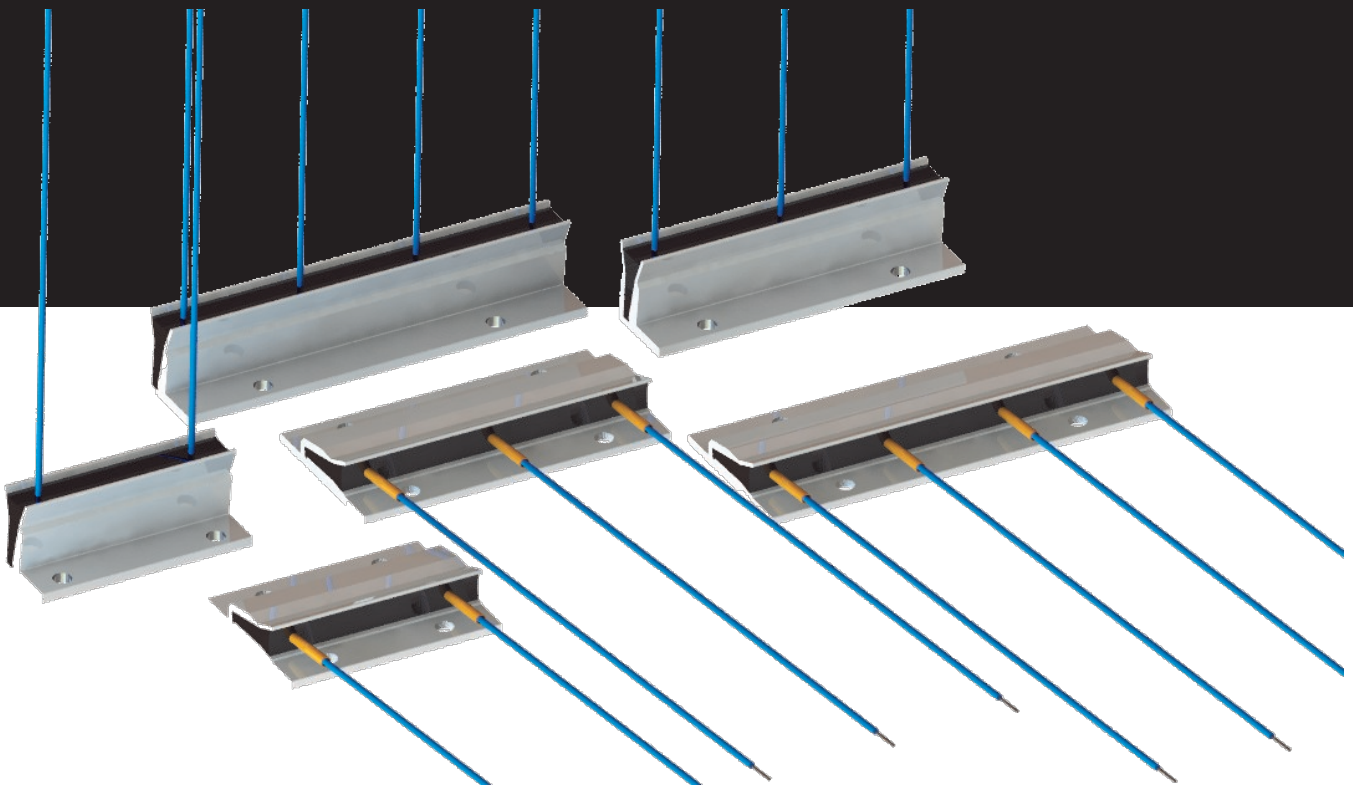




DANOTHERM™



Thick Film Heat Sink Cooled Resistors

- Balancing / Discharging / Single or multiple Resistors

- Mounted in Aluminum Profile
- Single or multi resistor types
- Fully insulated; no external live parts
- Non Critical mounting
- Cable terminals, standard or customer specified
- Trimmed or un-trimmed versions

The HSP and HSV resistor line combines the traditional wirewound heat sink resistors from the HSD line and the high reliable thick film technology.

The standard range focuses on discharging and voltage balancing resistors for large DC capacitor banks.

The standard types which are shown in the table on the next page can handle capacitor banks in one, two and three "layers"

The robust construction where the resistor element is molded in an aluminum profile allows an uncomplicated mounting on a heat sink with less demands to surface imperfections. The resistors having cable terminals are fully insulated and do not have any external live parts or creepage distances.

The HSP series (with the resistor element parallel to the heat sink) has a low element height of 11 mm which might be an advantage and a very large mounting surface.

