

# THERMAL MANAGEMENT GUIDELINES

FOR LUGA SHOP 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% ( $P_{\text{thermal}} / P_{\text{electrical}}$ )
- 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](http://www.vossloh-schwabe.com/en/home/products/notes-on-led-technology.html).

# Passive and Active Thermal Management Solutions for LUGA Shop 2014

■  $t_p \leq 65 \text{ }^\circ\text{C}$ 
■  $65 \text{ }^\circ\text{C} < t_p \leq 67 \text{ }^\circ\text{C}$ 
■  $67 \text{ }^\circ\text{C} < t_p \leq 85 \text{ }^\circ\text{C}$ 
■  $t_p > 85 \text{ }^\circ\text{C}$




| <br>www.avc-europa.de |   |        | VS Modules                    |         | WU-M-484*  |        |        |             | WU-M-485*   |        |        |             | WU-M-486*   |        |             |             |        |        |
|--|---|--------|-------------------------------|---------|--|--------|--------|-------------|---|--------|--------|-------------|---|--------|-------------|-------------|--------|--------|
|  |   |        |                               |         |                                 |        |        |             |  |        |        |             |  |        |             |             |        |        |
|  |   |        | Luminous flux                 |         | 2000 lm / 2700 lm  |        |        |             | 3000 lm / 4000 lm   |        |        |             | 5000 lm   |        |             |             |        |        |
|  |   |        | Current (mA)                  |         | 350  | 500    | 700    | 1050        | 350   | 500    | 700    | 1050        | 350   | 500    | 700         | 1050        |        |        |
|  |   |        | Voltage $U_{hyp.}$ (V)        |         | 22.2   | 22.8   | 23.7   | 25.1        | 33.3  | 34.3   | 35.5   | 37.6        | 41.6  | 42.8   | 44.4        | 47          |        |        |
| Power (W)  |   | 7.8    | 11.4                          | 16.6    | 26.4   | 11.7   | 17.2   | 24.9        | 39.5  | 14.6   | 21.4   | 31.1        | 49.4  |        |             |             |        |        |
| Heat sink type   |   | Weight | Dimensions<br>Ø / Height (mm) | Cooling | $t_p$ (Performance Temperature) in $^\circ\text{C}$ at $t_a$ (Ambient Temperature) = $35 \text{ }^\circ\text{C}$ |        |        |             |   |        |        |             |   |        |             |             |        |        |
| ST02G  |    | 987    | 165 / 55                      | passive | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Green   | Green  | Green       | Green       | Green  | Green  |
| ST02H  |    | 430    | 122 / 45                      | passive | Green  | Green  | Green  | Yellow      | Green   | Green  | Green  | Yellow      | Red   | Green  | Light Green | Yellow      | Yellow | Red    |
| ST02F  |    | 1007   | 165 / 60                      | passive | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Green   | Green  | Green       | Green       | Green  | Yellow |
| ST053  |    | 1040   | 170 / 40                      | passive | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Light Green | Yellow | Red    |
| ST04N  |    | 1060   | 125 / 70                      | passive | Green  | Green  | Green  | Light Green | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Yellow      | Yellow | Red    |
| ST034  |   | 589    | 125 / 45                      | passive | Green  | Green  | Green  | Yellow      | Green   | Green  | Green  | Yellow      | Red   | Green  | Light Green | Yellow      | Yellow | Red    |
| Z6ET042  |  | 320    | 125 / 35                      | active  | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Light Green | Yellow | Yellow |
| Z5LT02W  |  | 128    | 65 / 40                       | active  | Green  | Green  | Green  | Light Green | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Yellow      | Yellow | Red    |
| Z6ET03K  |  | 150    | 70 / 20                       | active  | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Green       | Green  | Yellow |
| Z5LT07P  |  | 126    | 65 / 40                       | active  | Green  | Green  | Green  | Yellow      | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Yellow      | Yellow | Red    |
| Z7LT04X  |  | 350    | 75 / 65                       | active  | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Light Green | Yellow | Yellow |
| Z5LT03F  |  | 80     | 65 / 10                       | active  | Green  | Green  | Green  | Yellow      | Green   | Green  | Green  | Yellow      | Red   | Green  | Yellow      | Yellow      | Yellow | Red    |
| ST02T  |  | 290    | 125 / 30                      | passive | Green  | Green  | Green  | Yellow      | Green   | Green  | Green  | Yellow      | Red   | Green  | Yellow      | Yellow      | Yellow | Red    |
| ST07A  |  | 80     | 100 / 10                      | passive | Green  | Yellow | Yellow | Red         | Yellow  | Yellow | Yellow | Red         | Red   | Yellow | Red         | Red         | Red    | Red    |
| ST07B  |  | 240    | 100 / 30                      | passive | Green  | Green  | Yellow | Red         | Green   | Green  | Yellow | Red         | Red   | Green  | Yellow      | Yellow      | Yellow | Red    |
| ST07E  |  | 290    | 135 / 25                      | passive | Green  | Green  | Green  | Yellow      | Green   | Green  | Green  | Light Green | Yellow  | Green  | Green       | Green       | Yellow | Red    |
| ST078  |  | 450    | 135 / 40                      | passive | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Yellow  | Green  | Green       | Green       | Green  | Yellow |
| ST079  |  | 900    | 135 / 80                      | passive | Green  | Green  | Green  | Green       | Green   | Green  | Green  | Green       | Green   | Green  | Green       | Green       | Green  | Yellow |

