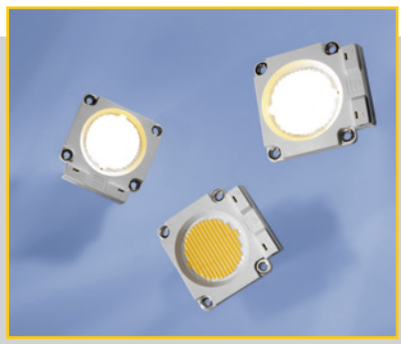
THERMAL MANAGEMENT GUIDELINES

FOR LUGA INDUSTRIAL 2014 MODULES



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GUIDELINES FOR A PASSIVE AND AN ACTIVE HEAT SINK SOLUTION

For Use with VS LED Modules

Given the power density of modern high-performance LEDs, a highly effective thermal management system is essential to ensure trouble-free operation of LED modules over long periods of time. In this regard, finding a suitable cooling solution poses one of the greatest challenges. As it forms a fundamental component of a luminaire, a suitable heat sink must be chosen early on in the process of developing and designing a luminaire under consideration of both thermal criteria and mechanical properties.

These guidelines are designed to simplify the process of selecting a suitable thermal management solution for VS LED modules and primarily constitute an overview of appropriate solutions that are available on the market.

Please note that the temperature ranges shown merely reflect theoretically calculated temperatures that should be generated at the tp point of the module given free convection and the requisite operating current. These calculated values closely approximate to measured data.

The calculations are based on the following assumptions:

- Ambient temperature: 35 °C
- Power dissipation ratio: 80% ($P_{thermal}$ / $P_{electrical}$)
- Thermal resistance of used thermal interface material: 0.04 K/W

To determine the exact temperatures that are generated when LED modules are operated in a luminaire under real-life operating conditions, users will have to have appropriate thermal measurements carried out. Function tests should therefore always be carried out on the fully assembled final product and under the most unfavourable operating conditions (blocked convection, maximum ambient temperature, etc.).

Further detailed information on effective thermal management systems can be found on our website at www.vossloh-schwabe.com/en/home/products/notes-on-led-technology.html.

VS LIGHTING SOLUTIONS

A Member of the Panasonic Group Panasonic

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$t_p \leq 65$ °C | 65 °C < $t_p \leq 67$ °C | 67 °C < $t_p \leq 85$ °C | $t_p > 85$ °C

SUNON®

www.sunoneurope.com

VS Modules	WU-M-467*			
Luminous flux (lm)	5700	7500	10,000	13,800
Current (mA)	350	500	700	1050
Spannung $U_{typ.}$ (V)	108.4	110.3	113.4	118.5
Leistung (W)	37.9	55.1	79.4	124.4

Heat sink type	Weight	Dimensions Ø / Height (mm)	Suitable VS driver 700 mA	Suitable VS driver 1050 mA	Mode	Cooling db (A) at 1 m	t_p (Performance Temperature) in °C at t_a (Ambient Temperature) = 35 °C
LM310-006AC5DN	352	[L/W/H] 121/92.3/66	186297 186298	186301 186302	–	18	
LM310-008AC5DN	406	[L/W/H] 121/92.3/79	186297 186298	186301 186302	–	30	

* Suitable fixing holes have to be requested separately from the manufacturer.

NUVENTIX

www.nuventix.com

VS Modules	WU-M-467*			
Luminous flux (lm)	5700	7500	10,000	13,800
Current (mA)	350	500	700	1050
Voltage $U_{typ.}$ (V)	108.4	110.3	113.4	118.5
Power (W)	37.9	55.1	79.4	124.4

Heat sink type	Weight	Dimensions Ø / Height (mm)	Suitable VS driver 700 mA	Suitable VS driver 1050 mA	Mode	Cooling db (A) at 1 m	t_p (Performance Temperature) in °C at t_a (Ambient Temperature) = 35 °C
R150-170 ohne Synjet's	1270	150 / 170	186297 186298	186301 186302	–	passive	
R150-170 mit 2 Synjet's	1490	150 / 170	186297 186298	186301 186302	standard performance	24	
R150-170 mit 3 Synjet's	1600	150 / 170	186297 186298	186301 186302	standard performance	26	
L100-180 ohne Synjet's	1220	[L/W/H] 180/100/70	186297 186298	186301 186302	–	passive	
L100-180 mit 2 Synjet's	1420	[L/W/H] 180/178/70	186297 186298	186301 186302	standard performance	23	
L100-270 ohne Synjet's	1800	[L/W/H] 270/100/70	186297 186298	186301 186302	–	passive	
L100-270 mit 3 Synjet's	2100	[L/W/H] 270/178/70	186297 186298	186301 186302	standard performance	25	
R186-70	1600	186 / 70	186297 186298	186301 186302	–	passive	

