

# fischer elektronik

to cool to protect to connect



 made  
in  
Germany



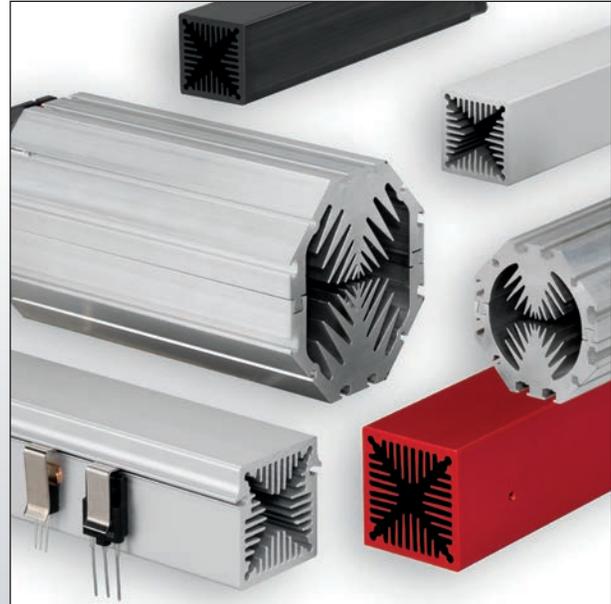
  
TUV ISO 9001  
ISO 14001  
ISO 27001

Segment-, miniature- and high capacity cooling aggregates



**Segment cooling aggregates**

- modular assembly consisting of different circle- and length segments
- electrical and thermal isolation of the single cooling segment sections
- standard drilling patterns TO 3 and pressfit
- segment profile also sold by the meter
- other fan types and fan voltages upon request



**Miniature cooling aggregates**

- compact construction for dissipating high power losses on smallest installation space
- heatsink geometries and fixed lengths optimal adjusted to the fan being used; - homogeneous heat dissipation
- mounting of the semi-conductor by means of sliding nut chanel or specific snap-to-retaining springs for transistors



**Heatsink cooling aggregates**

- effective heat dissipation of high capacity transistors
- very good thermal efficiency in connection with powerful axial fans
- fixing of the heatsink profiles and mounting of the fans by stable endplates
- cooling aggregates are also available without fan
- customer specific treatments according to drawing



**Hollow fin cooling aggregate**

- flow-optimized hollow fin geometry
- precise milled flat semi-conductor mounting surface, single- and double-sided
- laminar airflow and noise reduction by means of harmonized chamber systems
- additional treatments, modifications and designs according to customer specifications



**Lamella cooling aggregates**

- high power density by big heat exchanging surfaces, thick multi-wall sheets for best heat dissipation
- special formed lamella structures made of aluminium for maximum heat flow
- compact design, very low flow loss
- available with or without airflow chamber systems
- special solutions according to your demand



**High capacity cooling aggregates**

- very good thermal efficiency
- flow-optimized design with radial fans
- radial fans up to 1310 m<sup>3</sup>/h
- precise milled flat bottom area for component assembly
- optional motor capacitors
- cooling profile also available without fan
- cover plates for the fin side upon request



**High capacity cooling aggregates**

- exclusive for forced convection
- for radial- and tangential fans
- flow-optimized design, best heat dissipation by means of especially thick bottom plates
- precise milled flat semi-conductor mounting surfaces
- mechanical treatments, special designs and surface coating for your application



**Customer specific treatments**

- mechanical treatment possibilities such as cutting, milling, drilling, threading and deburring
- adhesive protection foils avoid scratching of the milled flat semiconductor mounting surfaces
- assembly and packaging of the cooling aggregates upon customer request
- surface treatments according to your demand

Please send us:



- Catalogue **f.cool**  
Extruded heatsinks  
LED-heatsinks  
Cooling aggregates  
Thermally conductive material



- Catalogue **f.case**  
Cases  
19" Technology  
Test equipment



- Catalogue **f.con**  
Sockets  
Connectors  
Brackets



- Slip case **f.collect**  
for collecting  
Fischer catalogues



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# Please return by fax!

## +49 23 51 4 57 54

Company: \_\_\_\_\_

Attn.: \_\_\_\_\_

Dept.: \_\_\_\_\_

Street: \_\_\_\_\_

Post code/city: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Please also send data to following place:

other company:

\_\_\_\_\_

same company to the attention of:

\_\_\_\_\_

No, thank you. We do not have any need for your data. Please remove us from your mailing list.

We thank you for helping us to avoid waste.

# fischer

## elektronik

**to cool to protect to connect**

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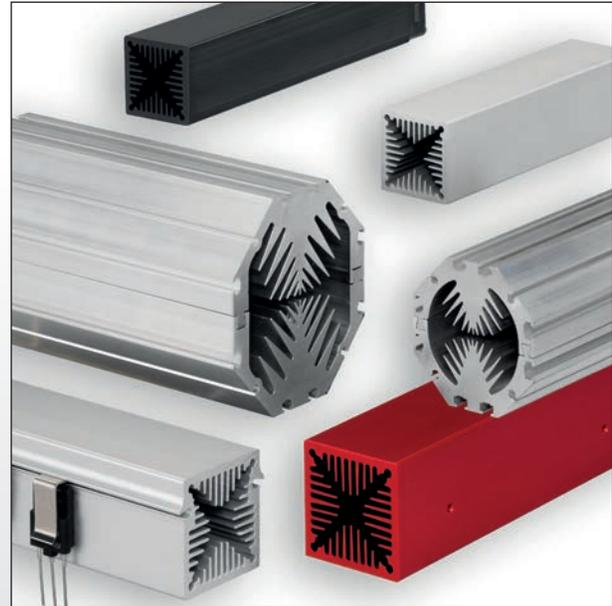
Internet [www.fischerelektronik.de](http://www.fischerelektronik.de)





### Segment cooling aggregates

- modular assembly consisting of different circle- and length segments
- electrical and thermal insulation of the single cooling segment sections
- standard drilling patterns TO 3 and pressfit
- segment profile also sold by the meter
- other fan types and fan voltages upon request



### Miniature cooling aggregates

- compact construction for dissipating high power losses on smallest installation space
- heatsink geometries and fixed length optimal adjusted to the fan being used
- homogeneous heat dissipation
- mounting of the semi-conductor by means of sliding nut channels or specific snap-to-retaining springs for transistors



### Hollow fin cooling aggregates

- flow-optimized hollow fin geometry
- precise milled flat semiconductor mounting surface, single- and double-sided
- laminar airflow and noise reduction by means of harmonized chamber systems
- additional treatments, modifications and designs according to customers specifications



### High performance heatsinks

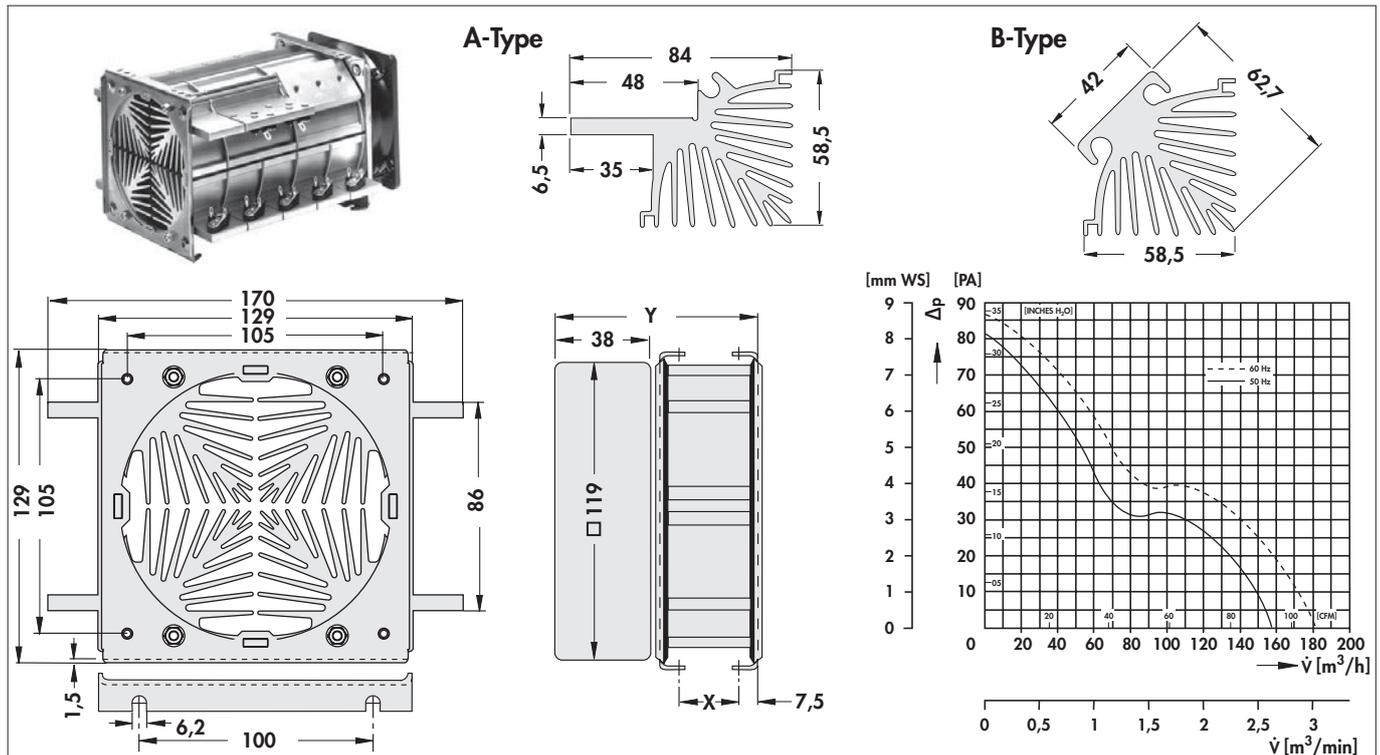
- exclusive for forced convection
- for radial- and tangential fans
- flow-optimized design, best heat dissipation by means of especially thick bottom plates
- precise milled flat semiconductor mounting surfaces
- mechanical treatments, special designs and surface coating for your application

## Alphanumerical product list

art. no.		page	art. no.	page
HPK 60	NEW	D 49	LA V 18	D 32
HPK 80	NEW	D 49	LA V 21	D 34
HPK 100	NEW	D 49	LA V 22	D 34
HPK 120	NEW	D 49	LA V 24	D 35
HPK 140	NEW	D 49	LA V 28	D 22
LA 1 01		D 5	LA V 29	D 22
LA 1 02		D 5	LA V 30	D 22
LA 1 03		D 5	LA V 31	D 26
LA 1 04		D 5	LA V 32	D 26
LA 1 05		D 5	LA V 33	D 26
LA 1 06		D 5	LA V 34	NEW D 28
LA 1 07		D 5	LA V 35	NEW D 28
LA 1 08		D 5	LA V HPK 1	NEW D 42
LA 1 09		D 5	LA V HPK 2	NEW D 44
LA 1 10		D 5	LA V HPK 3	NEW D 46
LA 2 01		D 7	LA V HPK 4	NEW D 48
LA 2 02		D 7	SK 440	NEW D 50
LA 2 03		D 7	SK 441	NEW D 50
LA 2 04		D 7	SK 458	NEW D 50
LA 2 05		D 7	SK 461	NEW D 50
LA 2 06		D 7	SK 497	D 50
LA 2 07		D 7	SK 498	D 50
LA 2 08		D 7	SK 603	D 51
LA 2 09		D 7	SK 604	D 51
LA 2 10		D 7	SK 605	D 51
LA 4		D 18	SK 606	D 51
LA 5		D 18	SK 607	D 51
LA 6		D 19	SK 608	D 51
LA 7		D 19	SK 661	NEW D 50
LA 8		D 19		
LA 9		D 23		
LA 10		D 23		
LA 11		D 23		
LA 14		D 29		
LA 15		D 29		
LA 17		D 31		
LA 18		D 31		
LA 20		D 54		
LA 21		D 33		
LA 22		D 33		
LA 25		D 53		
LA 26		D 53		
LA 27 K		D 17		
LA 28		D 21		
LA 29		D 21		
LA 30		D 21		
LA 31		D 25		
LA 32		D 25		
LA 33		D 25		
LA 34	NEW	D 27		
LA 35	NEW	D 27		
LAGI 40		D 55		
LAGI 60		D 55		
LAGI 80		D 55		
LAGI 92		D 55		
LAGI 119		D 55		
LA HL 1		D 37		
LA HL 2		D 37		
LA HL 3		D 37		
LAHL D 1		D 39		
LA HLV 1		D 38		
LA HLV 2		D 38		
LA HLV 3		D 38		
LA HPK 1	NEW	D 41		
LA HPK 2	NEW	D 43		
LA HPK 3	NEW	D 45		
LA HPK 4	NEW	D 47		
LAM 1		D 9		
LAM 2		D 9		
LAM 2 S		D 9		
LAM 3		D 10		
LAM 3 D		D 10		
LAM 3 D K	NEW	D 11		
LAM 3 K		D 10		
LAM 4		D 12		
LAM 4 D		D 12		
LAM 4 D K	NEW	D 13		
LAM 4 K		D 12		
LAM 5		D 14		
LAM 5 D		D 14		
LAM 5 D K	NEW	D 15		
LAM 5 K		D 14		
LAM 6	NEW	D 16		
LAM 6 K	NEW	D 16		
LA V 6		D 20		
LA V 7		D 20		
LA V 8		D 20		
LA V 9		D 24		
LA V 10		D 24		
LA V 11		D 24		
LA V 14		D 30		
LA V 15		D 30		
LA V 17		D 32		

<b>Cooling aggregates with axial fan</b>	D 17-49
<b>Cooling aggregates with radial fan</b>	D 53-54
<b>High-performance heatsinks</b>	D 50-52
<b>Miniature cooling aggregates</b>	D 9-16
<b>Protection grid for fans</b>	D 55
<b>Segment cooling aggregates</b>	D 5-8

## Segment cooling aggregates



art. no.	L [mm]	dim. [mm]		art. no.	L [mm]	dim. [mm]	
		X	Y			X	Y
LA 1 01 ...	35.0	26.0	88.6	LA 1 06 ...	217.5	208.5	271.1
LA 1 02 ...	71.5	62.5	125.1	LA 1 07 ...	254.0	245.0	307.6
LA 1 03 ...	108.0	99.0	161.6	LA 1 08 ...	290.5	281.5	344.1
LA 1 04 ...	144.5	135.5	198.1	LA 1 09 ...	327.0	318.0	380.6
LA 1 05 ...	181.0	172.0	234.6	LA 1 10 ...	363.5	354.5	417.1

... for A-types: please add an "A", for B-types: please add a "B".

**L:** unit lengths of the segments incl. insulation; **X:** mounting distance; **Y:** length of the cooling aggregate incl. fan

24 V DC fan on request

**In case of order please use order form.**

segments also available in meter length:

**art. no. for A-type: LA 1 1000 A; art. no. for B-type: LA 1 1000 B**

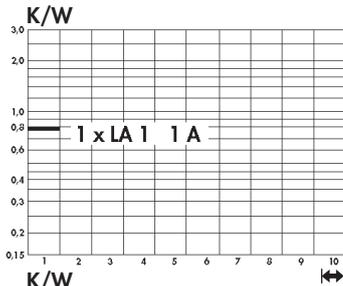
Other fan types and fan voltages on request.

### Technical data of the fans

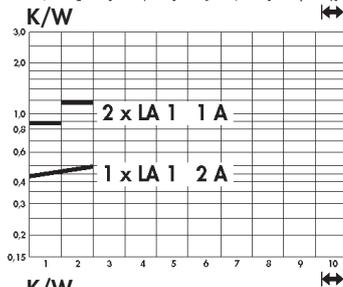
	<b>... 230</b>
<b>type</b>	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm
<b>tension</b>	230 V AC
<b>power inout</b>	19 W
<b>max. air volume</b>	160 m <sup>3</sup> /h
<b>temperature range</b>	-40°C... +85°C
<b>noise level</b>	47 dB(A)
<b>speed</b>	2,650 min <sup>-1</sup>
<b>weight</b>	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 37,500 h (40°C)

## Thermal resistance LA 1

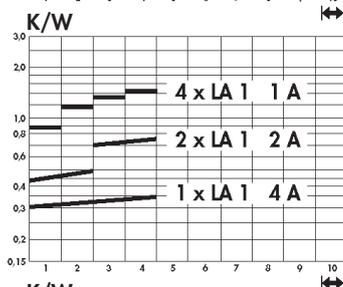
The thermal resistance in the following diagrams is given on the base of a total dissipation of 40 Watt per heatsink of the „A“-type. When using „B“-types this value increases by 3 %.



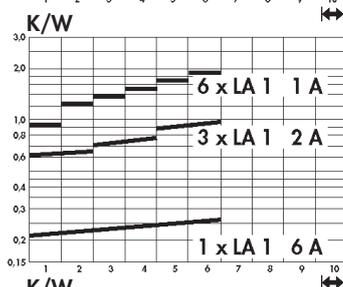
1. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A.  
Total dissipation 160 W.



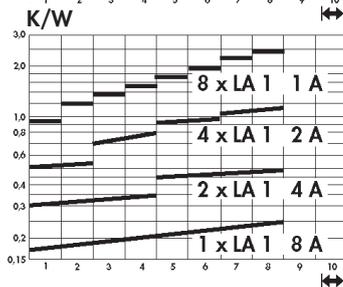
2. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A and 2 x 1 heatsink LA 1 - 2 A.  
Total dissipation 320 W.



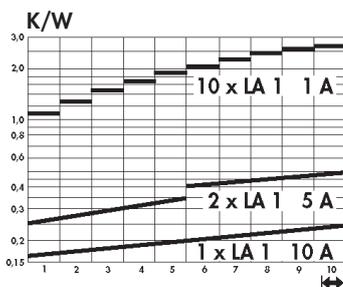
3. Cooling aggregate consisting of 4 heatsinks LA 1 - 1 A, 2 heatsinks LA 1 - 2 A and 2 x 1 heatsink LA 1 - 4 A. Total dissipation 640 W.



4. Cooling aggregate consisting of 6 heatsinks LA 1 - 1 A, 3 heatsinks LA 1 - 2 A and 2 x 1 heatsink LA 1 - 6 A. Total dissipation 960 W.