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



# Passive and Active Thermal Management Solutions for LUGA Shop 2014

■  $t_p \leq 65 \text{ }^\circ\text{C}$ 
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| <br><a href="http://www.nuventix.com">www.nuventix.com</a> |        |                               | VS Modules   |       |             |        | WU-M-484*           |             |        |        | WU-M-485*             |             |             |        | WU-M-486* |     |     |  |
|---|--------|-------------------------------|--|-------|-------------|--------|---------------------|-------------|--------|--------|-----------------------|-------------|-------------|--------|-----------|-----|-----|--|
|   |        |                               | Luminous flux  |       |             |        | Current (mA)        |             |        |        | Voltage $U_{typ}$ (V) |             |             |        | Power (W) |     |     |  |
|   |        |                               | 2000 lm / 2700 lm  |       |             |        | 3000 lm / 4000 lm   |             |        |        | 5000 lm               |             |             |        |           |     |     |  |
|   |        |                               | 3.50 500 700 1050  |       |             |        | 350 500 700 1050    |             |        |        | 350 500 700 1050      |             |             |        |           |     |     |  |
|   |        |                               | 22.2 22.8 23.7 25.1  |       |             |        | 33.3 34.3 35.5 37.6 |             |        |        | 41.6 42.8 44.4 47     |             |             |        |           |     |     |  |
|   |        |                               | 7.8 11.4 16.6 26.4   |       |             |        | 11.7 17.2 24.9 39.5 |             |        |        | 14.6 21.4 31.1 49.4   |             |             |        |           |     |     |  |
| Heat sink type***   | Weight | Dimensions<br>Ø / Height (mm) | Cooling/Mode   |       |             |        |                     |             |        |        |                       |             |             |        |           |     |     |  |
| SynJet-Typ**  |        |                               | $t_p$ (Performance Temperature) in $^\circ\text{C}$ at $t_a$ (Ambient Temperature) = $35 \text{ }^\circ\text{C}$ |       |             |        |                     |             |        |        |                       |             |             |        |           |     |     |  |
| PAR20 Cooler 24W<br>Zflow 65<br>                           | 140    | 66 / 40                       | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| PAR25 Cooler 32W<br>Zflow 65<br>                           | 170    | 75 / 46                       | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| PAR30 Cooler 40W<br>Zflow 65<br>                           | 300    | 95 / 46                       | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Spotlight Cooler 60W<br>Zflow 90<br>                       | 600    | 118 / 58                      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Spotlight Cooler 70W<br>Zflow 90<br>                      | 600    | 134 / 58                      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Downlight Cooler 120, 40W<br>Zflow 100<br>               | 490    | 118 / 57                      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Downlight Cooler 140, 48W<br>Zflow 100<br>               | 600    | 138 / 47                      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Twist Module Cooler 43W<br>Zflow 65<br>                  | 290    | 100 / 58                      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Twist Module Cooler 58W<br>Zflow 65<br>                  | 290    | 118 / 58                      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Wall Wash Cooler 82W<br>Zflow 90<br>                     | 400    | [L/W/H]<br>45/113/58(63)      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Spotlight Cooler 21W<br>Zflow 65<br>                     | 300    | 75 / 68                       | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Spotlight Cooler 31W<br>Zflow 75<br>                     | 280    | 75 / 77                       | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Spotlight Cooler 34W<br>Zflow 75<br>                     | 295    | 87 / 77                       | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
| Spotlight Cooler 38W<br>Zflow 75<br>                     | 335    | 100 / 77                      | High   | Green | Green       | Green  | Yellow              | Green       | Green  | Yellow | Red                   | Green       | Light Green | Yellow | Red       | Red |     |  |
|   |        |                               | Standard   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Silent   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |
|   |        |                               | Heat sink only   | Green | Light Green | Yellow | Green               | Light Green | Yellow | Red    | Green                 | Light Green | Yellow      | Red    | Red       | Red | Red |  |