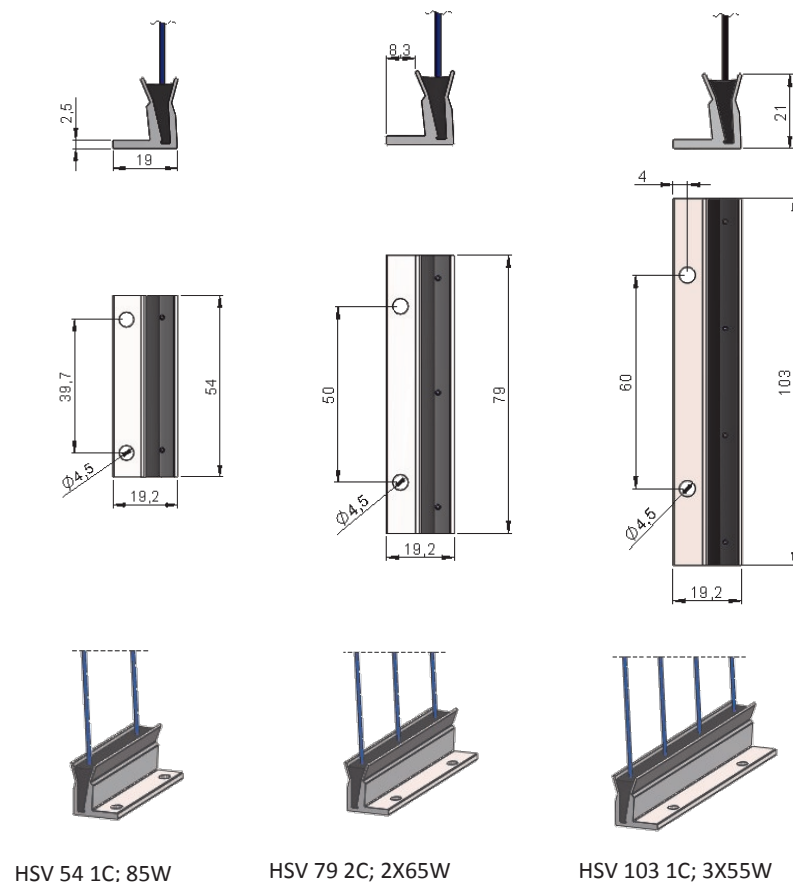
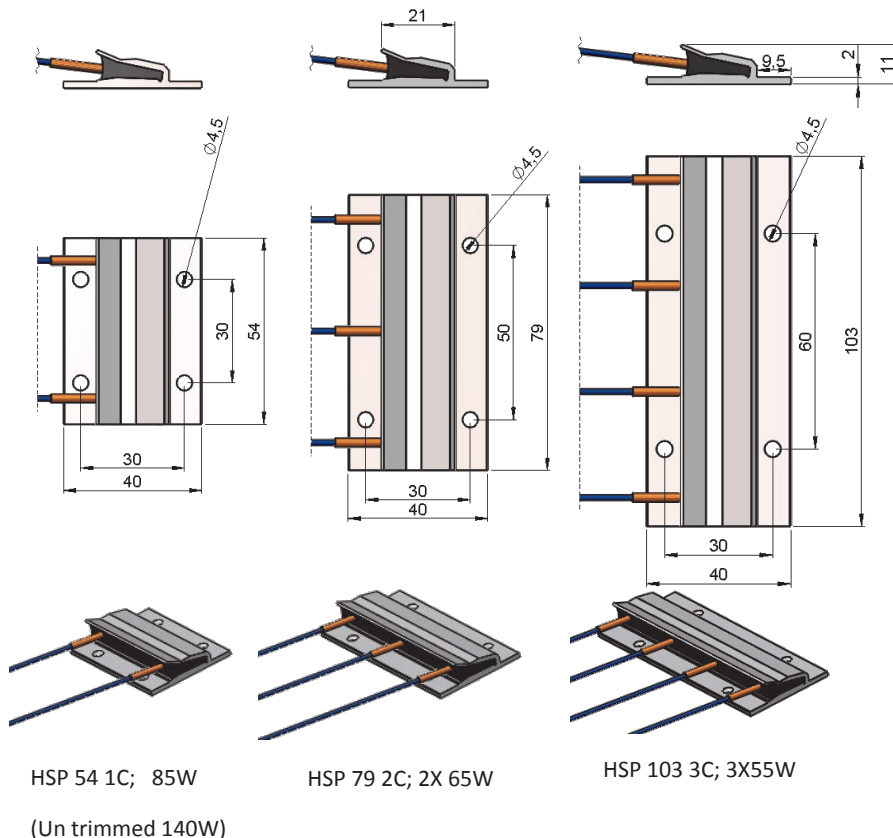
The HSV has the resistor element and cables in vertical position.