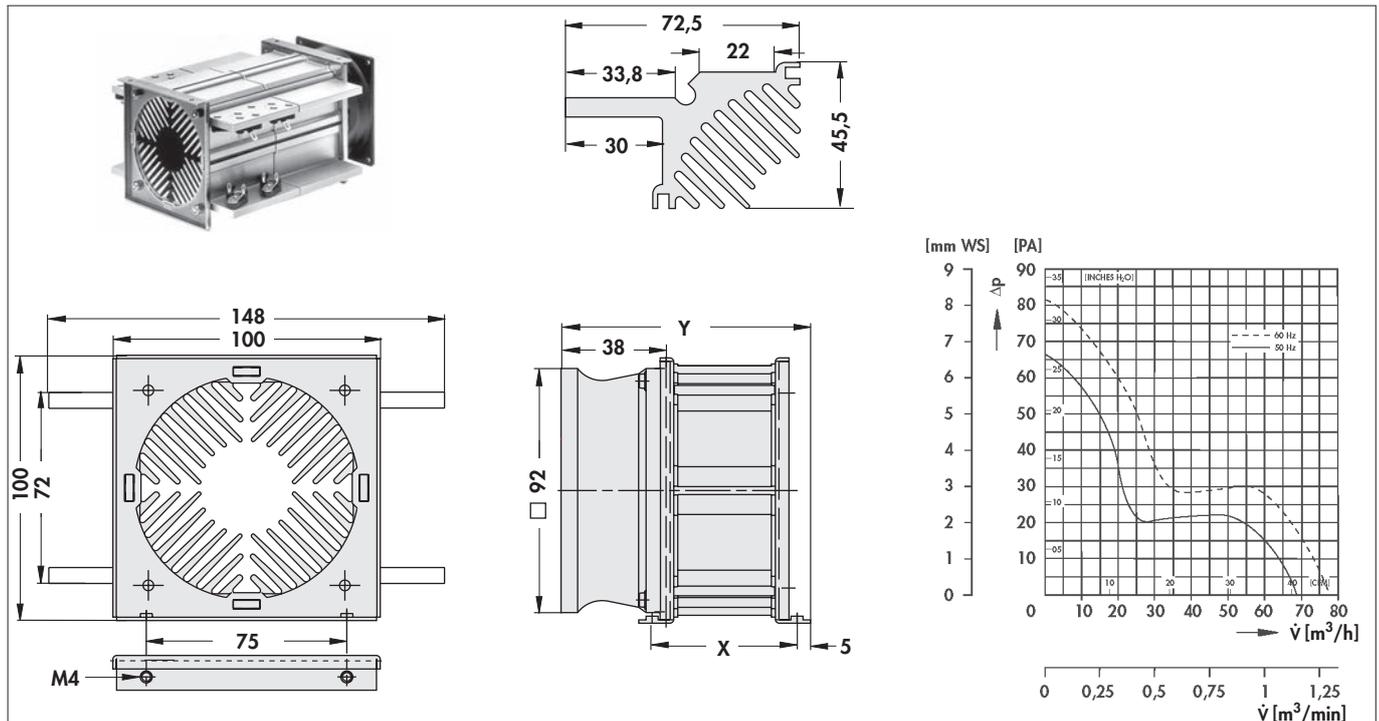


5. Cooling aggregate consisting of 8 heatsinks LA 1 - 1 A, 4 heatsinks LA 1 - 2 A, 2 heatsinks LA 1 - 4 A and 1 heatsink LA 1 - 8 A. Total dissipation 1280 W.



6. Cooling aggregate consisting of 10 heatsinks LA 1 - 1 A, 2 heatsinks LA 1 - 5 A, and 2 x 1 heatsink LA 1 - 10 A. Total dissipation 1600 W.

## Segment cooling aggregates



art. no.	L [mm]	dim. [mm]		art. no.	L [mm]	dim. [mm]	
		X	Y			X	Y
LA 2 01 ...	35.0	54.2	92.0	LA 2 06 ...	217.5	236.7	274.5
LA 2 02 ...	71.5	90.7	128.5	LA 2 07 ...	254.0	273.2	311.0
LA 2 03 ...	108.0	127.2	165.0	LA 2 08 ...	290.5	309.7	347.5
LA 2 04 ...	144.5	163.7	201.5	LA 2 09 ...	327.0	346.2	384.0
LA 2 05 ...	181.0	200.2	238.0	LA 2 10 ...	363.5	382.7	420.5

**L:** unit lengths of the segments incl. insulation; **X:** mounting distance; **Y:** length of the cooling aggregate incl. fan

24 V DC fan on request

**In case of order please use order form.**

segments also available in meter length: **art. no. for A-type: LA 1 1000 A; art. no. for B-type: LA 2 1000 B**

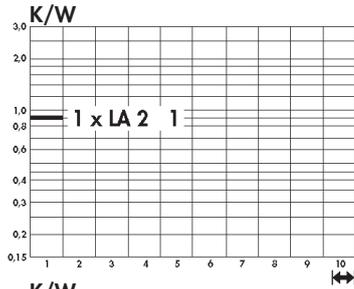
Other fan types and fan voltages on request.

### Technical data of the fans

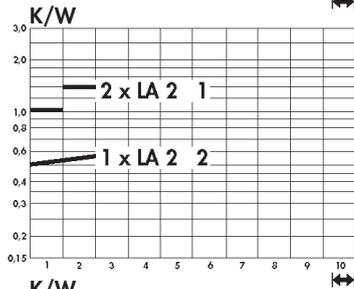
	<b>... 230</b>
<b>type</b>	ebmpapst 3656
<b>dimensions</b>	92x92x38 mm
<b>tension</b>	230 V AC
<b>power inout</b>	12 W
<b>max. air volume</b>	75 m <sup>3</sup> /h
<b>temperature range</b>	-40°C... +75°C
<b>noise level</b>	37 dB(A)
<b>speed</b>	2,700 min <sup>-1</sup>
<b>weight</b>	420 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 52,500 h (40°C)

## Thermal resistance LA 2

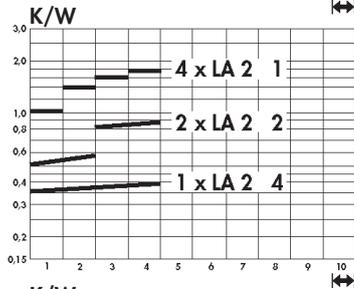
The thermal resistance in the following diagrams is given on the base of a total dissipation of 40 Watt per heatsink of the „A“-type.



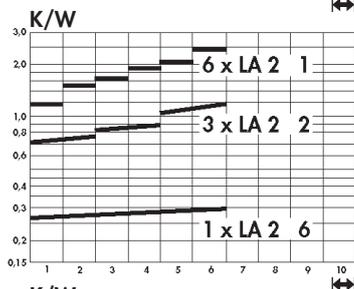
1. Cooling aggregate consisting of 4 heatsinks LA 2 - 1. Total dissipation 160 W maximal.



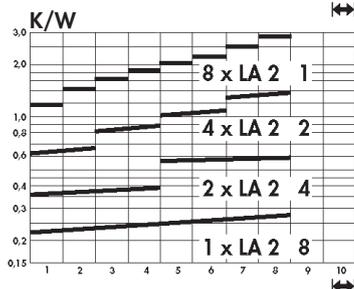
2. Cooling aggregate consisting of 4 heatsinks LA 2 - 1 and 2 x 1 heatsink LA 2 - 2. Total dissipation 320 W.



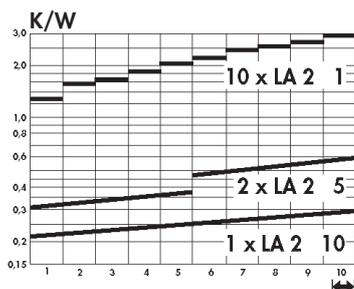
3. Cooling aggregate consisting of 4 heatsinks LA 2 - 1, 2 heatsinks LA 2 - 2 and 2 x 1 heatsink LA 2 - 4. Total dissipation 640 W.



4. Cooling aggregate consisting of 6 heatsinks LA 2 - 1, 3 heatsinks LA 2 - 2 and 2 x 1 heatsink LA 2 - 6. Total dissipation 960 W.



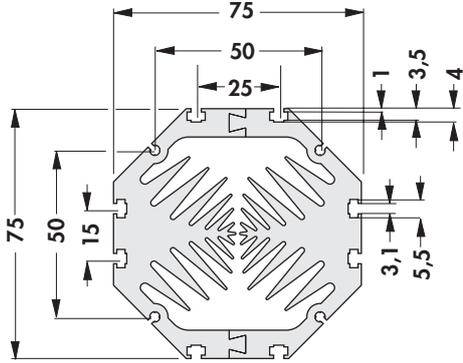
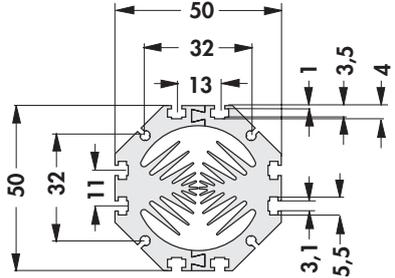
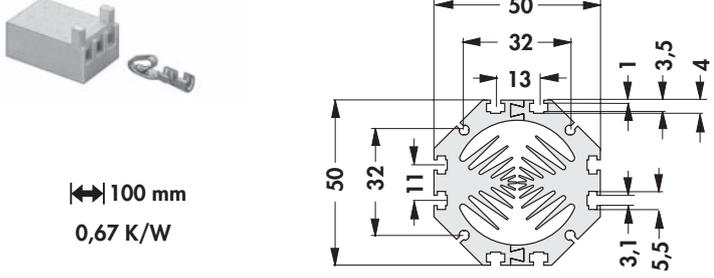
5. Cooling aggregate consisting of 8 heatsinks LA 2 - 1, 4 heatsinks LA 2 - 2, 2 heatsinks LA 2 - 4 and 1 heatsink LA 2 - 8. Total dissipation 1280 W.



6. Cooling aggregate consisting of 10 heatsinks LA 2 - 1, 2 heatsinks LA 2 - 5, and 2 x 1 heatsink LA 2 - 10. Total dissipation 1600 W.

## Miniature cooling aggregates

- made for dissipation of high power within a very small space
- fixed length is optimised to the fan
- slide-nut channels for M3 nuts for mounting the transistors and circuit boards
- other fan types and fan voltages on request

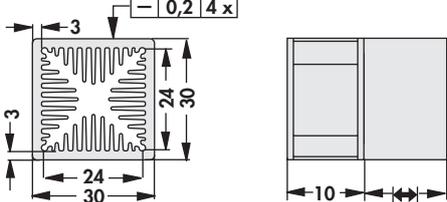
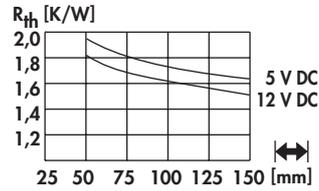
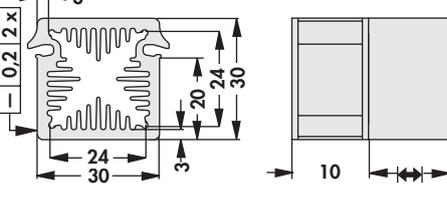
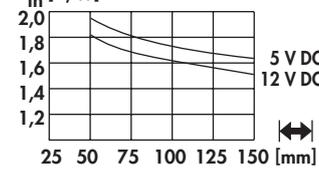
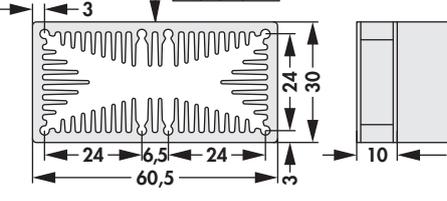
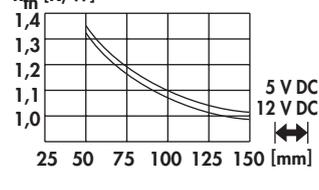
<b>art. no.</b>      <b>LAM 1</b>		 <p>140 mm 0,3 K/W</p>
<b>art. no.</b>      <b>LAM 2</b>		 <p>100 mm 0,73 K/W</p>
<b>art. no.</b>      <b>LAM 2 S</b>		 <p>100 mm 0,67 K/W</p> <p>50 x 50 mm, with axial fan pre-assembled with Molex case 2695 including alarm output, 3 pins; → B 0 ; strand length: 70 mm</p> <p><b>surface:</b> natural colour anodised</p>

### Technical data of the fans

	LAM 1	LAM 2	LAM 2
<b>type</b>	ebmpapst 612 NHH-118	ebmpapst 412 F	sepa MFB 40 H 12 HA
<b>dimensions</b>	60x60x25 mm	40x40x10 mm	40x40x10 mm
<b>tension</b>	12 V DC	12 V DC	12 V DC
<b>power inout</b>	2.9 W	0.7 W	
<b>max. air volume</b>	56 m <sup>3</sup> /h	8 m <sup>3</sup> /h	13.9 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C	-40°C... +85°C
<b>noise level</b>	41 dB(A)	22.1 dB(A)	33 dB(A)
<b>speed</b>	6,800 min <sup>-1</sup>	5,400 min <sup>-1</sup>	7,300 min <sup>-1</sup>
<b>weight</b>	66 g	17 g	13 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 60,000 h (40°C)	L <sub>10</sub> < 45,000 h (20°C)	L <sub>10</sub> < 70,000 h (40°C)

## Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

<b>art. no.</b>			
<b>LAM 3 ...</b>			
<b>art. no.</b>			
<b>LAM 3 K ...</b>	with grooves for lock-in retaining spring for transistors THFU → A 0		
<b>art. no.</b>			
<b>LAM 3 D ...</b>			
<b>please indicate:</b>	...  50 75 100 125 150 mm		<b>... fan type</b> 5 = 5 V DC 12 = 12 V DC
<b>surface:</b>	natural colour anodised		

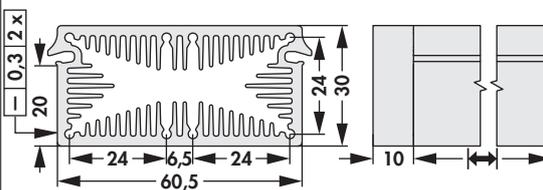
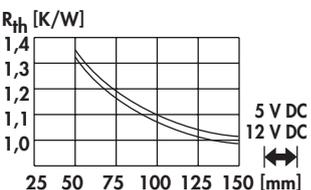
### Technical data of the fans

	<b>... 5</b>	<b>... 12</b>
<b>type</b>	Sepa, ball bearing	Sepa, ball bearing
<b>dimensions</b>	30x30x10 mm	30x30x10 mm
<b>tension</b>	5 V DC	12 V DC
<b>max. air volume</b>	6.8 m <sup>3</sup> /h	7.7 m <sup>3</sup> /h
<b>cur. consumpt.</b>	130 mA	60 mA
<b>temperature range</b>	-10°C... +70°C	-10°C ... +85°C
<b>noise level</b>	21 dB(A)	27 dB(A)
<b>speed</b>	8,500 min <sup>-1</sup>	9,100 min <sup>-1</sup>
<b>weight</b>	8 g	8 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L <sub>10</sub> > 100,000 h (20°C) MTBF > 400,000 h (20°C)

- |   |                                       |
|---|---------------------------------------|
| Retaining springs for transistors → A 0 - 0   | Fluid coolers → A 0 - 0               |
| Special heatsink design → A 145 - 148         | Protection grid for axial fans → D 55 |
| Hollow-fin cooling aggregates → D 19 - 35     | Insulating caps → E 0 - 0             |
| High performance cooling aggregate → D 36 - 0 | Technical introduction → A 2 - 8      |

## Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

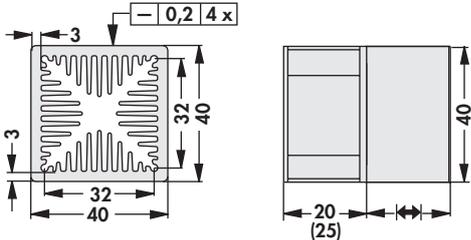
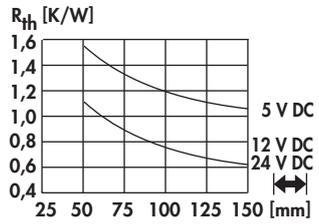
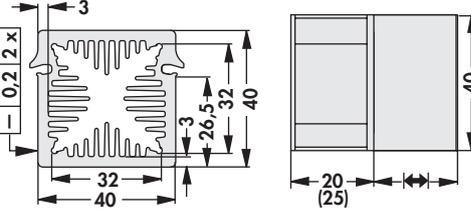
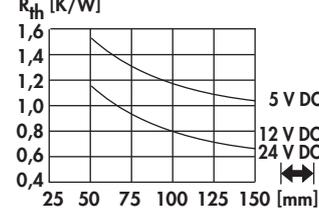
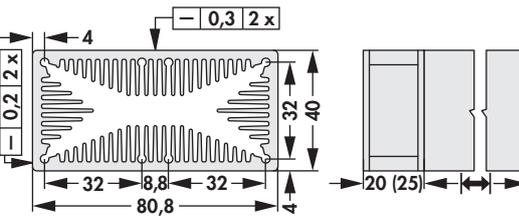
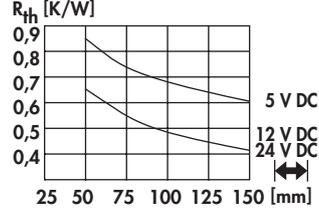
<b>art. no.</b>			
<b>LAM 3 D K ...</b>			
<b>please indicate:</b>	... $\left[ \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \end{array} \right]$ 50 75 100 125 150 mm		<b>... fan type</b> 5 = 5 V DC 12 = 12 V DC
<b>surface:</b>	natural colour anodised		

### Technical data of the fans

	... 5	... 12
<b>type</b>	Sepa, ball bearing	Sepa, ball bearing
<b>dimensions</b>	30x30x10 mm	30x30x10 mm
<b>tension</b>	5 V DC	12 V DC
<b>max. air volume</b>	6.8 m <sup>3</sup> /h	7.7 m <sup>3</sup> /h
<b>cur. consumpt.</b>	130 mA	60 mA
<b>temperature range</b>	-10°C... +70°C	-10°C ... +85°C
<b>noise level</b>	21 dB(A)	27 dB(A)
<b>speed</b>	8,500 min <sup>-1</sup>	9,100 min <sup>-1</sup>
<b>weight</b>	8 g	8 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L <sub>10</sub> > 100,000 h (20°C) MTBF > 400,000 h (20°C)

## Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

<b>art. no.</b>			
<b>LAM 4 ...</b>			
<b>art. no.</b>			
<b>LAM 4 K ...</b>	with grooves for lock-in retaining spring for transistors THFU → A 0		
<b>art. no.</b>			
<b>LAM 4 D ...</b>			
<b>please indicate:</b>	...  50 75 100 125 150 mm		<b>... fan type</b> 5 = 5 V DC 12 = 12 V DC 24 = 24 V DC
<b>surface:</b>	natural colour anodised		

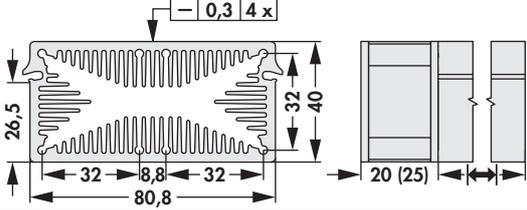
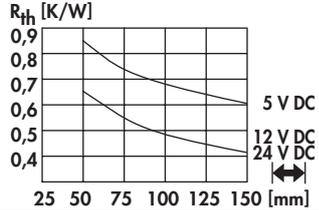
### Technical data of the fans

	... 5	... 12	... 24
<b>type</b>	ebmpapst 405	ebmpapst 412 JHH	ebmpapst 414 JHH
<b>dimensions</b>	40x40x20 mm	40x40x25 mm	40x40x25 mm
<b>tension</b>	5 V DC	12 V DC	24 V DC
<b>power inout</b>	0.9 W	3.3 W	3.6 W
<b>max. air volume</b>	10 m <sup>3</sup> /h	24 m <sup>3</sup> /h	24 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +60°C	-20°C... +60°C
<b>noise level</b>	18 dB(A)	46 dB(A)	46 dB(A)
<b>speed</b>	6,000 min <sup>-1</sup>	13,000 min <sup>-1</sup>	13,000 min <sup>-1</sup>
<b>weight</b>	27 g	50 g	50 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 50,000 h (40°C) L <sub>10</sub> < 20,000 h (tmax)	L <sub>10</sub> < 57,500 h (40°C) L <sub>10</sub> < 35,000 h (tmax)	L <sub>10</sub> < 57,500 h (40°C) L <sub>10</sub> < 35,000 h (tmax)

<b>Thermal interface material</b>	→ E 0 - 0	<b>Insulating clamping parts</b>	→ E 0
<b>Mounting material for semiconduct.</b>	→ E 0 - 0		
<b>Mounting pads for transistors</b>	→ E 0		
<b>Lock-in retaining spring for transistors</b>	→ A 0 - 0	<b>Technical introduction</b>	→ A 2 - 8

## Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

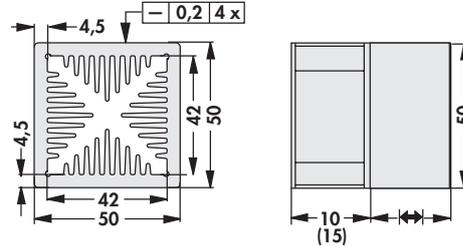
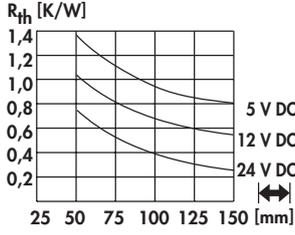
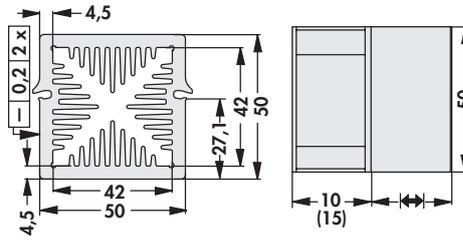
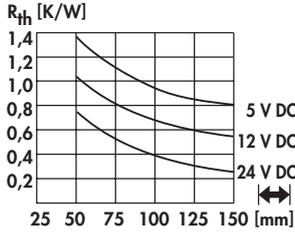
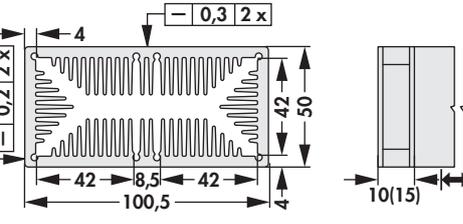
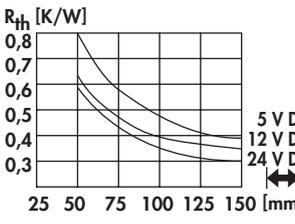
<b>art. no.</b>			
<b>LAM 4 D K ...</b>			
<b>please indicate:</b>	... $\left[ \begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$	<b>50 75 100 125 150 mm</b>	<b>... fan type</b> 5 = 5 V DC 12 = 12 V DC 24 = 24 V DC
<b>surface:</b>	natural colour anodised		

### Technical data of the fans

	... 5	... 12	... 24
<b>type</b>	ebmpapst 405	ebmpapst 412 JHH	ebmpapst 414 JHH
<b>dimensions</b>	40x40x20 mm	40x40x25 mm	40x40x25 mm
<b>tension</b>	5 V DC	12 V DC	24 V DC
<b>power inout</b>	0.9 W	3.3 W	3.6 W
<b>max. air volume</b>	10 m <sup>3</sup> /h	24 m <sup>3</sup> /h	24 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +60°C	-20°C... +60°C
<b>noise level</b>	18 dB(A)	46 dB(A)	46 dB(A)
<b>speed</b>	6,000 min <sup>-1</sup>	13,000 min <sup>-1</sup>	13,000 min <sup>-1</sup>
<b>weight</b>	27 g	50 g	50 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 50,000 h (40°C) L <sub>10</sub> < 20,000 h (tmax)	L <sub>10</sub> < 57,500 h (40°C) L <sub>10</sub> < 35,000 h (tmax)	L <sub>10</sub> < 57,500 h (40°C) L <sub>10</sub> < 35,000 h (tmax)

## Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

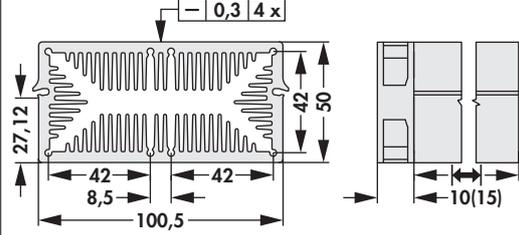
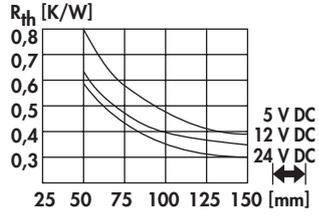
<b>art. no.</b>     <b>LAM 5 ...</b>			
<b>art. no.</b>     <b>LAM 5 K ...</b>			
with grooves for lock-in retaining spring for transistors THFU → A 0			
<b>art. no.</b>     <b>LAM 5 D ...</b>			
<b>please indicate:</b> ... $\left[ \begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ <b>50 75 100 125 150 mm</b>			
<b>... fan type</b> <b>5 = 5 V DC</b> <b>12 = 12 V DC</b> <b>24 = 24 V DC</b>			
<b>surface:</b>	natural colour anodised		

### Technical data of the fans

	... 5	... 12	... 24
<b>type</b>	Sepa, ball bearing	Sepa, ball bearing	ebmpapst
<b>dimensions</b>	50x50x10 mm	50x50x10 mm	50x50x15 mm
<b>tension</b>	5 V DC	12 V DC	24 V DC
<b>max. air volume</b>	10 m <sup>3</sup> /h	14.3 m <sup>3</sup> /h	20 m <sup>3</sup> /h
<b>temperature range</b>	-10°C... +70°C	-10°C... +70°C	-20°C... +70°C
<b>speed</b>	3,400 min <sup>-1</sup>	4,800 min <sup>-1</sup>	5,000 min <sup>-1</sup>
<b>noise level</b>	17 dB(A)	22 dB(A)	30 dB(A)
<b>weight</b>	19 g	19 g	27 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L <sub>10</sub> < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L <sub>10</sub> 50,000 h (20°C)
<b>alarm output</b>	with	with	

## Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

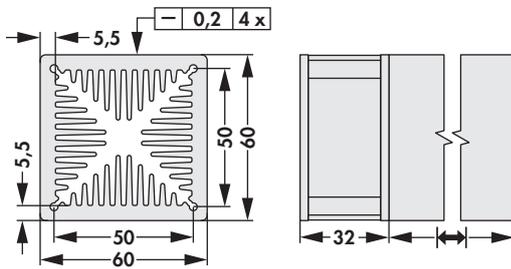
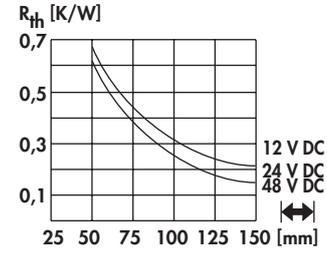
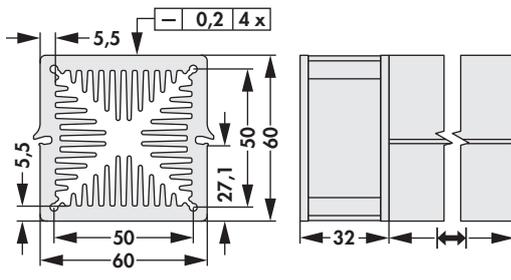
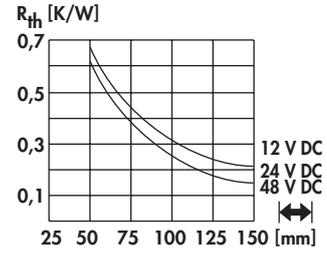
<b>art. no.</b>			
<b>LAM 5 D K ...</b>			
<b>please indicate:</b>	<b>... <math>\left[ \right]</math></b> 50 75 100 125 150 mm	<b>... fan type</b> 5 = 5 V DC 12 = 12 V DC 24 = 24 V DC	
<b>surface:</b>	natural colour anodised		

### Technical data of the fans

	... 5	... 12	... 24
<b>type</b>	Sepa, ball bearing	Sepa, ball bearing	ebmpapst
<b>dimensions</b>	50x50x10 mm	50x50x10 mm	50x50x15 mm
<b>tension</b>	5 V DC	12 V DC	24 V DC
<b>max. air volume</b>	10 m <sup>3</sup> /h	14.3 m <sup>3</sup> /h	20 m <sup>3</sup> /h
<b>temperature range</b>	-10°C... +70°C	-10°C... +70°C	-20°C... +70°C
<b>speed</b>	3,400 min <sup>-1</sup>	4,800 min <sup>-1</sup>	5,000 min <sup>-1</sup>
<b>noise level</b>	17 dB(A)	22 dB(A)	30 dB(A)
<b>weight</b>	19 g	19 g	27 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L <sub>10</sub> < 95,000 h (20°C) MTBF < 280,000 h (20°C)	L <sub>10</sub> 50,000 h (20°C)
<b>alarm output</b>	with	with	

## Miniature cooling aggregates

- compact design
- homogeneous heat distribution
- mounting possible on any side
- powerful axial-fan motor
- other lengths, special designs and machinings according to customer's specifications
- other surfaces, fan types and fan voltages upon request

<b>art. no.</b>      <b>LAM 6 ...</b>			
<b>art. no.</b>      <b>LAM 6 K ...</b>			
<b>with grooves for lock-in retaining spring for transistors THFU → A 0</b>			
<b>please indicate:</b> ... $\longleftrightarrow$ <b>50 75 100 125 150 mm</b>		<b>... fan type</b> <b>12 = 12 V DC</b> <b>24 = 24 V DC</b> <b>48 = 48 V DC</b>	
<b>surface:</b>		natural colour anodised	

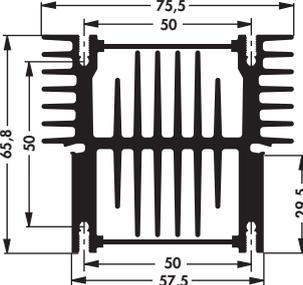
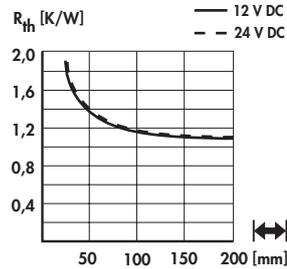
### Technical data of the fans

	... 12	... 24	... 48
<b>type</b>	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
<b>dimensions</b>	60x60x32 mm	60x60x32 mm	60x60x32 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	7.7 W	14.6 W	14.6 W
<b>max. air volume</b>	70 m <sup>3</sup> /h	82 m <sup>3</sup> /h	82 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
<b>noise level</b>	53 dB(A)	62 dB(A)	62 dB(A)
<b>speed</b>	11,700 min <sup>-1</sup>	15,000 min <sup>-1</sup>	15,000 min <sup>-1</sup>
<b>weight</b>	100 g	100 g	100 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)

## Cooling aggregates with axial fan

### Heatsink-cooling aggregates

- with grooves for lock-in retaining springs THFU → A 0
- screw-in solder pin M3 (**art. no.: ELS 3**)
- different lengths, special designs and machinings according to customer specifications
- different surfaces, fan types and fan voltages upon request

<b>art. no.</b>			
<b>LA 27 K ...</b>			
<b>please indicate:</b>	... 		<b>... fan type</b>
	50 75 84 94 100 125 150 mm		12 = 12 V DC 24 = 24 V DC

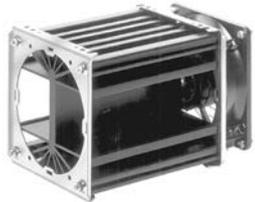
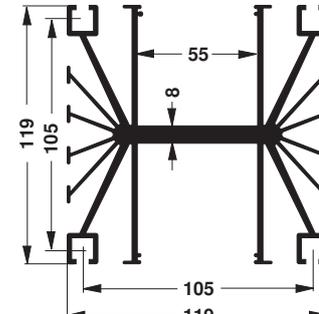
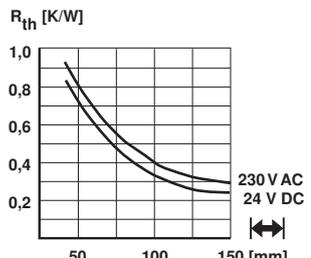
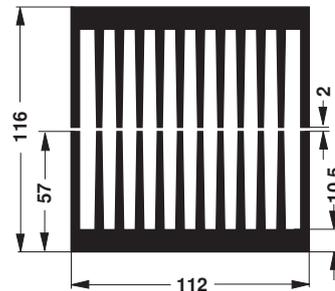
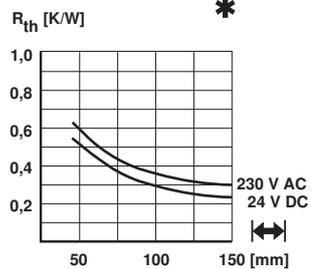
### Technical data of the fans

	... 12	... 24
<b>type</b>	ebmpapst 612 NHH-118	ebmpapst 614 NHH-119
<b>dimensions</b>	60x60x25 mm	60x60x25 mm
<b>tension</b>	12 V DC	24 V DC
<b>power inout</b>	2.9 W	2.9 W
<b>max. air volume</b>	56 m <sup>3</sup> /h	56 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	41 dB(A)	41 dB(A)
<b>speed</b>	6,800 min <sup>-1</sup>	6,850 min <sup>-1</sup>
<b>weight</b>	66 g	66 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 60,000 h (40°C)	L <sub>10</sub> < 60,000 h (40°C)

## Cooling aggregates with axial fan

### Heatsink-cooling aggregates

- especially suitable for IGBT, SSR, semiconductor modules, high performance transistors etc.
- effective construction with axial fans
- good thermal performance
- additional machining according to customer's instructions
- cooling aggregates also available without fans
- other fan types and fan voltages on request

<b>art. no.</b>          <b>LA 4 ...</b>			
<b>art. no.</b>          <b>LA 5 ...</b>			
<b>please indicate:</b> ...  <b>75 100 150 mm</b>		<b>... fan type</b> <b>24 = 24 V DC</b> <b>230 = 230 V AC</b>	

### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 4184NXH	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm	119x119x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	11 W	19 W
<b>max. air volume</b>	237 m <sup>3</sup> /h	160 m <sup>3</sup> /h
<b>temperature range</b>	-30°C ... +70°C	-40°C... +85°C
<b>noise level</b>	57 dB(A)	47 dB(A)
<b>speed</b>	4,400 min <sup>-1</sup>	2,650 min <sup>-1</sup>
<b>weight</b>	390 g	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 70,000 h (40°C)	L <sub>10</sub> < 37,500 h (40°C)

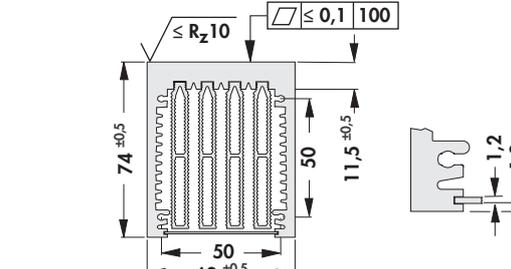
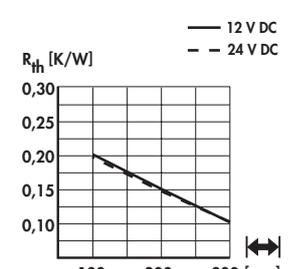
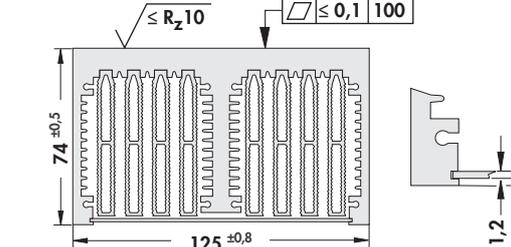
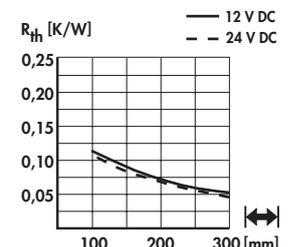
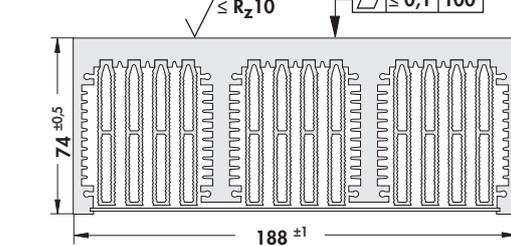
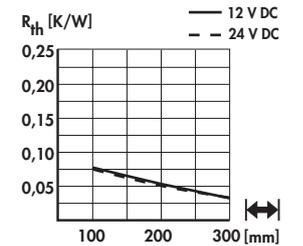
Cooling aggreg. in segment mount. → D 5 – 7  
 Miniature cooling aggregates → D 9 – 12  
 Protection grid for axial fans → D 55  
 Thermal interface material → E 0 – 0

Extruded heatsinks → A 0 – 0  
 Cooling aggregates with radial fan → D 53 – 0  
 Heatsinks with hollow fin profile → D 50  
 Technical introduction → A 2 – 8

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- geometry of hollow fin optimising the air flow
- particularly effective heat dissipation
- compact construction
- milled flat semiconductor mounting surface
- other fan types and fan voltages on request

<b>art. no.</b>         <b>LA 6 ...</b>			
without air flow chamber			
<b>art. no.</b>         <b>LA 7 ...</b>			
without air flow chamber			
<b>art. no.</b>         <b>LA 8 ...</b>			
without air flow chamber			
<p><b>please indicate:</b>    ... <math>\left[ \begin{array}{c} \text{---} \\ \text{---} \end{array} \right]</math>    <b>... fan type</b></p> <p style="margin-left: 100px;">100 150 200 250 300 mm</p> <p style="margin-left: 400px;">12 = 12 V DC 24 = 24 V DC</p>			

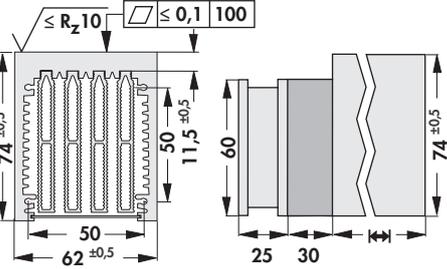
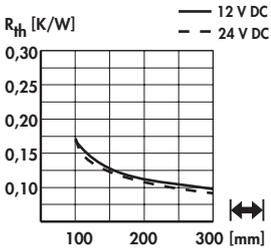
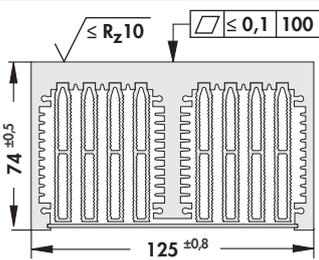
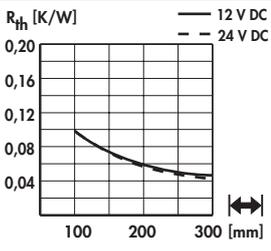
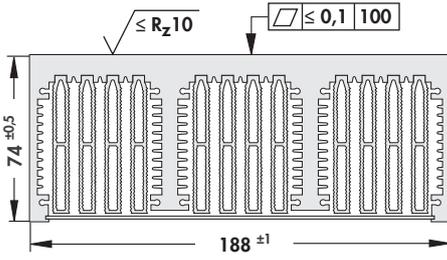
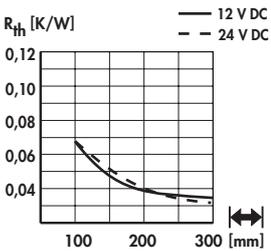
### Technical data of the fans

	... 12	... 24
<b>type</b>	ebmpapst 612 NHH-118	ebmpapst 614 NHH-119
<b>dimensions</b>	60x60x25 mm	60x60x25 mm
<b>tension</b>	12 V DC	24 V DC
<b>power inout</b>	2.9 W	2.9 W
<b>max. air volume</b>	56 m <sup>3</sup> /h	56 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	41 dB(A)	41 dB(A)
<b>speed</b>	6,800 min <sup>-1</sup>	6,850 min <sup>-1</sup>
<b>weight</b>	66 g	66 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 60,000 h (40°C)	L <sub>10</sub> < 60,000 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- geometry of hollow fin optimising the air flow
- particularly effective heat dissipation
- compact construction
- milled flat semiconductor mounting surface
- other fan types and fan voltages on request

<b>art. no.</b>			
<b>LA V 6 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 7 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 8 ...</b>	with air flow chamber		
<b>please indicate:</b>	...  <b>100 150 200 250 300 mm</b>		<b>... fan type</b> 12 = 12 V DC 24 = 24 V DC