\* Suitable fixing holes have to be requested separately from the manufacturer. \*\* 5V or 12V version is available.

\*\*\* Suitable as active solution (incl. SynJet) or as passive solution (heat sink only).

Global sales contact: [www.nuventix.com/contact-us/worldwide-sales-offices/](http://www.nuventix.com/contact-us/worldwide-sales-offices/)

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| <br><a href="http://www.nuventix.com">www.nuventix.com</a> |        |                               | VS Modules  |  |   |   | WU-M-484*  |   |   |   | WU-M-485*  |   |   |   | WU-M-486*              |   |   |   |                     |   |   |   |                     |  |  |  |                     |  |  |  |
|---|--------|-------------------------------|---|--|---|---|--|---|---|---|--|---|---|---|------------------------|---|---|---|---------------------|---|---|---|---------------------|--|--|--|---------------------|--|--|--|
|   |        |                               | <br>Luminous flux: 2000 lm / 2700 lm |  |   |   | <br>3000 lm / 4000 lm |   |   |   | <br>5000 lm |   |   |   |                        |   |   |   |                     |   |   |   |                     |  |  |  |                     |  |  |  |
|   |        |                               |   |  |   |   |  |   |   |   |  |   |   |   | Current (mA)           |   |   |   | 350 500 700 1050    |   |   |   | 350 500 700 1050    |  |  |  | 350 500 700 1050    |  |  |  |
|   |        |                               |   |  |   |   |  |   |   |   |  |   |   |   | Voltage $U_{typ.}$ (V) |   |   |   | 22.2 22.8 23.7 25.1 |   |   |   | 33.3 34.3 35.5 37.6 |  |  |  | 41.6 42.8 44.4 47   |  |  |  |
|   |        |                               |   |  |   |   |  |   |   |   |  |   |   |   | Power (W)              |   |   |   | 7.8 11.4 16.6 26.4  |   |   |   | 11.7 17.2 24.9 39.5 |  |  |  | 14.6 21.4 31.1 49.4 |  |  |  |
| Heat sink type***   | Weight | Dimensions<br>Ø / Height (mm) | Cooling/ Mode   | $t_p$ (Performance Temperature) in °C at $t_a$ (Ambient Temperature) = 35 °C |   |   |  |   |   |   |  |   |   |   |                        |   |   |   |                     |   |   |   |                     |  |  |  |                     |  |  |  |
| Spotlight Cooler 36W<br>Zflow 87<br>                       | 335    | 87 / 82                       | High  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ |   |   |                     |  |  |  |                     |  |  |  |
|   |        |                               | Standard  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ |   |                     |  |  |  |                     |  |  |  |
|   |        |                               | Silent  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
|   |        |                               | Heat sink only  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
| Spotlight Cooler 47W<br>Zflow 87<br>                       | 335    | 87 / 104                      | High  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ |   |   |                     |  |  |  |                     |  |  |  |
|   |        |                               | Standard  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ |   |                     |  |  |  |                     |  |  |  |
|   |        |                               | Silent  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
|   |        |                               | Heat sink only  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
| LED Cooler R87-46<br>Zflow 87<br>                          | 335    | 80 / 90                       | High  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ |   |   |                     |  |  |  |                     |  |  |  |
|   |        |                               | Standard  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ |   |                     |  |  |  |                     |  |  |  |
|   |        |                               | Silent  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
|   |        |                               | Heat sink only  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
| LED Cooler R87-60<br>Zflow 87<br>                         | 335    | 80 / 104                      | High  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ |   |   |                     |  |  |  |                     |  |  |  |
|   |        |                               | Standard  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
|   |        |                               | Silent  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |
|   |        |                               | Heat sink only  | ■  | ■ | ■ | ■  | ■ | ■ | ■ | ■  | ■ | ■ | ■ | ■                      | ■ | ■ | ■ | ■                   | ■ | ■ | ■ |                     |  |  |  |                     |  |  |  |












\* Suitable fixing holes have to be requested separately from the manufacturer.      \*\* 5V or 12V version is available.