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$t_p \leq 65$ °C | 65 °C $< t_p \leq 67$ °C | 67 °C $< t_p \leq 85$ °C | $t_p > 85$ °C

www.cooliance.eu

VS Modules	WU-M-467*			
				
Luminous flux (lm)	5700	7500	10,000	13,800
Current (mA)	350	500	700	1050
Voltage $U_{typ.}$ (V)	108.4	110.3	113.4	118.5
Power (W)	37.9	55.1	79.4	124.4

Heat sink type	Weight	Dimensions Ø / Height (mm)	Suitable VS driver 700 mA	Suitable VS driver 1050 mA	Mode	Cooling db (A) at 1 m	t_p (Performance Temperature) in °C at t_a (Ambient Temperature) = 35 °C			
Coolstrate 780	340	80 / 64	–	–	maximum	34				
	480	80 / 92	–	–	quiet	20				
			–	–	maximum	34				
	570	80 / 110	–	–	quiet	20				
			–	–	maximum	34				
CML 140-70		140 / 70	186297 186298	186301 186302	–	passive				
CML 160-70		160 / 70	186297 186298	186301 186302	–	passive				
Coolstrate 7160	1200	160 / 110	–	–	super quiet	22				
			–	–	quiet	22				
			–	–	maximum	32				

* Suitable fixing holes have to be requested separately from the manufacturer.

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www.frigodynamics.com

VS Modules	WU-M-467*			
Luminous flux (lm)	5700	7500	10,000	13,800
Current (mA)	350	500	700	1050
Voltage $U_{typ.}$ (V)	108.4	110.3	113.4	118.5
Power (W)	37.9	55.1	79.4	124.4

Heat sink type	Weight	Dimensions Ø / Height (mm)	Suitable VS driver 700 mA	Suitable VS driver 1050 mA	Mode	Cooling db (A) at 1 m	t_p (Performance Temperature) in °C at t_a (Ambient Temperature) = 35 °C			
HB-HPK-Fin270	385	100 / 230	186297 186298	186301 186302	–	passive				
HB-HPK-Fin200	870	160 / 210	186297 186298	186301 186302	–	passive				
HB-HPK-Fin270	1120	160 / 275	186297 186298	186301 186302	–	passive				
HB-HPK-Fin360	1410	160 / 365	186297 186298	186301 186302	–	passive				

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www.mechatronix-asia.com

VS Modules	WU-M-467*			
Luminous flux (lm)	5700	7500	10,000	13,800
Current (mA)	350	500	700	1050
Voltage $U_{typ.}$ (V)	108.4	110.3	113.4	118.5
Power (W)	37.9	55.1	79.4	124.4

Heat sink type	Weight	Dimensions Ø / Height (mm)	Suitable VS driver 700 mA	Suitable VS driver 1050 mA	Mode	Cooling db (A) at 1 m	t_p (Performance Temperature) in °C at t_a (Ambient Temperature) = 35 °C			
IceLED Ultra	400	99 / 75	186297 186298	186301 186302	–	39				

* Suitable fixing holes have to be requested separately from the manufacturer.

Disclaimer

Responsibility for an optimum thermal management system as well as for conducting tests to ensure products are fit for their intended purpose solely rests with the luminaire manufacturer.

Not all of the possible uses or operating conditions of VS modules can be foreseen. Vossloh-Schwabe therefore cannot accept any liability with regard to the suitability of any thermal management solution in combination with the mentioned LED modules for either a specific purpose or any general purpose or application.

As thermal behaviour can vary in accordance with the operating conditions, ambient temperatures, installation location and intensity of existing air currents, Vossloh-Schwabe accepts no liability for any damage or secondary damage that may be caused.