### Technical data of the fans

	<b>... 12</b>	<b>... 24</b>
<b>type</b>	ebmpapst 612 NHH-118	ebmpapst 614 NHH-119
<b>dimensions</b>	60x60x25 mm	60x60x25 mm
<b>tension</b>	12 V DC	24 V DC
<b>power inout</b>	2.9 W	2.9 W
<b>max. air volume</b>	56 m <sup>3</sup> /h	56 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	41 dB(A)	41 dB(A)
<b>speed</b>	6,800 min <sup>-1</sup>	6,850 min <sup>-1</sup>
<b>weight</b>	66 g	66 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 60,000 h (40°C)	L <sub>10</sub> < 60,000 h (40°C)

Miniature cooling aggregates → D 9 – 12  
 Protection grid for axial fans → D 55  
 Drilling pattern for Solid State Relais → A 12  
 High capacity heatsinks → A 0 – 0

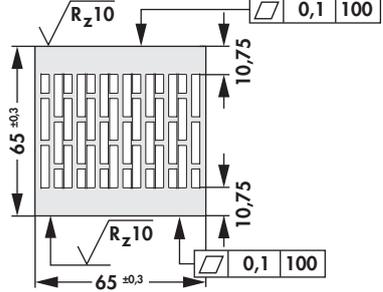
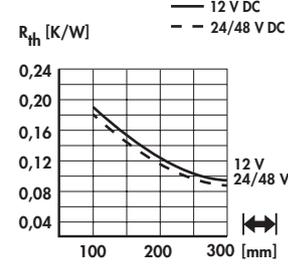
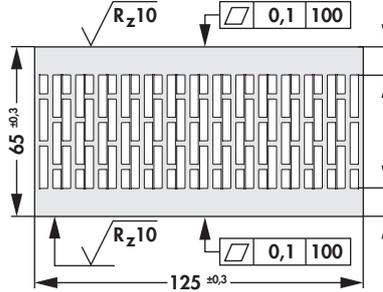
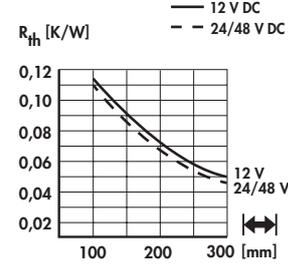
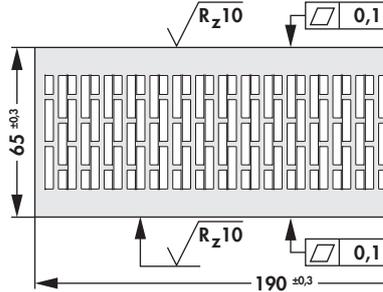
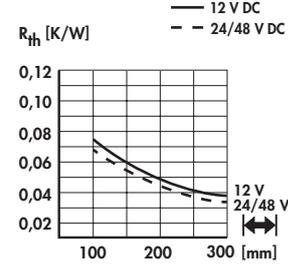
Special heatsink design → A 145 – 148  
 Heatsinks with hollow fin profile → D 50  
 Thermal interface material → E 0 – 0  
 Technical introduction → A 2 – 8

A  
B  
C  
D  
E  
F  
G  
H  
I  
K  
L  
M  
N

## Cooling aggregates with axial fan

### High performance cooling aggregate

- compact construction by means of connected extruded profiles
- excellent efficiency by means of flow-optimised hollow fin structure
- powerful axial fans
- double-sided precise milled semiconductor mounting surfaces
- different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

<b>art. no.</b>          <b>LA 28 ...</b>			
without air flow chamber			
<b>art. no.</b>          <b>LA 29 ...</b>			
without air flow chamber			
<b>art. no.</b>          <b>LA 30 ...</b>			
without air flow chamber			
<b>please indicate:</b> ... $\left[ \right]$ <b>100 150 200 250 300 mm</b>		<b>... fan type</b> <b>12 = 12 V DC</b> <b>24 = 24 V DC</b> <b>48 = 48 V DC</b>	

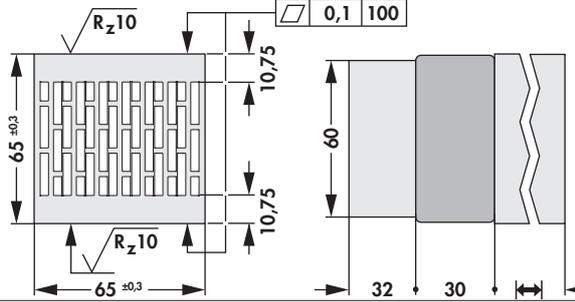
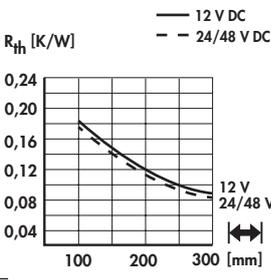
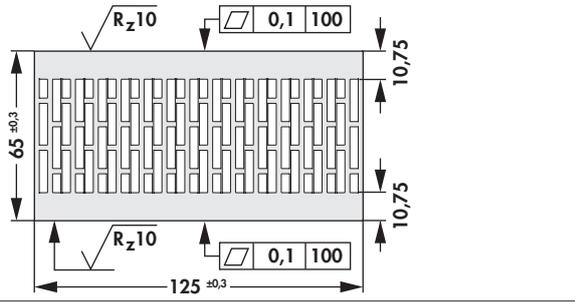
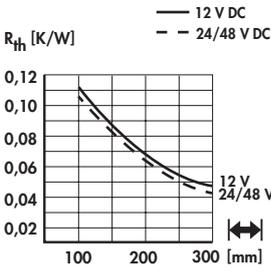
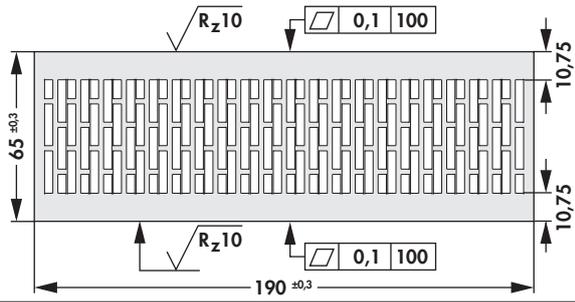
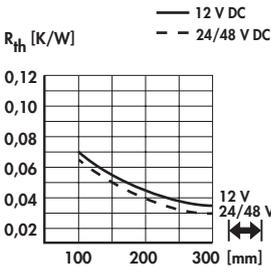
### Technical data of the fans

	... 12	... 24	... 48
<b>type</b>	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
<b>dimensions</b>	60x60x32 mm	60x60x32 mm	60x60x32 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	7.7 W	14.6 W	14.6 W
<b>max. air volume</b>	70 m <sup>3</sup> /h	82 m <sup>3</sup> /h	82 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
<b>noise level</b>	53 dB(A)	62 dB(A)	62 dB(A)
<b>speed</b>	11,700 min <sup>-1</sup>	15,000 min <sup>-1</sup>	15,000 min <sup>-1</sup>
<b>weight</b>	100 g	100 g	100 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)

## Cooling aggregates with axial fan

### High performance cooling aggregate

- additional efficiency enhancement and noise reduction by means of air-technically adjusted airflow chambers
- excellent thermal efficiency in connection with powerful axial fans
- double-sided precise milled semiconductor mounting surfaces
- different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

<b>art. no.</b>			
<b>LA V 28 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 29 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 30 ...</b>	with air flow chamber		
<b>please indicate:</b>	...  <b>100 150 200 250 300 mm</b>	<b>... fan type</b> 12 = 12 V DC 24 = 24 V DC 48 = 48 V DC	

### Technical data of the fans

	<b>... 12</b>	<b>... 24</b>	<b>... 48</b>
<b>type</b>	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
<b>dimensions</b>	60x60x32 mm	60x60x32 mm	60x60x32 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	7.7 W	14.6 W	14.6 W
<b>max. air volume</b>	70 m <sup>3</sup> /h	82 m <sup>3</sup> /h	82 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
<b>noise level</b>	53 dB(A)	62 dB(A)	62 dB(A)
<b>speed</b>	11,700 min <sup>-1</sup>	15,000 min <sup>-1</sup>	15,000 min <sup>-1</sup>
<b>weight</b>	100 g	100 g	100 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)

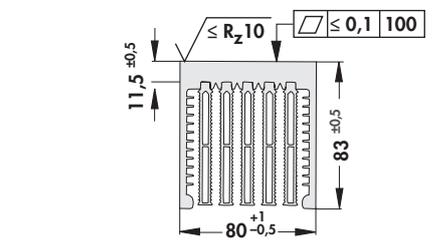
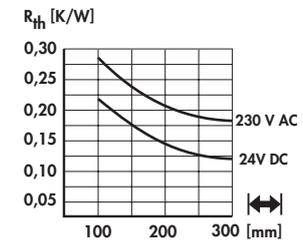
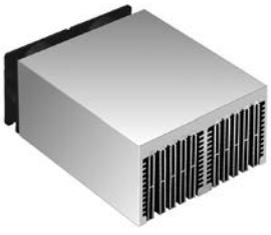
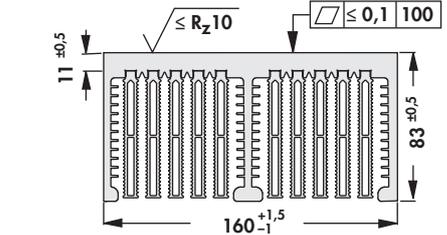
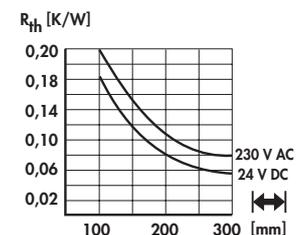
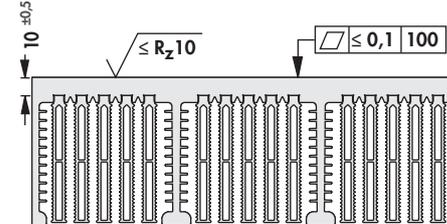
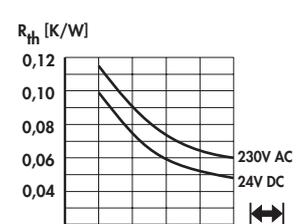
Miniature cooling aggregates → D 9 - 12  
 Protection grid for axial fans → D 55  
 Drilling pattern for Solid State Relais → A 12  
 High capacity heatsinks → A 0 - 0

Special heatsink design → A 145 - 148  
 Heatsinks with hollow fin profile → D 50  
 Thermal interface material → E 0 - 0  
 Technical introduction → A 2 - 8

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- geometry of hollow fin optimising the air flow
- particularly effective heat dissipation
- compact construction
- milled flat semiconductor mounting surface
- other fan types and fan voltages on request

<b>art. no.</b>			
<b>LA 9 ...</b>	without air flow chamber		
<b>art. no.</b>			
<b>LA 10 ...</b>	without air flow chamber		
<b>art. no.</b>			
<b>LA 11 ...</b>	without air flow chamber		
<b>please indicate:</b>	... $\left\langle \right\rangle$ 100 150 200 250 300 mm		<b>... fan type</b> 24 = 24 V DC 230 = 230 V AC

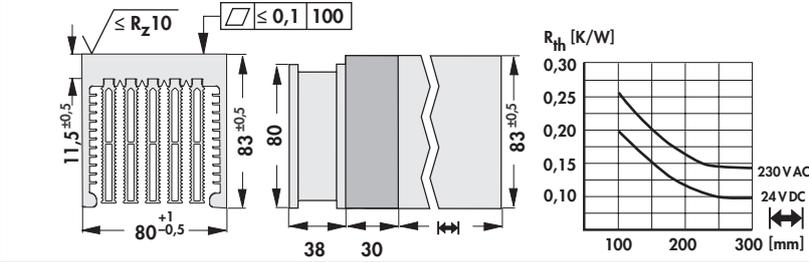
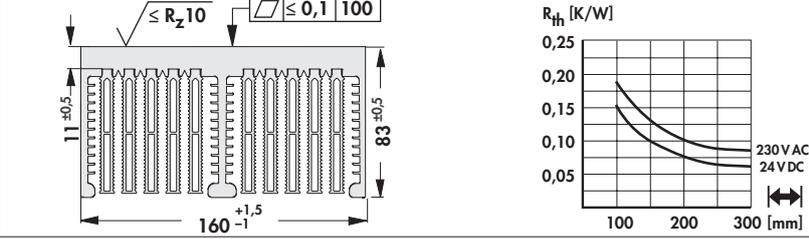
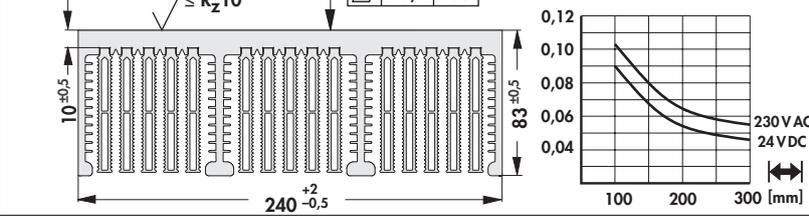
### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 8314H	ebmpapst 8556N
<b>dimensions</b>	80x80x32 mm	80x80x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	6 W	12 W
<b>max. air volume</b>	80 m <sup>3</sup> /h	50 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... 75°C	-40°C... +90°C
<b>noise level</b>	48 dB(A)	31 dB(A)
<b>speed</b>	5,000 min <sup>-1</sup>	2,800 min <sup>-1</sup>
<b>weight</b>	170 g	490 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 55,000 h (40°C)	L <sub>10</sub> < 52,500 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- geometry of hollow fin optimising the air flow
- particularly effective heat dissipation
- compact construction
- milled flat semiconductor mounting surface
- other fan types and fan voltages on request

<b>art. no.</b>			<b>LA V 9 ...</b> with air flow chamber
<b>art. no.</b>			<b>LA V 10 ...</b> with air flow chamber
<b>art. no.</b>			<b>LA V 11 ...</b> with air flow chamber
<b>please indicate:</b>	...  <b>100 150 200 250 300 mm</b>		<b>... fan type</b> <b>24 = 24 V DC</b> <b>230 = 230 V AC</b>

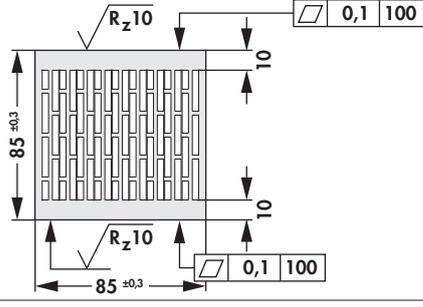
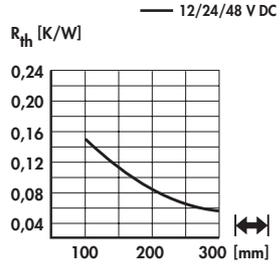
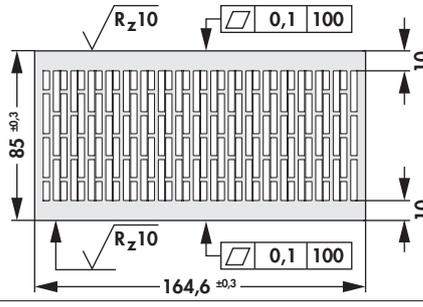
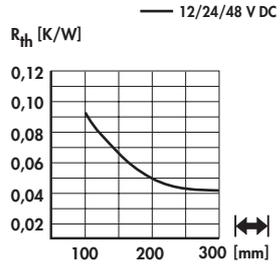
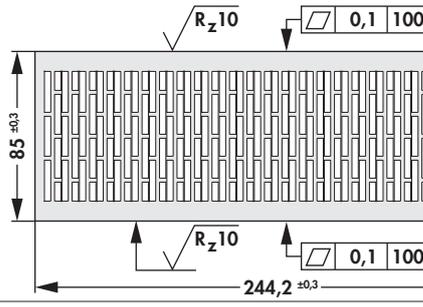
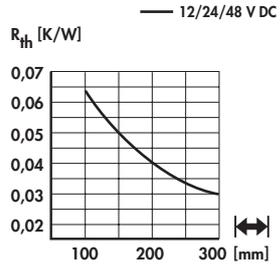
### Technical data of the fans

	<b>... 24</b>	<b>... 230</b>
<b>type</b>	ebmpapst 8314H	ebmpapst 8556N
<b>dimensions</b>	80x80x32 mm	80x80x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	6 W	12 W
<b>max. air volume</b>	80 m <sup>3</sup> /h	50 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... 75°C	-40°C... +90°C
<b>noise level</b>	48 dB(A)	31 dB(A)
<b>speed</b>	5,000 min <sup>-1</sup>	2,800 min <sup>-1</sup>
<b>weight</b>	170 g	490 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 55,000 h (40°C)	L <sub>10</sub> < 52,500 h (40°C)

## Cooling aggregates with axial fan

### High performance cooling aggregate

- compact construction by means of connected extruded profiles
- excellent efficiency by means of flow-optimised hollow fin structure
- powerful axial fans
- double-sided precise milled semiconductor mounting surfaces
- different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

<b>art. no.</b>			
<b>LA 31 ...</b>	without air flow chamber		
<b>art. no.</b>			
<b>LA 32 ...</b>	without air flow chamber		
<b>art. no.</b>			
<b>LA 33 ...</b>	without air flow chamber		
<b>please indicate:</b>	... $\left[ \right]$ 100 150 200 250 300 mm		<b>... fan type</b> 12 = 12 V DC 24 = 24 V DC 48 = 48 V DC

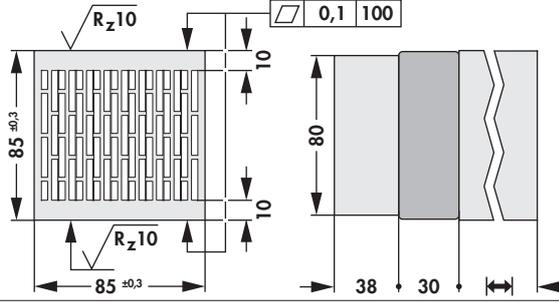
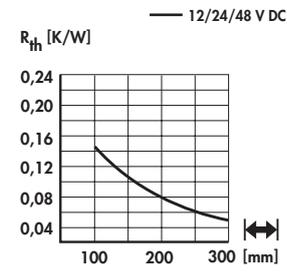
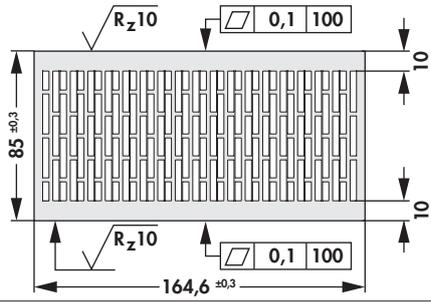
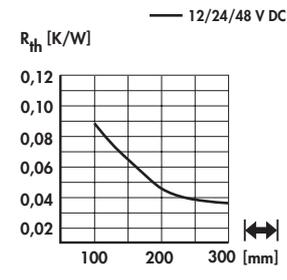
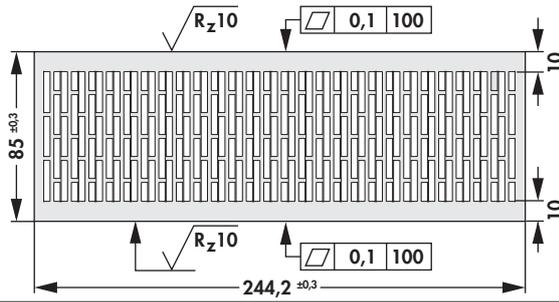
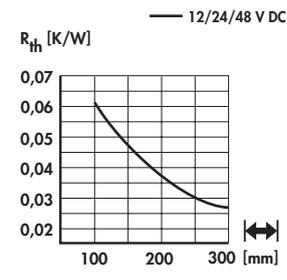
### Technical data of the fans