Other resistance values are possible, please consult Danotherm. More individual resistor elements mounted in one profile is possible as well.

Thick film resistors can be produced to $\pm 15\%$ tolerance without trimming and $\pm 3\%$ (relative for balancing resistors $\pm 1\%$) if the resistors are trimmed.

The nominal power is reduced if the resistor is trimmed with the square of the relative trimming depth (worst case)

The curves at the opposite page show the power/resistor ratings of the three standard sizes mounted with one, two and three resistors. The power ratings are valid for resistors mounted on heat sinks and show the dependencies to the heat sink temperature



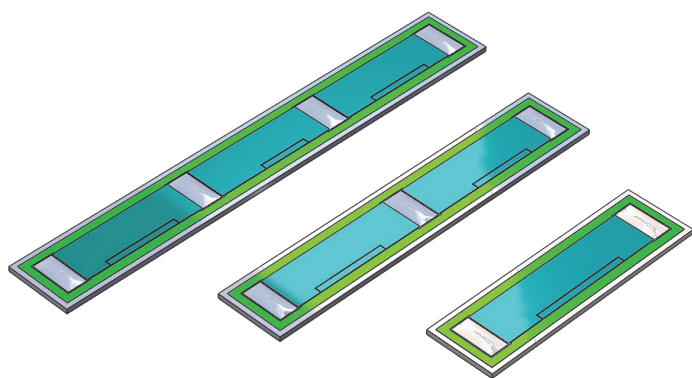
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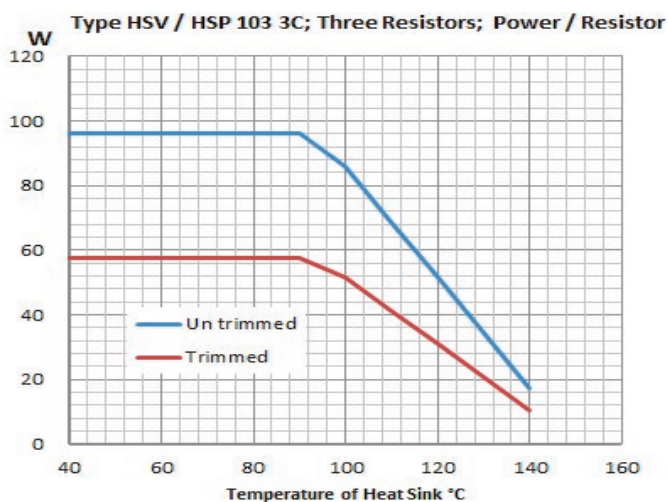
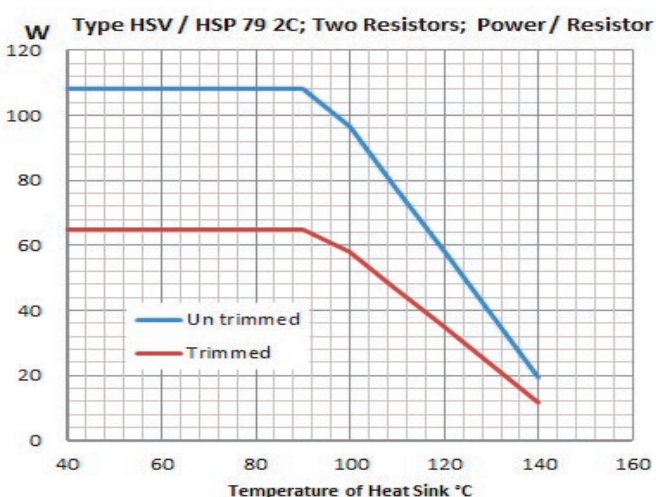
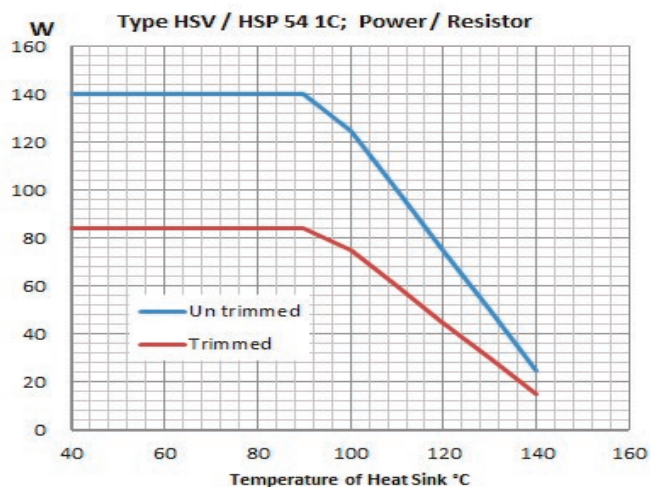
Type	Standard Resistance Values						
HSV / HSP 54 - 1C	3 k 3	3k9	4k7	5k6	6k8		
HSV / HSP 79- 2C		2 X 3k9	2 X 4k7	2 X 5k6	2 X 6k8	2 X 8k2	
HSV / HSP 103- 3C			3x 4k7	3X 5k6	3 X 6k8	3 X 8k2	3 X 10k

