals	UL 508

PN: NOMINAL POWER WITH NATURAL COOLING and For CAV and CAH mounted in a horizontal position For CAR mounted in a vertical position

Colour code for thermo watch cables: 130°C: brown/ 160°C: blue/ 180°C: orange/ 200°C: white

Mechanical Data



CAH shown with CLIP-ON external thermo watch TW

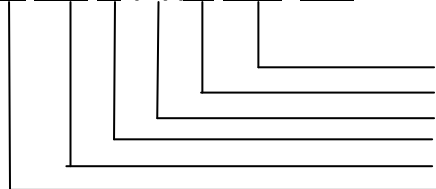
External thermo watch is possible for CAH and CAV.

Internal thermo watch (TW) for all types require 25 mm extra length of the housing.

Type	L ± 2	L1 ± 2	Weight g	Type	L ± 2	L1 ± 2	Weight g
CAH / CAV 120 C	120	102	160	CAR 85 C	85	115	200
CAH / CAV 150 C	150	132	185	CAR 115 C	115	145	280
CAH / CAV 165 C	165	147	220	CAR 130 C	130	160	300
CAH / CAV 210 C	210	192	315	CAR 175 C	175	205	380
CAH / CAV 240 C	240	222	370	CAR 205 C	205	235	530
CAH / CAV 300 C	300	282	460	CAR 265 C	265	295	600
CAH / CAV 360 C	360	342	550	CAR 325 C	325	355	740

Type identification:

CAR (K) 175 C (H)(T) 22R 081



(X): Only part of ID number if option is chosen

800: CAH and CAV: Standard / CAR: 001 = No TW / 081 = 200 °C TW / 071 = 180 °C TW / 061 = 160°C TW / 051 = 130°C TW / XXX > 400 for customer specified versions

Ohm Value (Examples: 2R2=2.2Ω; 22R=22 Ω; 220R=220Ω; 2K2 = 2.2 kΩ)

T = Internal Thermo Watch, 130, 160, 180 or 200°C

H: helix shape winding (only specified by Danotherm).

C: Cable connections

Length of resistor profile in mm.

K: 1000V; () 600V

Type CAH, CAV or CAR

NON UL Versions CAH X 165 C 22R 800