	... 12	... 24	... 48
<b>type</b>	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
<b>dimensions</b>	80x80x38 mm	80x80x38 mm	80x80x38 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	39 W	38 W	36 W
<b>max. air volume</b>	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	71 dB(A)	71 dB(A)	71 dB(A)
<b>speed</b>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>
<b>weight</b>	200 g	200 g	200 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)

## Cooling aggregates with axial fan

### High performance cooling aggregate

- additional efficiency enhancement and noise reduction by means of air-technically adjusted airflow chambers
- excellent thermal efficiency in connection with powerful axial fans
- double-sided precise milled semiconductor mounting surfaces
- different width dimensions, customised machinings, surfaces, fan types and fan voltages upon request

<b>art. no.</b>			
<b>LA V 31 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 32 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 33 ...</b>	with air flow chamber		
<b>please indicate:</b>	...  <b>100 150 200 250 300 mm</b>	<b>... fan type</b> 12 = 12 V DC 24 = 24 V DC 48 = 48 V DC	

### Technical data of the fans

	<b>... 12</b>	<b>... 24</b>	<b>... 48</b>
<b>type</b>	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
<b>dimensions</b>	80x80x38 mm	80x80x38 mm	80x80x38 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	39 W	38 W	36 W
<b>max. air volume</b>	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	71 dB(A)	71 dB(A)	71 dB(A)
<b>speed</b>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>
<b>weight</b>	200 g	200 g	200 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)

Miniature cooling aggregates → D 9 – 12  
 Protection grid for axial fans → D 55  
 Drilling pattern for Solid State Relais → A 12  
 High capacity heatsinks → A 0 – 0

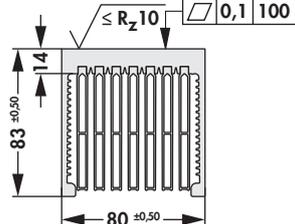
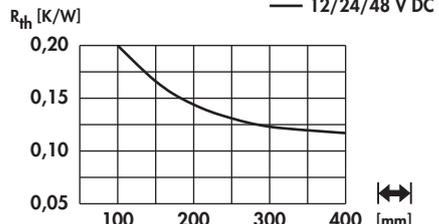
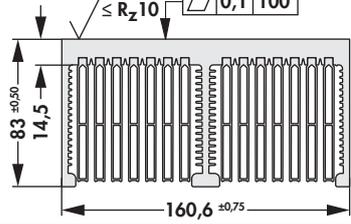
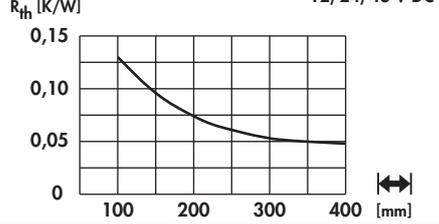
Special heatsink design → A 145 – 148  
 Heatsinks with hollow fin profile → D 50  
 Thermal interface material → E 0 – 0  
 Technical introduction → A 2 – 8

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## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- hollow-fin geometry of new conception
- enlarged surface due to larger fin quantity
- effective heat dissipation with low pressure drop
- available with and without air-flow chamber
- milled flat semiconductor mounting surface
- mechanical treatments according to customer's specifications

<b>art. no.</b>			
<b>LA 34 ...</b>	without air flow chamber		
<b>art. no.</b>			
<b>LA 35 ...</b>	without air flow chamber		
<b>please indicate:</b>		... $\left[ \right]$ 100 150 200 250 300 mm	... fan type 12 = 12 V DC 24 = 24 V DC 48 = 48 V DC

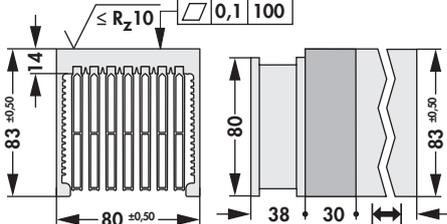
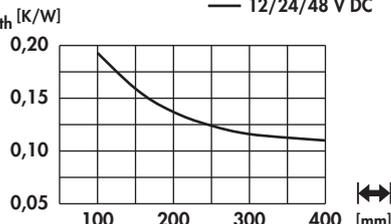
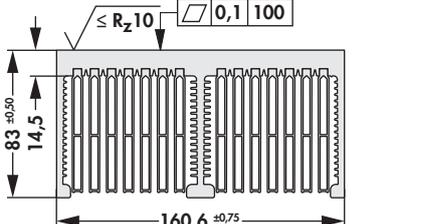
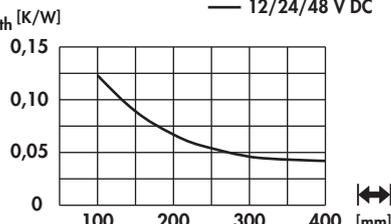
### Technical data of the fans

	... 12	... 24	... 48
<b>type</b>	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
<b>dimensions</b>	80x80x38 mm	80x80x38 mm	80x80x38 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	39 W	38 W	36 W
<b>max. air volume</b>	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	71 dB(A)	71 dB(A)	71 dB(A)
<b>speed</b>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>
<b>weight</b>	200 g	200 g	200 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- hollow-fin geometry of new conception
- enlarged surface due to larger fin quantity
- effective heat dissipation with low pressure drop
- available with and without air-flow chamber
- milled flat semiconductor mounting surface
- mechanical treatments according to customer's specifications

<b>art. no.</b>			
<b>LA V 34 ...</b>	with air flow chamber		— 12/24/48 V DC
<b>art. no.</b>			
<b>LA V 35 ...</b>	with air flow chamber		— 12/24/48 V DC
<b>please indicate:</b>	... $\left[ \right]$ 100 150 200 250 300 mm		<b>... fan type</b> 12 = 12 V DC 24 = 24 V DC 48 = 48 V DC

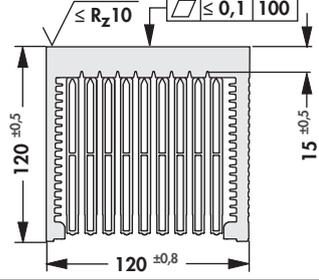
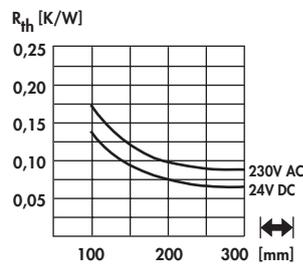
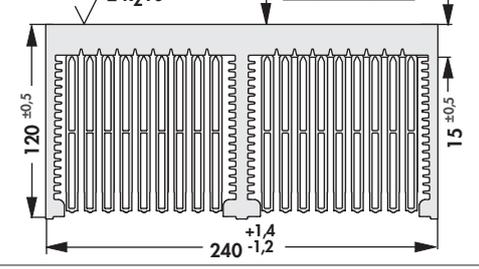
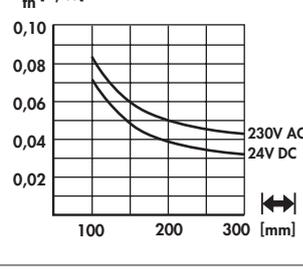
### Technical data of the fans

	... 12	... 24	... 48
<b>type</b>	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
<b>dimensions</b>	80x80x38 mm	80x80x38 mm	80x80x38 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power in out</b>	39 W	38 W	36 W
<b>max. air volume</b>	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	71 dB(A)	71 dB(A)	71 dB(A)
<b>speed</b>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>
<b>weight</b>	200 g	200 g	200 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- particularly effective heat dissipation
- compact design with axial fan
- milled flat semiconductor mounting surface
- additional design to customer's instructions
- other fan types and fan voltages on request

<b>art. no.</b>         <b>LA 14 ...</b>			
without air flow chamber			
<b>art. no.</b>         <b>LA 15 ...</b>			
without air flow chamber			
<b>please indicate:</b> ... $\longleftrightarrow$ <b>100 150 200 250 300 400 mm</b>		<b>... fan type</b> <b>24 = 24 V DC</b> <b>230 = 230 V AC</b>	

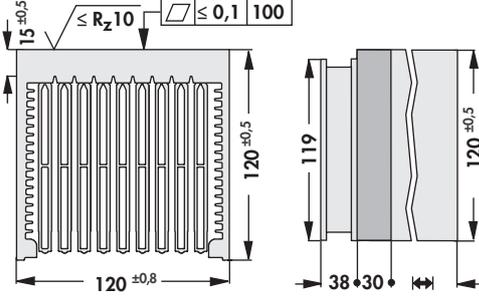
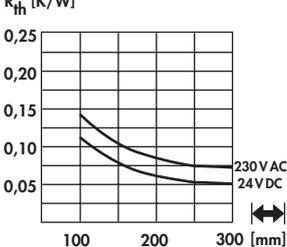
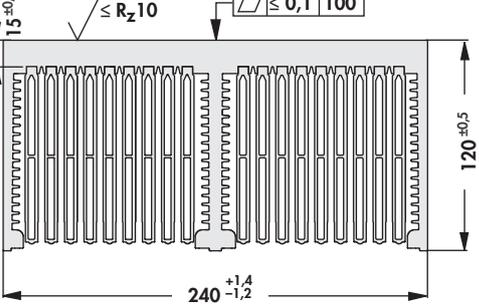
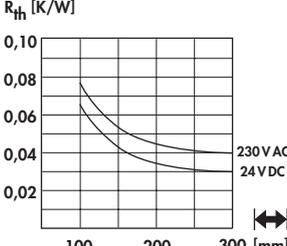
### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 4184NXH	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm	119x119x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	11 W	19 W
<b>max. air volume</b>	237 m <sup>3</sup> /h	160 m <sup>3</sup> /h
<b>temperature range</b>	-30°C ... +70°C	-40°C... +85°C
<b>noise level</b>	57 dB(A)	47 dB(A)
<b>speed</b>	4,400 min <sup>-1</sup>	2,650 min <sup>-1</sup>
<b>weight</b>	390 g	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 70,000 h (40°C)	L <sub>10</sub> < 37,500 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- particularly effective heat dissipation
- compact design with axial fan
- milled flat semiconductor mounting surface
- additional design to customer's instructions on request
- other fan types and fan voltages on request

<b>art. no.</b>			
<b>LA V 14 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 15 ...</b>	with air flow chamber		
<b>please indicate:</b> ... 		<b>... fan type</b>	
100 150 200 250 300 400 mm		24 = 24 V DC 230 = 230 V AC	

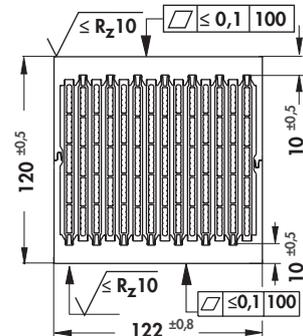
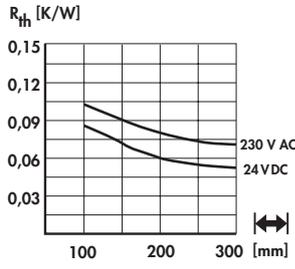
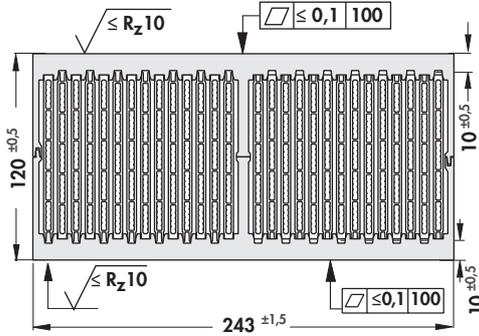
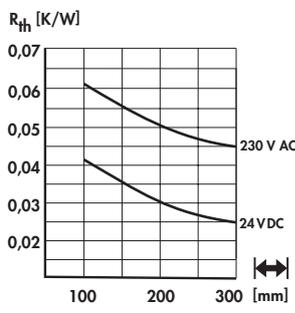
### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 4184NXH	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm	119x119x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	11 W	19 W
<b>max. air volume</b>	237 m <sup>3</sup> /h	160 m <sup>3</sup> /h
<b>temperature range</b>	-30°C ... +70°C	-40°C... +85°C
<b>noise level</b>	57 dB(A)	47 dB(A)
<b>speed</b>	4,400 min <sup>-1</sup>	2,650 min <sup>-1</sup>
<b>weight</b>	390 g	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 70,000 h (40°C)	L <sub>10</sub> < 37,500 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

<b>art. no.</b>  		
<b>LA 17 ...</b>	without air flow chamber	
<b>art. no.</b>  		
<b>LA 18 ...</b>	without air flow chamber	
please indicate: ...  <b>100 150 200 250 300 400 mm</b>		
... fan type <b>24 = 24 V DC</b> <b>230 = 230 V AC</b>		

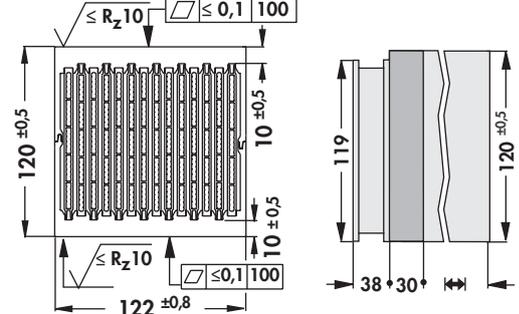
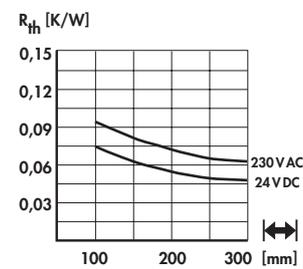
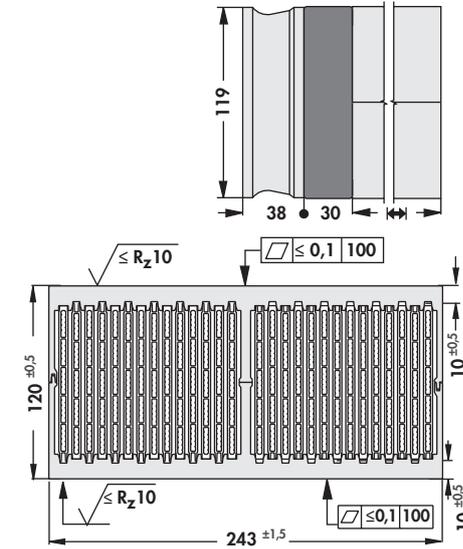
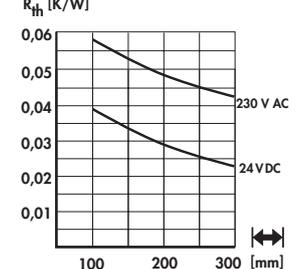
### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 4184NXH	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm	119x119x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	11 W	19 W
<b>max. air volume</b>	237 m <sup>3</sup> /h	160 m <sup>3</sup> /h
<b>temperature range</b>	-30°C ... +70°C	-40°C... +85°C
<b>noise level</b>	57 dB(A)	47 dB(A)
<b>speed</b>	4,400 min <sup>-1</sup>	2,650 min <sup>-1</sup>
<b>weight</b>	390 g	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 70,000 h (40°C)	L <sub>10</sub> < 37,500 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

<b>art. no.</b>  		
<b>LA V 17 ...</b> with air flow chamber		
<b>art. no.</b>  		
<b>LA V 18 ...</b> with air flow chamber		
<b>please indicate:</b> ...  <b>100 150 200 250 300 400 mm</b>		
<b>... fan type</b> <b>24 = 24 V DC</b> <b>230 = 230 V AC</b>		

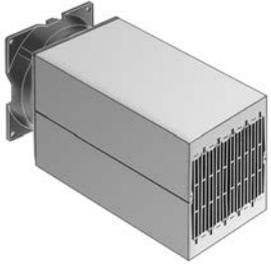
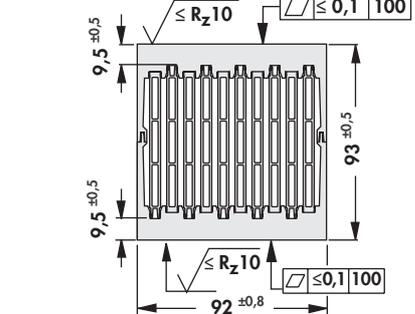
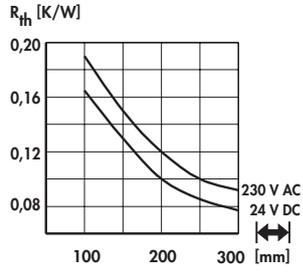
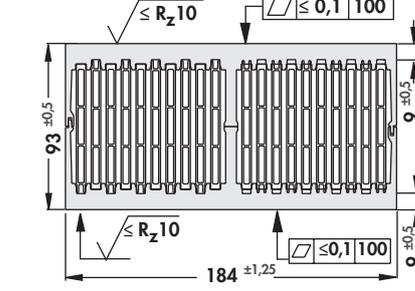
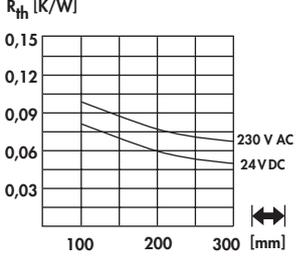
### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 4184NXH	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm	119x119x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	11 W	19 W
<b>max. air volume</b>	237 m <sup>3</sup> /h	160 m <sup>3</sup> /h
<b>temperature range</b>	-30°C ... +70°C	-40°C... +85°C
<b>noise level</b>	57 dB(A)	47 dB(A)
<b>speed</b>	4,400 min <sup>-1</sup>	2,650 min <sup>-1</sup>
<b>weight</b>	390 g	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 70,000 h (40°C)	L <sub>10</sub> < 37,500 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

<b>art. no.</b> 		
<b>LA 21 ...</b>	without air flow chamber	
<b>art. no.</b> 		
<b>LA 22 ...</b>	without air flow chamber	
<b>please indicate:</b> ... $\longleftrightarrow$ <b>100 150 200 250 300 400 mm</b>		
... <b>fan type</b> 24 = 24 V DC 230 = 230 V AC		

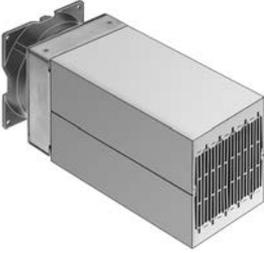
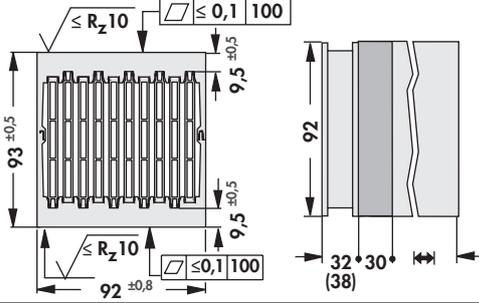
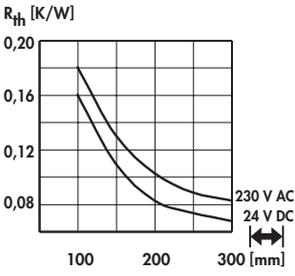
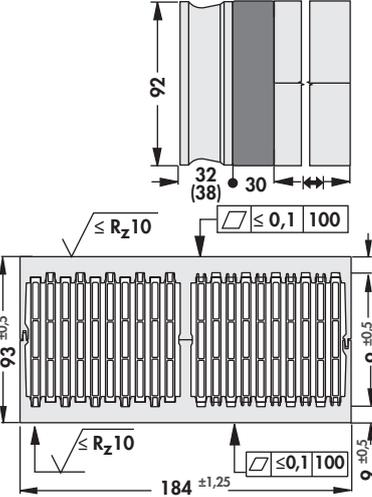
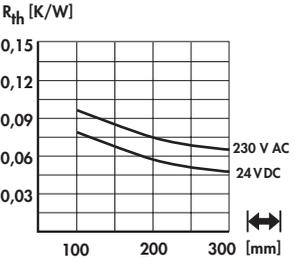
### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 3314 NHH	ebmpapst 3656
<b>dimensions</b>	92x92x32 mm	92x92x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	3.4 W	12 W
<b>max. air volume</b>	107 m <sup>3</sup> /h	75 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... 75°C	-40°C... +75°C
<b>noise level</b>	42 dB(A)	37 dB(A)
<b>speed</b>	3,450 min <sup>-1</sup>	2,700 min <sup>-1</sup>
<b>weight</b>	190 g	420 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> < 52,500 h (40°C)