\*\*\* Suitable as active solution (incl. SynJet) or as passive solution (heat sink only).

Global sales contact: [www.nuventix.com/contact-us/worldwide-sales-offices/](http://www.nuventix.com/contact-us/worldwide-sales-offices/)

# Passive and Active Thermal Management Solutions for LUGA Shop 2014












■  $t_p \leq 65 \text{ }^\circ\text{C}$   
 ■  $65 \text{ }^\circ\text{C} < t_p \leq 67 \text{ }^\circ\text{C}$   
 ■  $67 \text{ }^\circ\text{C} < t_p \leq 85 \text{ }^\circ\text{C}$   
 ■  $t_p > 85 \text{ }^\circ\text{C}$

| <br>www.cooliance.eu |   |                               |              | VS Modules   | WU-M-484*         |      |      |      | WU-M-485*         |      |      |      | WU-M-486* |      |      |      |
|---|---|-------------------------------|--------------|--|-------------------|------|------|------|-------------------|------|------|------|-----------|------|------|------|
|   |   |                               |              | Luminous flux  | 2000 lm / 2700 lm |      |      |      | 3000 lm / 4000 lm |      |      |      | 5000 lm   |      |      |      |
|   |   |                               |              | Current (mA)   | 350               | 500  | 700  | 1050 | 350               | 500  | 700  | 1050 | 350       | 500  | 700  | 1050 |
|   |   |                               |              | Voltage $U_{yp}$ (V)   | 22.2              | 22.8 | 23.7 | 25.1 | 33.3              | 34.3 | 35.5 | 37.6 | 41.6      | 42.8 | 44.4 | 47   |
|   |   |                               |              | Power (W)  | 7.8               | 11.4 | 16.6 | 26.4 | 11.7              | 17.2 | 24.9 | 39.5 | 14.6      | 21.4 | 31.1 | 49.4 |
| Heat sink type**  | Weight  | Dimensions<br>Ø / Height (mm) | Cooling/Mode | $t_p$ (Performance Temperature) in $^\circ\text{C}$ at $t_a$ (Ambient Temperature) = $35 \text{ }^\circ\text{C}$ |                   |      |      |      |                   |      |      |      |           |      |      |      |
| CML80x70  |    | 80 / 70                       | passive      | ■  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| CML100x70   |    | 100 / 70                      | passive      | ■  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| CML120x70   |    | 120 / 70                      | passive      | ■  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| CML140x70   |    | 140 / 70                      | passive      | ■  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| Coolstrate 750<br>CSL5025   |    | 130                           | 50 / 60      | very quiet   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | quiet  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | max. power   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| Coolstrate 750<br>CSL5050   |   | 160                           | 50 / 85      | very quiet   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | quiet  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | max. power   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| Coolstrate 750<br>CSL5070   |  | 190                           | 50 / 105     | very quiet   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | quiet  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | max. power   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| Coolstrate 780<br>CSL8025   |  | 340                           | 80 / 64      | very quiet   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | quiet  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | max. power   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| Coolstrate 780<br>CSL8050   |  | 480                           | 80 / 92      | very quiet   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | quiet  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | max. power   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
| Coolstrate 780<br>CSL8070   |  | 570                           | 80 / 110     | very quiet   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | quiet  | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |
|   |   |                               |              | max. power   | ■                 | ■    | ■    | ■    | ■                 | ■    | ■    | ■    | ■         | ■    | ■    | ■    |

\* Suitable fixing holes have to be requested separately from the manufacturer.  
 \*\* No separate fan interface necessary (operation parallel to the LED module).