Power Rating	Un trimmed	Trimmed
HSP/HSV 54 1C	140W	85W
HSP/HSV 79 1C	249W	145W
HSP/HSV 79 2C / Resistor	108W	65W
HSP/HSV 103 1C	335W	200W
HSP/HSV 103 3C / Resistor	95W	56W


Vorking Voltage	600V / 1000 VAC
Dielectric strength	2500 VAC
Test Voltage for one minute	6000 VDC*
Temperature limits	-40°C—125 °C
Insulation	< 1000MΩ @500V DC
Over Load	2 X in 10s
Weight	
HSP 54	27g
HCV 54	25g
HSP 79	37g
HSV 79	40g
HSp103	48 g
HSV 103	52g



The resistor elements

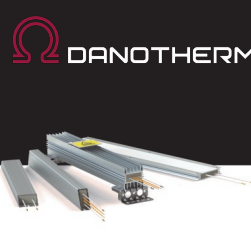


Overview of the ALPHA resistor family (IP00-IP65)




PR 100 & PR250

Standard Thick Film Resistors 100—600W




CCH / CAV / CAH / CAR

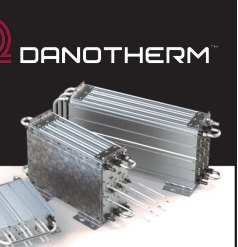


CBH / CBV / CBR

CBT-V / CBT-H



CBS / CMQ / CVS / HVBS

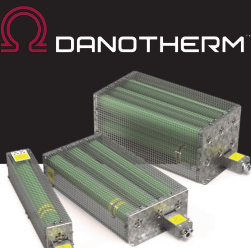


CBW-V / CBW-H


Water cooled

Power: 100-600W	Power: 85W-1.7kW	Power: 85W-12kW	Power: 445W-15kW	Power: 860W-25kW
	9-150kJ @5s	25-550kJ @5s	80kJ-2.5MJ @5s	6.4kJ-1.1MJ @5s
- Applications				
Charge / Discharge	High Pulse load	High Pulse load	High Pulse load	Short recovery time
Snubber resistors	Brake	Brake	Brake	Brake
Filter	Filter	Filter	Medium voltage	Filter
	Charge / Discharge	Charge / Discharge	Charge / Discharge	High Pulse load


Other resistor types from Danotherm (IP00-IP66)



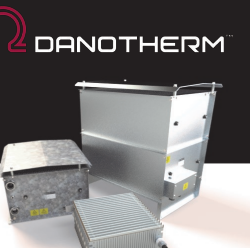
SIGMA




OHMEGA - Air



WHHB / WHBS / WHBSA



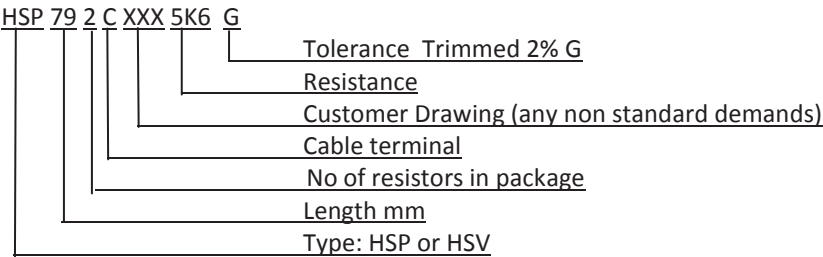
TERA



OHMEGA - Water

Multi purpuse	Outdoor & Marine	Filter	Medium & High voltage	Filter & load
Power: 100W-5kW	Power: 1-500kW	Power: 4-200kW	Power: 500W->	Power: 5kW-1MW
Ceramic wirewound	Steel tube	Wirewound	Steel grid	Steel tube

Nomenklature:



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