## Cooling aggregates with axial fan

### Hollow-fin cooling aggregates

- extremely low losses due to optimised hollow fin geometry
- effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

<b>art. no.</b>			
<b>LA V 21 ...</b>	with air flow chamber		
<b>art. no.</b>			
<b>LA V 22 ...</b>	with air flow chamber		
<b>please indicate:</b>	...  <b>100 150 200 250 300 400 mm</b>	<b>... fan type</b>	<b>24 = 24 V DC</b> <b>230 = 230 V AC</b>

### Technical data of the fans

	<b>... 24</b>	<b>... 230</b>
<b>type</b>	ebmpapst 3314 NHH	ebmpapst 3656
<b>dimensions</b>	92x92x32 mm	92x92x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	3.4 W	12 W
<b>max. air volume</b>	107 m <sup>3</sup> /h	75 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... 75°C	-40°C... +75°C
<b>noise level</b>	42 dB(A)	37 dB(A)
<b>speed</b>	3,450 min <sup>-1</sup>	2,700 min <sup>-1</sup>
<b>weight</b>	190 g	420 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> < 52,500 h (40°C)

**Miniature cooling aggregates** → D 9 - 12  
**Protection grid for axial fans** → D 55  
**Drilling pattern for Solid State Relais** → A 12  
**High capacity heatsinks** → A 0 - 0

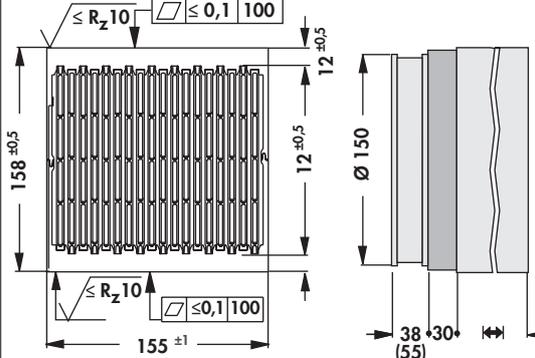
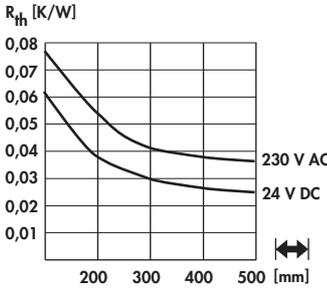
**Special heatsink design** → A 143 - 144  
**Heatsinks with hollow fin profile** → D 50  
**Thermal interface material** → E 0 - 0  
**Technical introduction** → A 2 - 8

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## Cooling aggregates with axial fan

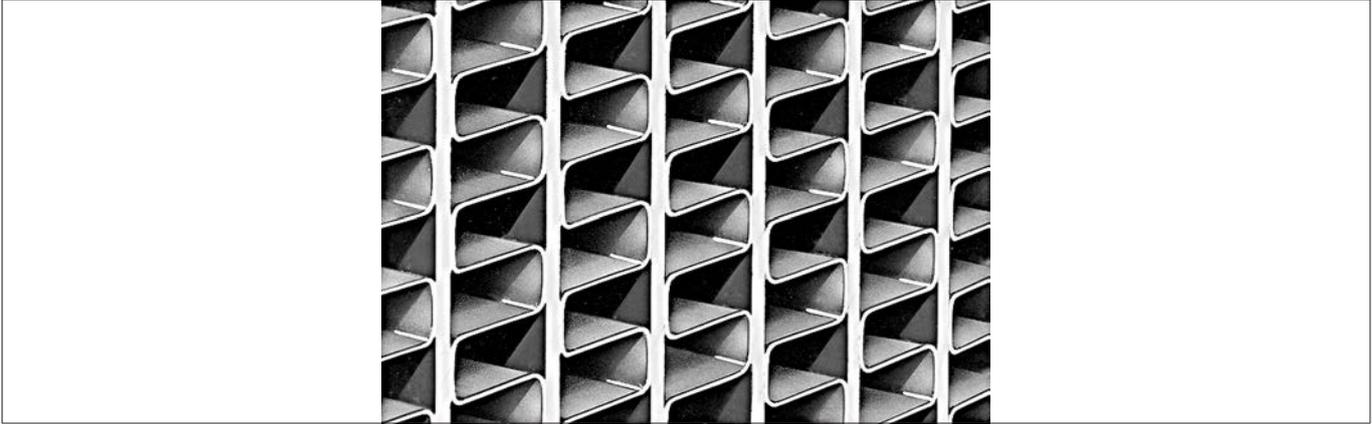
### Hollow-fin cooling aggregates

- extremely low losses due optimised hollow fin geometry
- especially effective heat dissipation
- compact construction with axial fans
- two opposite mounting surfaces are milled flat
- additional treatment upon customer's request
- other fan types and fan voltages on request

<b>art. no.</b>			
<b>LA V 24 ...</b>	with air flow chamber		
<b>please indicate:</b> ... $\left  \right $		<b>200 300 400 mm</b>	<b>... fan type</b> 24 = 24 V DC 230 = 230 V AC

### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst, ball bearing, with grid	ebmpapst, ball bearing, with grid
<b>dimensions</b>	Ø150x38 mm	Ø150x55 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	19 W	47 W
<b>max. air volume</b>	420 m <sup>3</sup> /h	380 m <sup>3</sup> /h
<b>temperature range</b>	-25°C... +72°C	-30°C... +60°C
<b>noise level</b>	59 dB(A)	60 dB(A)
<b>speed</b>	3,350 min <sup>-1</sup>	2,700 min <sup>-1</sup>
<b>weight</b>	620 g	1,100 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 75,000 h (40°C)	L <sub>10</sub> < 40,000 h (40°C)

**High performance cooling aggregate**


extremely low losses of air flow as compared to cooling aggregates with extruded aluminium

- compact dimensions, that means high performance density due to large heat-conducting surfaces
- maximum heat flow due to brazing or thermal adhesion
- high performance cooling aggregates are only effective with forced ventilation by means of the fan, but not with free convection
- other fan types and fan voltages on request

**material:** solder-plated aluminium sheet, thus minimal weight due to the thickness of the material

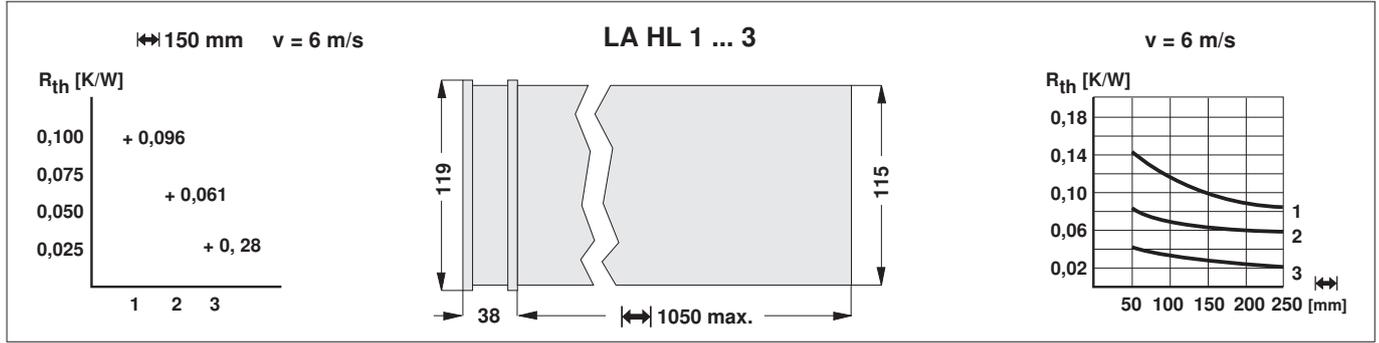
An optimised unit for any application can be produced from the wide range of existing components upon request.  
The specific capacity will be determined by a test run upon customer's request.

**Technical data of the fans**

	<b>... 230</b>
<b>type</b>	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm
<b>tension</b>	230 V AC
<b>power in/out</b>	19 W
<b>max. air volume</b>	160 m <sup>3</sup> /h
<b>temperature range</b>	-40°C... +85°C
<b>noise level</b>	47 dB(A)
<b>speed</b>	2,650 min <sup>-1</sup>
<b>weight</b>	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 37,500 h (40°C)

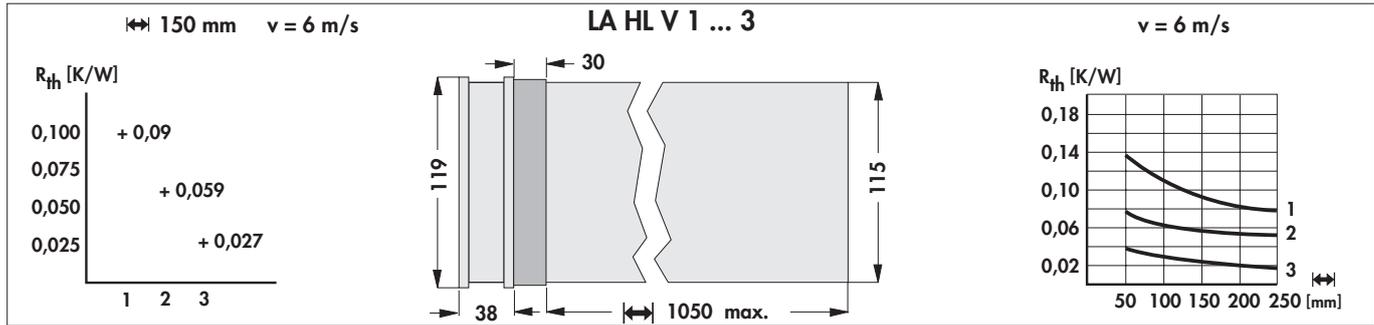
## Cooling aggregates with axial fan

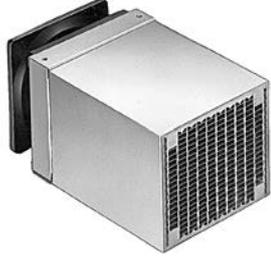
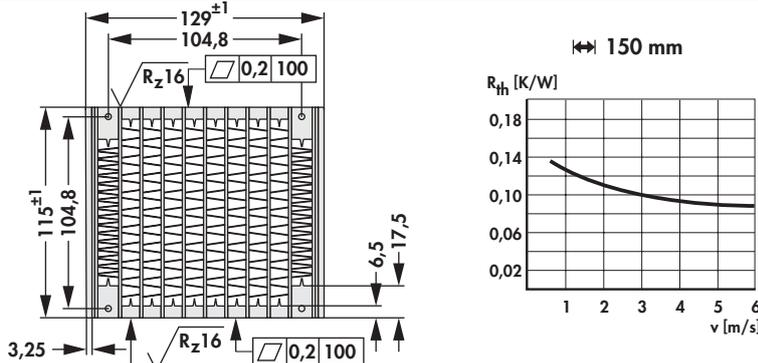
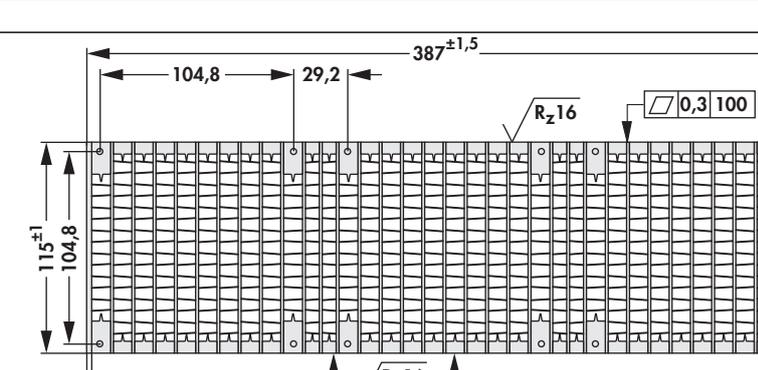
### High performance cooling aggregate



<p>art. no.</p> 	<p>without air flow chamber</p>		<p><math>\text{v} = 6 \text{ m/s}</math></p> <p><math>R_{th} \text{ [K/W]}</math></p> <p>0,18 0,14 0,10 0,06 0,02</p> <p>1 2 3 4 5 6 v [m/s]</p>
<p>LA HL 1 ...</p> <p>art. no.</p> 	<p>without air flow chamber</p>		
<p>LA HL 2 ...</p> <p>art. no.</p> 	<p>without air flow chamber</p>		
<p>LA HL 3 ...</p> <p>without air flow chamber</p>		<p>please indicate: ... <math>\text{v}</math></p> <p>100 150 200 250 300 400 mm</p>	

### High performance cooling aggregate



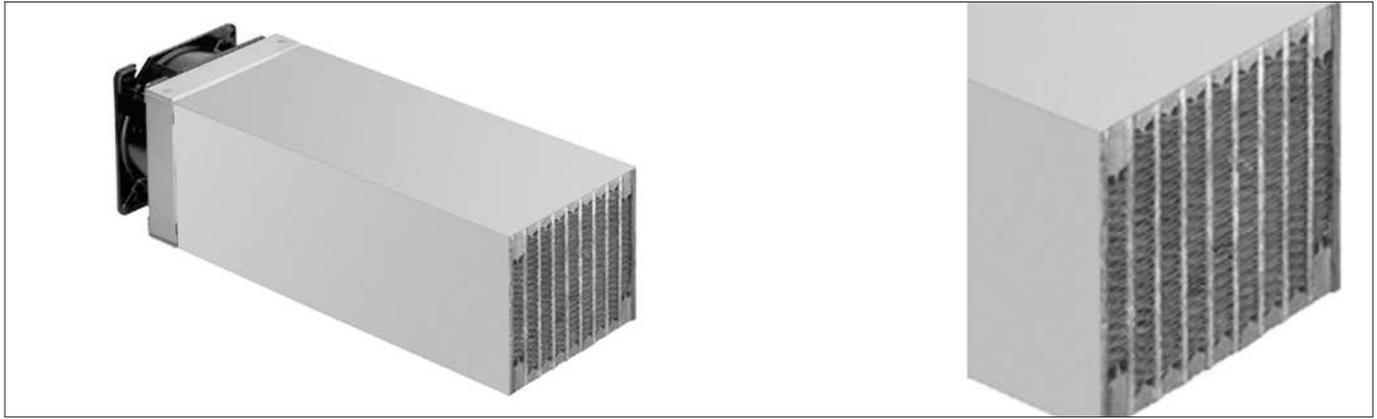
<b>art. no.</b>  	
<b>LA HL V 1 ...</b>	with air flow chamber
<b>art. no.</b>  	
<b>LA HL V 2 ...</b>	with air flow chamber
<b>art. no.</b>  	
<b>LA HL V 3 ...</b>	with air flow chamber
<b>please indicate:</b> ... $\left[ \right]$ 100 150 200 250 300 400 mm	

Miniature cooling aggregates → D 9 - 12  
 Protection grid for axial fans → D 55  
 Drilling pattern for Solid State Relais → A 12  
 High capacity heatsinks → A 0 - 0

→ D 9 - 12  
 → D 55  
 → A 12  
 → A 0 - 0

Special heatsink design → A 145 - 148  
 Heatsinks with hollow fin profile → D 50  
 Thermal interface material → E 0 - 0  
 Technical introduction → A 2 - 8

→ A 145 - 148  
 → D 50  
 → E 0 - 0  
 → A 2 - 8



**High performance cooling aggregate**

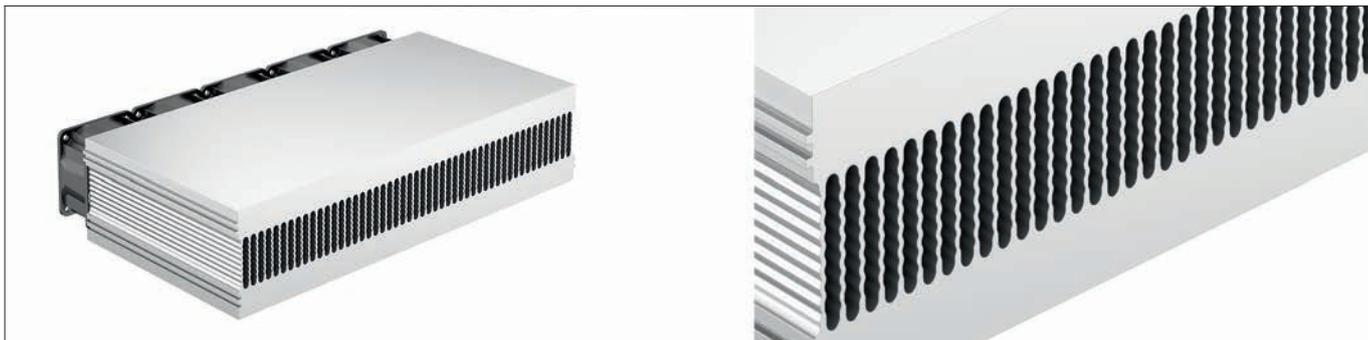
- innovative, efficient heatsink design
- thick multiwall sheets for maximum heat dissipation
- specially formed laminated structures ensure optimum heat exchange with the air flow
- powerful mixed axial fan for highly efficient heat dissipation
- reduced noise output achieved by an optimised adaption of fan and heatsink
- additional treatment and modifications upon customer's request
- double and triple versions upon request

<b>art. no.</b>			
<b>LAHL D 1 ...</b>	please indicate: ... $\leftarrow \rightarrow$ <b>100 150 200 250 300 400 mm</b>	... <b>fan type</b> <b>12 = 12 V DC</b> <b>24 = 24 V DC</b>	

**Technical data of the fans**

	<b>... 12</b>	<b>... 24</b>
<b>type</b>	ebmpapst 4112NH3	ebmpapst 4114NH3
<b>dimensions</b>	119x119x38 mm	119x119x38 mm
<b>tension</b>	12 V DC	24 V DC
<b>power in/out</b>	21 W	19,5 W
<b>max. air volume</b>	310 m <sup>3</sup> /h	310 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +65°C	-20°C... +65°C
<b>noise level</b>	65 dB(A)	65 dB(A)
<b>speed</b>	6,000 min <sup>-1</sup>	6,000 min <sup>-1</sup>
<b>weight</b>	390 g	390 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 60,000 h (40°C) L <sub>10</sub> > 37,500 h (tmax)	L <sub>10</sub> > 65,000 h (40°C) L <sub>10</sub> > 37,500 h (tmax)





**High performance cooling aggregate**

- cooling aggregates of special conception with pressed in fins
- enlarged surface by means of fluted fin geometry
- flow-optimised hollow fin structure
- milled flat mounting surface for component assembly
- maximum heatsink length 300 mm
- special designs and other fans upon request

<b>art. no.</b>			
<b>LA HPK 1 ...</b>	without air flow chamber		
<b>please indicate:</b>	... $\left[ \begin{array}{c} \leftarrow \rightarrow \\ \hline 100 \quad 150 \quad 200 \quad 250 \quad 300 \text{ mm} \end{array} \right]$	<b>... fan type</b>	12 = 12 V DC 24 = 24 V DC 48 = 48 V DC