# Passive and Active Thermal Management Solutions for LUGA Shop 2014




















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 ■  $67 \text{ }^\circ\text{C} < t_p \leq 85 \text{ }^\circ\text{C}$   
 ■  $t_p > 85 \text{ }^\circ\text{C}$

| <br>www.frigodynamics.com |              |   | VS Modules             |  | WU-M-484*         |      |      |      | WU-M-485*         |      |      |      | WU-M-486* |      |      |      |  |  |
|--|--------------|---|------------------------|--|-------------------|------|------|------|-------------------|------|------|------|-----------|------|------|------|--|--|
|  |              |   | Luminous flux          |  | 2000 lm / 2700 lm |      |      |      | 3000 lm / 4000 lm |      |      |      | 5000 lm   |      |      |      |  |  |
|  |              |   | Current (mA)           |  | 350               | 500  | 700  | 1050 | 350               | 500  | 700  | 1050 | 350       | 500  | 700  | 1050 |  |  |
|  |              |   | Voltage $U_{typ.}$ (V) |  | 22.2              | 22.8 | 23.7 | 25.1 | 33.3              | 34.3 | 35.5 | 37.6 | 41.6      | 42.8 | 44.4 | 47   |  |  |
|  |              |   | Power (W)              |  | 7.8               | 11.4 | 16.6 | 26.4 | 11.7              | 17.2 | 24.9 | 39.5 | 14.6      | 21.4 | 31.1 | 49.4 |  |  |
| Heat exchanger type  | Weight       | Dimensions<br>$\varnothing$ / Height (mm) | Cooling                | $t_p$ (Performance Temperature) in $^\circ\text{C}$ at $t_a$ (Ambient Temperature) = $35 \text{ }^\circ\text{C}$ |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| SC HPK-Fin 110<br>        | 220          | 100 / 110                                 | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| SC HPK-Fin 150<br>        | 245          | 100 / 150                                 | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| SC HPK-Fin 180<br>        | 285          | 100 / 180                                 | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| SC HPK-Fin 230<br>        | 335          | 100 / 230                                 | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| OC HPK-Fin 210<br>      | 295<br>[310] | [L/W/H]<br>210/120/55                     | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| OC HPK-Fin 250<br>      | 360<br>[375] | [L/W/H]<br>250/120/55                     | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| OC HPK-Fin 300<br>      | 425<br>[430] | [L/W/H]<br>300/120/55                     | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| TC HPK-Fin 110<br>      | 310<br>[325] | [L/W/H]<br>115/120/110                    | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| TC HPK-Fin 160<br>      | 350<br>[370] | [L/W/H]<br>157/120/110                    | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |
| TC HPK-Fin 210<br>      | 425<br>[440] | [L/W/H]<br>207/120/110                    | passive                |  |                   |      |      |      |                   |      |      |      |           |      |      |      |  |  |

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# Passive and Active Thermal Management Solutions for LUGA Shop 2014

■  $t_p \leq 65 \text{ }^\circ\text{C}$   
 ■  $65 \text{ }^\circ\text{C} < t_p \leq 67 \text{ }^\circ\text{C}$   
 ■  $67 \text{ }^\circ\text{C} < t_p \leq 85 \text{ }^\circ\text{C}$   
 ■  $t_p > 85 \text{ }^\circ\text{C}$