**Technical data of the fans**

	... 12	... 24	... 48
<b>type</b>	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
<b>dimensions</b>	60x60x32 mm	60x60x32 mm	60x60x32 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	7.7 W	14.6 W	14.6 W
<b>max. air volume</b>	70 m <sup>3</sup> /h	82 m <sup>3</sup> /h	82 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
<b>noise level</b>	53 dB(A)	62 dB(A)	62 dB(A)
<b>speed</b>	11,700 min <sup>-1</sup>	15,000 min <sup>-1</sup>	15,000 min <sup>-1</sup>
<b>weight</b>	100 g	100 g	100 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)



### High performance cooling aggregate

- cooling aggregates of special conception with pressed in fins
- enlarged surface by means of fluted fin geometry
- flow-optimised hollow fin structure
- milled flat mounting surface for component assembly
- maximum heatsink length 300 mm
- special designs and other fans upon request

art. no.				
<b>LA V HPK 1 ...</b>	without air flow chamber			
<b>please indicate:</b>	... <b>100 150 200 250 300 mm</b>		<b>... fan type</b> <b>12 = 12 V DC</b> <b>24 = 24 V DC</b> <b>48 = 48 V DC</b>	

### Technical data of the fans

	... 12	... 24	... 48
<b>type</b>	ebmpapst 612 JH	ebmpapst 614 J/2HHP	ebmpapst 618 J/2HHP
<b>dimensions</b>	60x60x32 mm	60x60x32 mm	60x60x32 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	7.7 W	14.6 W	14.6 W
<b>max. air volume</b>	70 m <sup>3</sup> /h	82 m <sup>3</sup> /h	82 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... 75°C	-20°C... 75°C
<b>noise level</b>	53 dB(A)	62 dB(A)	62 dB(A)
<b>speed</b>	11,700 min <sup>-1</sup>	15,000 min <sup>-1</sup>	15,000 min <sup>-1</sup>
<b>weight</b>	100 g	100 g	100 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)	L <sub>10</sub> > 65,000 h (40°C)

A  
B  
C  
**D**  
E  
F  
G  
H  
I  
K  
L  
M  
N



**High performance cooling aggregate**

- cooling aggregates of special conception with pressed in fins
- enlarged surface by means of fluted fin geometry
- flow-optimised hollow fin structure
- milled flat mounting surface for component assembly
- maximum heatsink length 300 mm
- special designs and other fans upon request

<b>art. no.</b>			
<b>LA HPK 2 ...</b>	without air flow chamber		
<b>please indicate:</b>	... $\left[ \right]$ <b>100 150 200 250 300 mm</b>	<b>... fan type</b>	<b>12 = 12 V DC</b> <b>24 = 24 V DC</b> <b>48 = 48 V DC</b>

**Technical data of the fans**

	... 12	... 24	... 48
<b>type</b>	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
<b>dimensions</b>	80x80x38 mm	80x80x38 mm	80x80x38 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power in/out</b>	39 W	38 W	36 W
<b>max. air volume</b>	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	71 dB(A)	71 dB(A)	71 dB(A)
<b>speed</b>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>
<b>weight</b>	200 g	200 g	200 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)



**High performance cooling aggregate**

- cooling aggregates of special conception with pressed in fins
- enlarged surface by means of fluted fin geometry
- flow-optimised hollow fin structure
- milled flat mounting surface for component assembly
- maximum heatsink length 300 mm
- special designs and other fans upon request

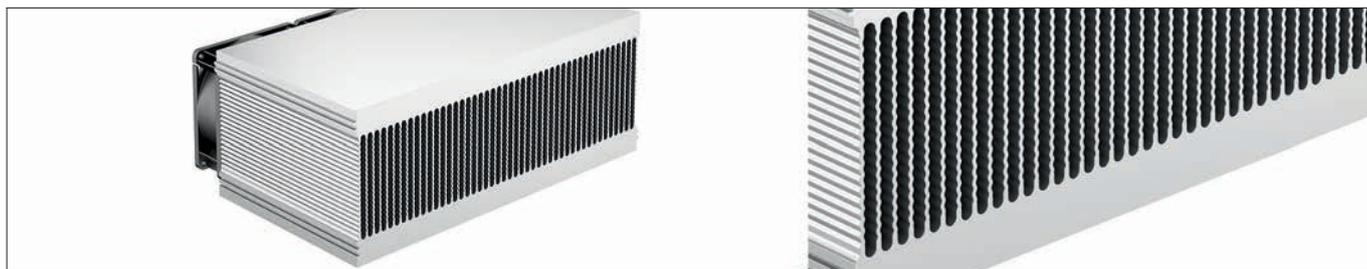
<b>art. no.</b>	
<b>LA V HPK 2 ...</b>	without air flow chamber
<b>please indicate:</b>	... $\left[ \begin{array}{c} \text{---} \\ \text{---} \end{array} \right]$ <b>100 150 200 250 300 mm</b>
	<b>... fan type</b> <b>12 = 12 V DC</b> <b>24 = 24 V DC</b> <b>48 = 48 V DC</b>

**Technical data of the fans**

	... 12	... 24	... 48
<b>type</b>	ebmpapst 8212 JH4	ebmpapst 8214 JH4	ebmpapst 8218 JH4
<b>dimensions</b>	80x80x38 mm	80x80x38 mm	80x80x38 mm
<b>tension</b>	12 V DC	24 V DC	48 V DC
<b>power inout</b>	39 W	38 W	36 W
<b>max. air volume</b>	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h	222 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +70°C	-20°C... +70°C	-20°C... +70°C
<b>noise level</b>	71 dB(A)	71 dB(A)	71 dB(A)
<b>speed</b>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>	14,000 min <sup>-1</sup>
<b>weight</b>	200 g	200 g	200 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)	L <sub>10</sub> > 50,000 h (40°C)

A  
B  
C  
**D**  
E  
F  
G  
H  
I  
K  
L  
M  
N

Cooling aggregates with axial fan



High performance cooling aggregate

- high performance cooling aggregates of special design
- optimal pressed in single lamellae
- low pressure losses due to adjusted fin geometry
- smallest fin spacings give a big heat exchange area
- maximum heatsink length 300 mm
- special designs according to drawing

<b>art. no.</b>	
<b>LA HPK 3 ...</b>	without air flow chamber
<b>please indicate:</b>	... $\left[ \right]$ 100 150 200 250 300 mm
	... fan type 24 = 24 V DC 230 = 230 V AC

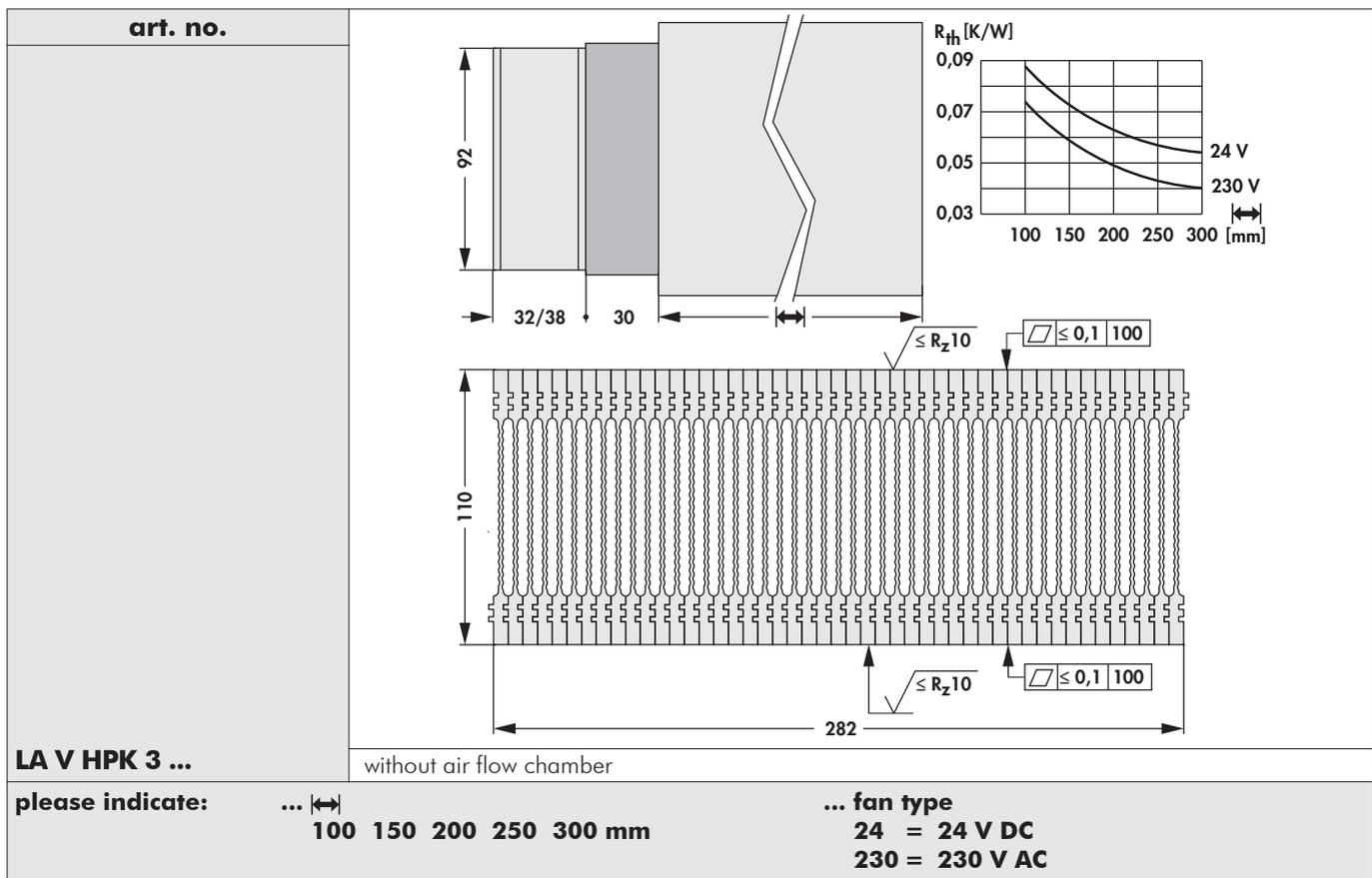
Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 3314 NHH	ebmpapst 3656
<b>dimensions</b>	92x92x32 mm	92x92x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power in/out</b>	3.4 W	12 W
<b>max. air volume</b>	107 m <sup>3</sup> /h	75 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... 75°C	-40°C... +75°C
<b>noise level</b>	42 dB(A)	37 dB(A)
<b>speed</b>	3,450 min <sup>-1</sup>	2,700 min <sup>-1</sup>
<b>weight</b>	190 g	420 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> < 52,500 h (40°C)



### High performance cooling aggregate

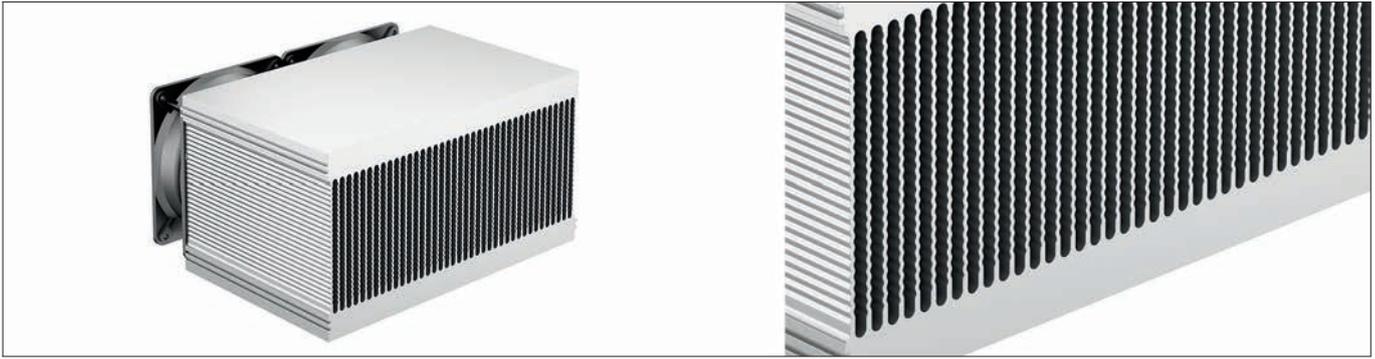
- high performance cooling aggregates of special design
- optimal pressed in single lamellae
- low pressure losses due to adjusted fin geometry
- smallest fin spacings give a big heat exchange area
- maximum heatsink length 300 mm
- special designs according to drawing



### Technical data of the fans

	... 24	... 230
<b>type</b>	ebmpapst 3314 NHH	ebmpapst 3656
<b>dimensions</b>	92x92x32 mm	92x92x38 mm
<b>tension</b>	24 V DC	230 V AC
<b>power inout</b>	3.4 W	12 W
<b>max. air volume</b>	107 m <sup>3</sup> /h	75 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... 75°C	-40°C... +75°C
<b>noise level</b>	42 dB(A)	37 dB(A)
<b>speed</b>	3,450 min <sup>-1</sup>	2,700 min <sup>-1</sup>
<b>weight</b>	190 g	420 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> < 57,500 h (40°C)	L <sub>10</sub> < 52,500 h (40°C)

Cooling aggregates with axial fan



High performance cooling aggregate

- high performance cooling aggregates of special design
- optimal pressed in single lamellae
- low pressure losses due to adjusted fin geometry
- smallest fin spacings give a big heat exchange area
- maximum heatsink length 300 mm
- special designs according to drawing

<b>art. no.</b>		
<b>LA HPK 4 ...</b>	without air flow chamber	
<b>please indicate:</b>	... $\longleftrightarrow$ <b>100 150 200 250 300 mm</b>	<b>... fan type</b> <b>12 = 12 V DC</b> <b>24 = 24 V DC</b> <b>230 = 230 V AC</b>

Technical data of the fans

	... 12	... 24	... 230
<b>type</b>	ebmpapst 4112NH3	ebmpapst 4114NH3	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm	119x119x38 mm	119x119x38 mm
<b>tension</b>	12 V DC	24 V DC	230 V AC
<b>power inout</b>	21 W	19.5 W	19 W
<b>max. air volume</b>	310 m <sup>3</sup> /h	310 m <sup>3</sup> /h	160 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +65°C	-20°C... +65°C	-40°C... +85°C
<b>noise level</b>	65 dB(A)	65 dB(A)	47 dB(A)
<b>speed</b>	6,000 min <sup>-1</sup>	6,000 min <sup>-1</sup>	2,650 min <sup>-1</sup>
<b>weight</b>	390 g	390 g	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 60,000 h (40°C) L <sub>10</sub> > 37,500 h (tmax)	L <sub>10</sub> > 65,000 h (40°C) L <sub>10</sub> > 37,500 h (tmax)	L <sub>10</sub> < 37,500 h (40°C)



### High performance cooling aggregate

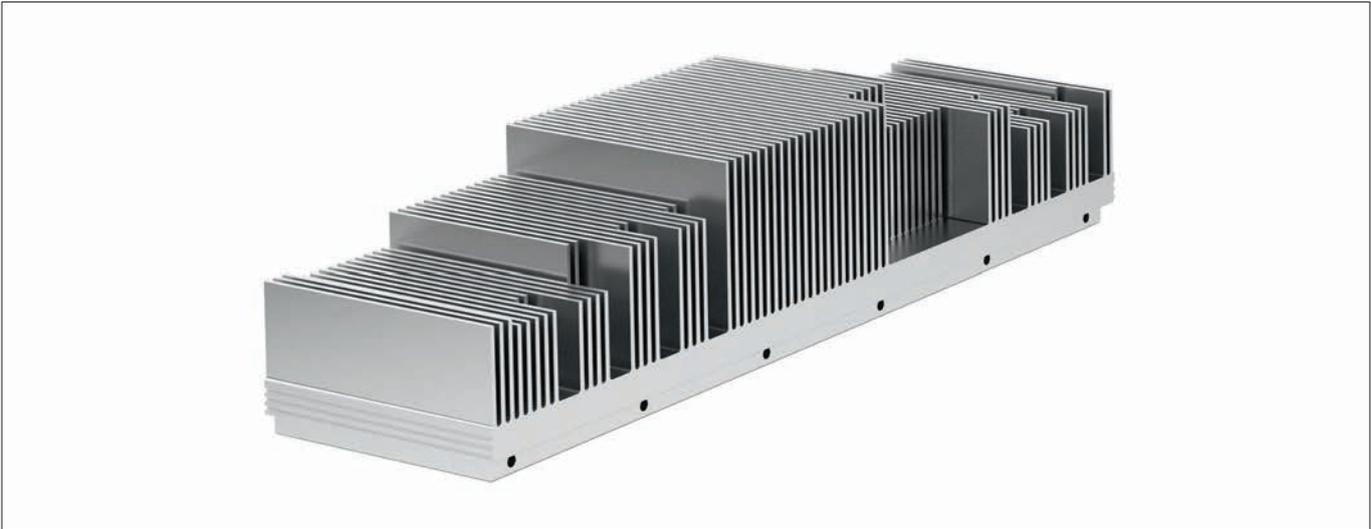
- high performance cooling aggregates of special design
- optimal pressed in single lamellae
- low pressure losses due to adjusted fin geometry
- smallest fin spacings give a big heat exchange area
- maximum heatsink length 300 mm
- special designs according to drawing

art. no.		
<b>LA V HPK 4 ...</b>		
<b>please indicate:</b>	... <b>100 150 200 250 300 mm</b>	<b>... fan type</b> 12 = 12 V DC 24 = 24 V DC 230 = 230 V AC
	without air flow chamber	

### Technical data of the fans

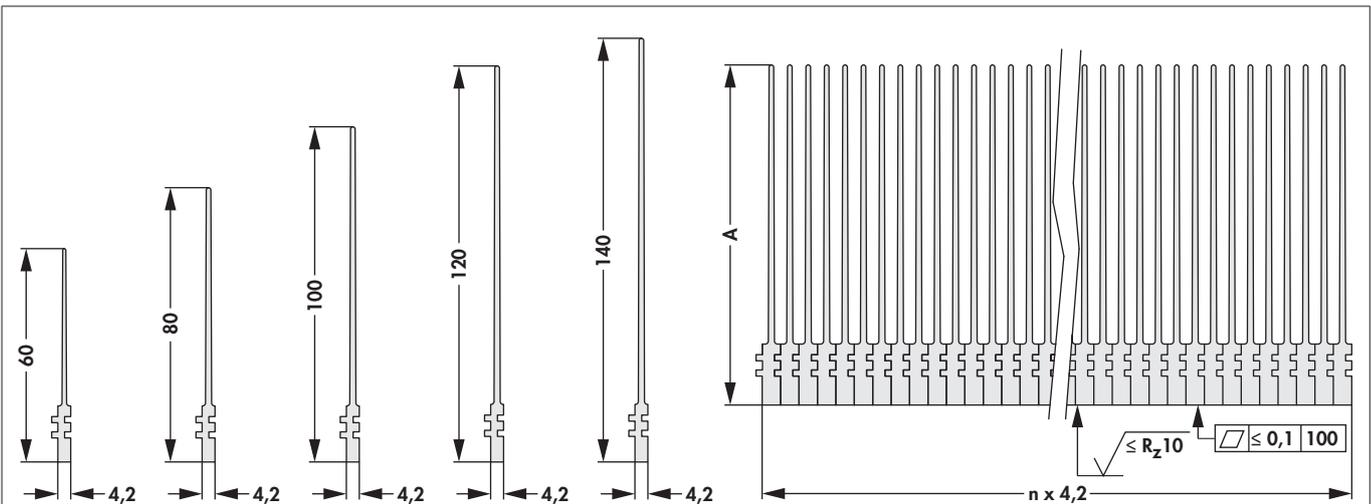
	... 12	... 24	... 230
<b>type</b>	ebmpapst 4112NH3	ebmpapst 4114NH3	ebmpapst 4656N
<b>dimensions</b>	119x119x38 mm	119x119x38 mm	119x119x38 mm
<b>tension</b>	12 V DC	24 V DC	230 V AC
<b>power inout</b>	21 W	19.5 W	19 W
<b>max. air volume</b>	310 m <sup>3</sup> /h	310 m <sup>3</sup> /h	160 m <sup>3</sup> /h
<b>temperature range</b>	-20°C... +65°C	-20°C... +65°C	-40°C... +85°C
<b>noise level</b>	65 dB(A)	65 dB(A)	47 dB(A)
<b>speed</b>	6,000 min <sup>-1</sup>	6,000 min <sup>-1</sup>	2,650 min <sup>-1</sup>
<b>weight</b>	390 g	390 g	550 g
<b>failure rate (L<sub>10</sub>)</b>	L <sub>10</sub> > 60,000 h (40°C) L <sub>10</sub> > 37,500 h (tmax)	L <sub>10</sub> > 65,000 h (40°C) L <sub>10</sub> > 37,500 h (tmax)	L <sub>10</sub> < 37,500 h (40°C)