| <br>www.mechatronix-asia.com |   |                               |          | VS Modules   |       |             |             | WU-M-484*         |       |             |             | WU-M-485*         |             |             |        | WU-M-486* |        |        |        |
|---|---|-------------------------------|----------|--|-------|-------------|-------------|-------------------|-------|-------------|-------------|-------------------|-------------|-------------|--------|-----------|--------|--------|--------|
|   |   |                               |          | Luminous flux  |       |             |             | 2000 lm / 2700 lm |       |             |             | 3000 lm / 4000 lm |             |             |        | 5000 lm   |        |        |        |
|   |   |                               |          | Current (mA)   |       |             |             | 350               | 500   | 700         | 1050        | 350               | 500         | 700         | 1050   | 350       | 500    | 700    | 1050   |
|   |   |                               |          | Voltage $U_{typ.}$ (V)   |       |             |             | 22.2              | 22.8  | 23.7        | 25.1        | 33.3              | 34.3        | 35.5        | 37.6   | 41.6      | 42.8   | 44.4   | 47     |
|   |   |                               |          | Power (W)  |       |             |             | 7.8               | 11.4  | 16.6        | 26.4        | 11.7              | 17.2        | 24.9        | 39.5   | 14.6      | 21.4   | 31.1   | 49.4   |
| Heat sink type  | Weight  | Dimensions<br>Ø / Height (mm) | Cooling  | $t_p$ (Performance Temperature) in $^\circ\text{C}$ at $t_a$ (Ambient Temperature) = $35 \text{ }^\circ\text{C}$ |       |             |             |                   |       |             |             |                   |             |             |        |           |        |        |        |
| LPF70x50  |    | 153                           | 70 / 50  | passive  | Green | Light Green | Yellow      | Red               | Green | Yellow      | Red         | Red               | Yellow      | Red         | Red    | Red       | Red    | Red    | Red    |
| LPF80x40  |    | 168                           | 80 / 40  | passive  | Green | Green       | Yellow      | Red               | Green | Yellow      | Red         | Red               | Yellow      | Red         | Red    | Red       | Red    | Red    | Red    |
| LPF80x50  |    | 197                           | 80 / 50  | passive  | Green | Green       | Yellow      | Red               | Green | Yellow      | Red         | Red               | Green       | Yellow      | Red    | Red       | Red    | Red    | Red    |
| LPF11180-ZHE Zhaga  |    | 572                           | 111 / 80 | passive  | Green | Green       | Green       | Green             | Green | Green       | Yellow      | Green             | Green       | Light Green | Yellow | Yellow    | Yellow | Yellow | Yellow |
| LED Star LSB7080  |    | 407                           | 70 / 80  | passive  | Green | Green       | Yellow      | Red               | Green | Yellow      | Red         | Red               | Light Green | Yellow      | Red    | Red       | Red    | Red    | Red    |
| LED Star LSB9950  |    | 469                           | 99 / 50  | passive  | Green | Green       | Green       | Yellow            | Green | Green       | Yellow      | Red               | Green       | Light Green | Yellow | Yellow    | Yellow | Yellow | Yellow |
| LED Star LSB9980  |    | 731                           | 99 / 80  | passive  | Green | Green       | Light Green | Red               | Green | Light Green | Yellow      | Red               | Green       | Yellow      | Red    | Red       | Red    | Red    | Red    |
| LED Star LSB13450   |   | 917                           | 134 / 50 | passive  | Green | Green       | Green       | Light Green       | Green | Green       | Yellow      | Green             | Green       | Yellow      | Yellow | Yellow    | Yellow | Yellow | Yellow |
| ModuLED Nano 7050   |  | 188                           | 70 / 50  | passive  | Green | Green       | Yellow      | Red               | Green | Yellow      | Yellow      | Red               | Green       | Yellow      | Red    | Red       | Red    | Red    | Red    |
| ModuLED Nano 7080   |  | 340                           | 70 / 80  | passive  | Green | Green       | Green       | Yellow            | Green | Green       | Yellow      | Red               | Green       | Yellow      | Yellow | Yellow    | Yellow | Yellow | Yellow |
| ModuLED 9950  |  | 356                           | 99 / 50  | passive  | Green | Green       | Green       | Yellow            | Green | Green       | Light Green | Yellow            | Green       | Green       | Yellow | Yellow    | Yellow | Yellow | Yellow |
| ModuLED 9980  |  | 573                           | 99 / 80  | passive  | Green | Green       | Green       | Green             | Green | Green       | Yellow      | Green             | Green       | Light Green | Yellow | Yellow    | Yellow | Yellow | Yellow |
| ModuLED Xtra 9980   |  | 638                           | 99 / 80  | passive  | Green | Green       | Green       | Green             | Green | Green       | Yellow      | Green             | Green       | Light Green | Yellow | Yellow    | Yellow | Yellow | Yellow |
| IceLED 450  |  | 223                           | 99 / 45  | active   | Green | Green       | Green       | Green             | Green | Green       | Green       | Green             | Green       | Green       | Green  | Green     | Green  | Green  | Green  |
| IceLED 550  |  | 249                           | 99 / 55  | active   | Green | Green       | Green       | Green             | Green | Green       | Green       | Green             | Green       | Green       | Green  | Green     | Green  | Green  | Green  |
| IceLED Xtra 550   |  | 266                           | 99 / 55  | active   | Green | Green       | Green       | Green             | Green | Green       | Green       | Green             | Green       | Green       | Green  | Green     | Green  | Green  | Green  |
| IceLED Ultra  |  | 400                           | 99 / 75  | active   | Green | Green       | Green       | Green             | Green | Green       | Green       | Green             | Green       | Green       | Green  | Green     | Green  | Green  | Green  |
| IceLED Xtra Ultra   |  | 400                           | 99 / 75  | active   | Green | Green       | Green       | Green             | Green | Green       | Green       | Green             | Green       | Green       | Green  | Green     | Green  | Green  | Green  |

\* Suitable fixing holes have to be requested separately from the manufacturer.  
 \*\* Fan needs min. 12 V/3 W interface.

## 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.