Cooling aggregates with axial fan



High performance heatsinks

- flexible designable heatsink solutions
- modular system with different fin heights
- for free and forced convection
- milled flat semiconductor mounting surface
- maximum heatsink length 420 mm
- customer specific designs, machinings and surfaces upon request



art. no.	A [mm]
HPK 60 ...	60
HPK 80 ...	80
HPK 100 ...	100
HPK 120 ...	120
HPK 140 ...	140

please indicate: ... number of fins (min. - max.) 24 - 83 ...  $\longleftrightarrow$  100 150 200 250 300 mm

... surface  
 SA = black anodised  
 ME = natural colour anodised

## High-performance heatsinks

### High performance heatsinks with hollow-fin profile

- high performance heatsinks for fan operation
- exclusively for forced convection
- preferably for radial or tangential fans
- hollow fin geometry optimises the air flow
- particularly effective heat dissipation
- milled flat base (except length 1000 mm)

<b>art. no.</b>		<p><math>R_{th} [K/W] \quad v = 5 \text{ m/s}</math></p>
<b>SK 497 ...</b>		
<b>art. no.</b>		<p><math>R_{th} [K/W] \quad v = 5 \text{ m/s}</math></p>
<b>SK 498 ...</b>		
<b>please indicate:</b>	... $\left[ \text{mm} \right]$ 150 200 250 300 1000 mm	<b>... surface</b> SA = black anodised AL = raw degreased aluminium (by the metre raw aluminium)

	<p><math>R_{th} [K/W] \quad v = 5 \text{ m/s}</math></p>				
<b>art. no.</b>	number of fins	dim. [mm]	A	B	C
<b>SK 440 ...</b>	15	84 ± 1	84 ± 1	200 ± 1.2	16
<b>SK 458 ...</b>	19			250 ± 1.4	
<b>SK 441 ...</b>	23			300 ± 1.6	
<b>SK 461 ...</b>	31	88 ± 1	88 ± 1	400 ± 2.0	20
<b>SK 661 ...</b>	48	84 ± 1	84 ± 1	500 ± 2.5	19
<b>please indicate:</b>	... $\left[ \text{mm} \right]$ 150 200 300 1000 mm	<b>... surface</b> SA = black anodised AL = raw degreased aluminium (by the metre raw aluminium)			

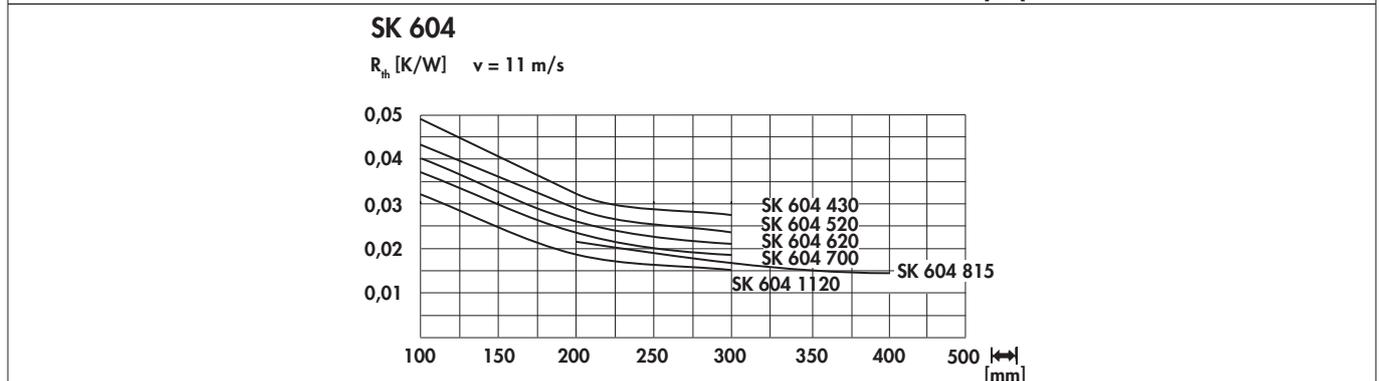
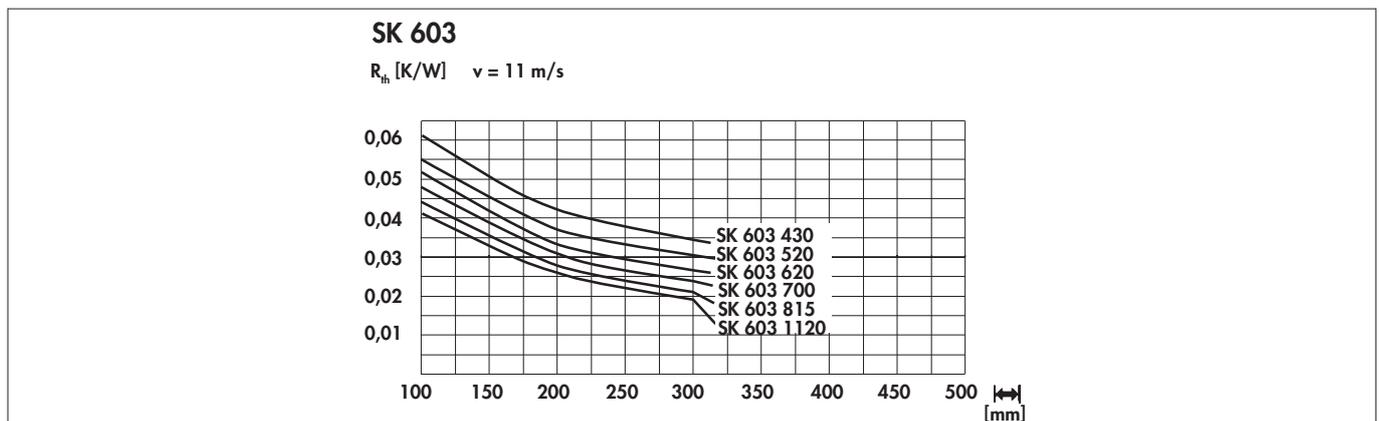
## High performance heatsinks with hollow-fin profile

- high capacity heatsinks for fan operation preferably for radial- or tangential fan motors
- universal modular design
- exclusively for forced convection
- flow-optimized hollow fin geometry
- minimum order quantity: 1000 kg, samples on request

art. no.	number of fins	dim. [mm]
SK 603 ...	25	A 200
SK 604 ...	32	250
SK 605 ...	39	300
SK 606 ...	45	350
SK 607 ...	52	400
SK 608 ...	65	500

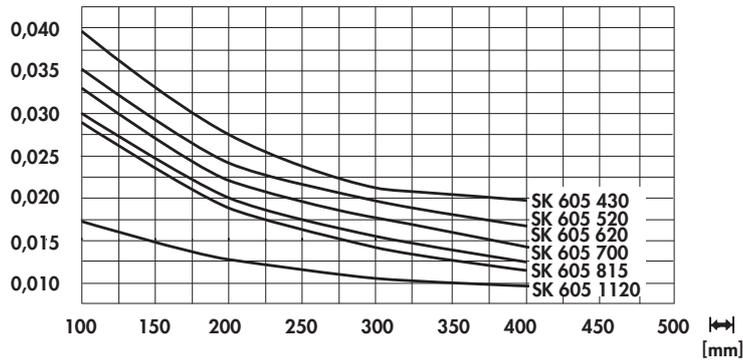
please indicate:    ... fin height    ...  $\longleftrightarrow$     ... surface

430 = 43 mm	200 300 400 500 mm	SA = black anodised
520 = 52 mm		ME = natural colour anodised
620 = 62 mm		
700 = 70 mm		
815 = 81.5 mm		
1120 = 112 mm		



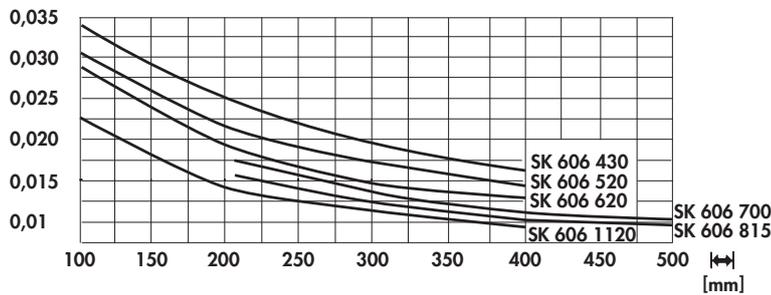
**SK 605**

$R_{th}$  [K/W]  $v = 11$  m/s



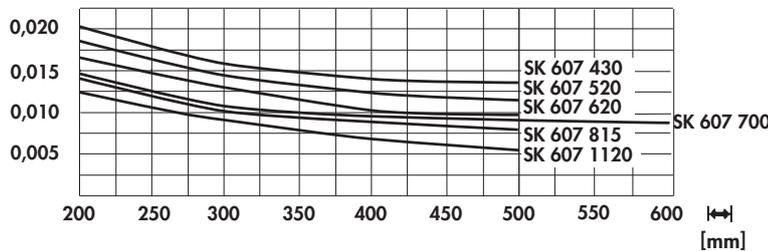
**SK 606**

$R_{th}$  [K/W]  $v = 11$  m/s



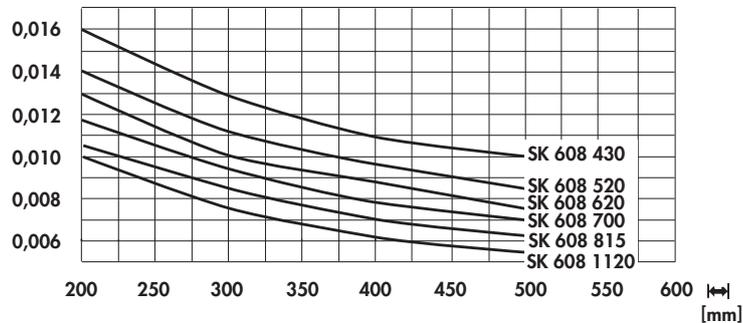
**SK 607**

$R_{th}$  [K/W]  $v = 11$  m/s



**SK 608**

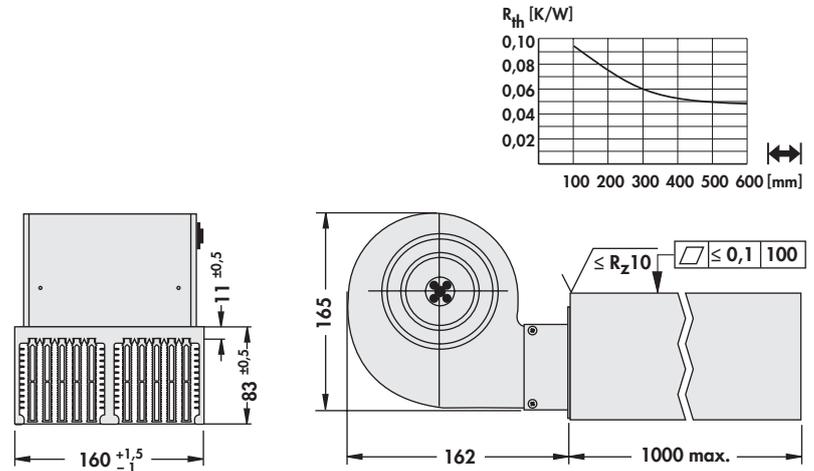
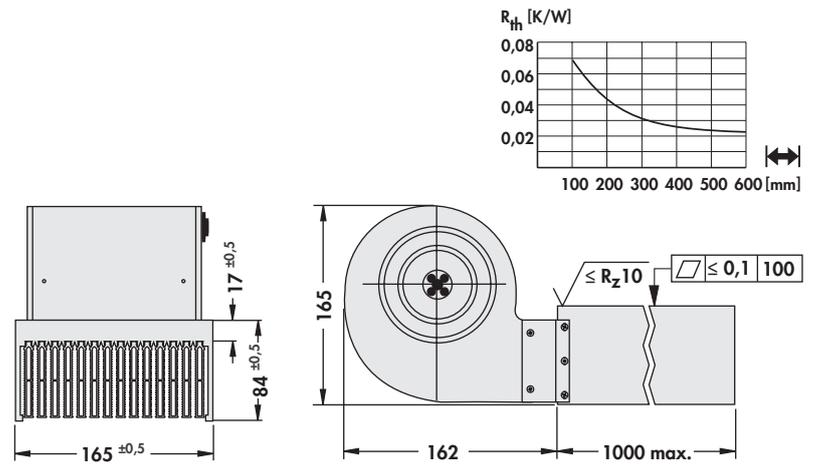
$R_{th}$  [K/W]  $v = 11$  m/s



## Cooling aggregates with radial fan

### High performance cooling aggregate

- optimised air flow due to hollow fin geometrie
- very good thermal performance
- optimized high performance construction with radial fan
- milled flat mounting surface for semiconductor
- cover plate for fin side upon request
- additional customized treatment upon request
- fan condenser: **art. no. LAHLR K 2**

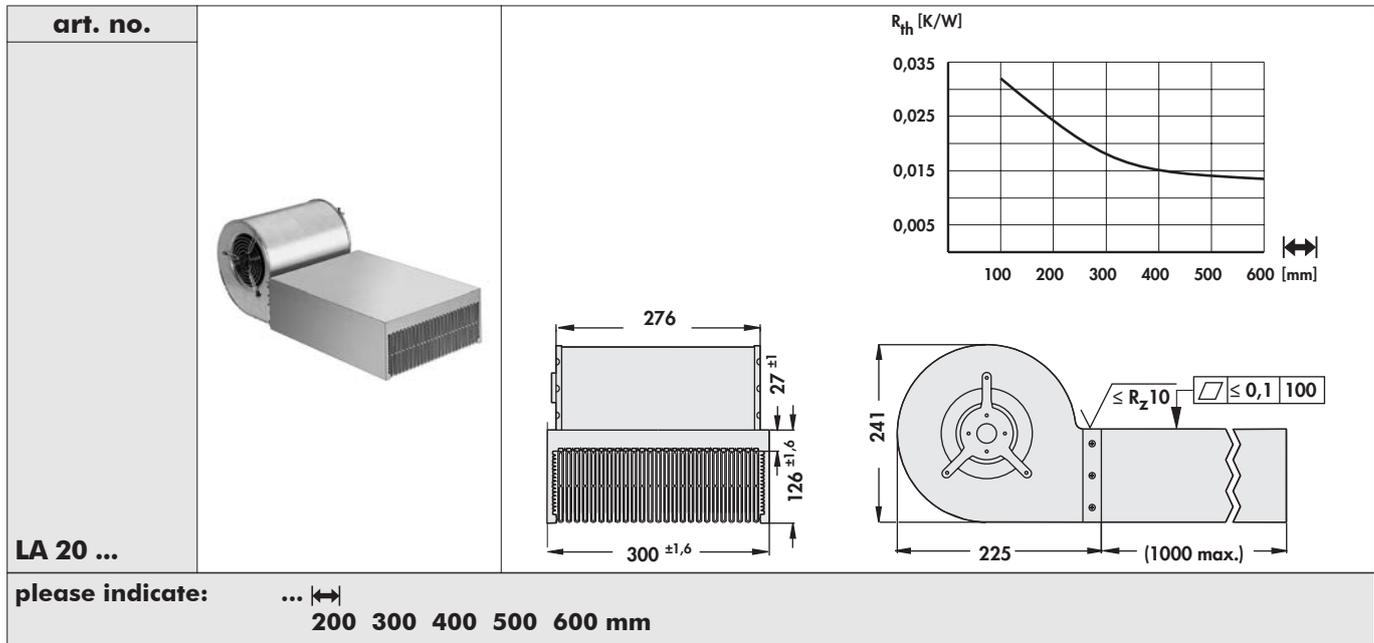
<b>art. no.</b>          <b>LA 25 ...</b>		
<b>art. no.</b>          <b>LA 26 ...</b>		
<b>please indicate:</b> ... $\longleftrightarrow$ 200 300 400 500 600 mm		

### Technical data of the fans

	... 230
<b>type</b>	ebmpapst, radial blower with grid, double sided absorption
<b>bearing type</b>	ball bearing
<b>discharge air flow</b>	435 m <sup>3</sup> /h
<b>rotation speed</b>	1,950 min <sup>-1</sup>
<b>power inout</b>	87 W
<b>current consumption</b>	0.39 A
<b>temperature range</b>	-25°C... +40°C
<b>circuit voltage</b>	230 V AC
<b>motor condenser</b>	2 μF/400 V
<b>noise level</b>	58 dB(A)
<b>weight</b>	1,500 g

**High performance cooling aggregate**

- optimised air flow due to hollow fin geometrie
- very good thermal performance
- optimized high performance construction with radial fan
- milled flat mounting surface for semiconductor
- cover plate for fin side upon request
- additional customized treatment upon request
- fan condenser: **art. no. LA 20 K 6**


**Technical data of the fans**

	<b>... 230</b>
<b>bearing type</b>	ball bearing
<b>type</b>	ebmpapst, radial blower with grid, double sided absorbtion
<b>discharge air flow</b>	1,310 m <sup>3</sup> /h
<b>rotation speed</b>	1,350 min <sup>-1</sup>
<b>power inout</b>	185 W
<b>current consumption</b>	0.81 A
<b>circuit voltage</b>	230 V AC
<b>temperature range</b>	-25°C... +70°C
<b>motor condenser</b>	6 μF
<b>noise level</b>	64 dB(A)
<b>weight</b>	5,900 g

## Protection grid for fans

- protection against contact as per EN 294
- aerodynamic construction
- minimized noise modification
- only low modification of the air flow

<b>art. no.</b>	suitable for cooling aggregate	
<b>LAGI 40</b>	LAM 2/ LAM 4/ LAM 4 D/ LAM 4 K	
<b>art. no.</b>	suitable for cooling aggregate	
<b>LAGI 60</b>	LAM 1/ LA (M) 6/ LA (M) 7/ LA (M) 8/ LA 27 K/ LA (M) 28/ LA (M) 29/ LA (M) 30	
<b>art. no.</b>	suitable for cooling aggregate	
<b>LAGI 80</b>	LA (M) 9/ LA (M) 10/ LA (M) 11/ LA (M) 31/ LA (M) 32/ LA (M) 33	
<b>art. no.</b>	suitable for cooling aggregate	
<b>LAGI 92</b>	LA 2/ LA (M) 21/ LA (M) 22	
<b>art. no.</b>	suitable for cooling aggregate	
<b>LAGI 119</b>	LA 1/ LA 4/ LA 5/ LA (M) 14/ LA (M) 15/ LA (M) 17/ LA (M) 18/ LA HL (M) 1/ LA HL (M) 2/ LA HL (M) 3 / LA HL D1	
<b>material:</b>	steel wire, nickel-plated	