



A New Lighting Experience



- long service lifetime due to optimal thermal management
- very high lumen output
- highly efficient (up to 90 lm/W)
- high colour rendering: CRI ~85/92
- easy connections due to pre-assembled leads
- attachment for lenses with different radiation angles
- VDE approved (acc. to EN 62031)



## LED Modules HC – Line / Spot / Mini

WU-M-395, -396, -397

### Typical Applications

- Integration in luminaires
- Architectural illumination
- Marking of paths, stairs, etc.
- Furniture lighting
- Light advertising
- Entertainment, shop design
- Showcase lighting (high colour rendering)

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# LED Modules HC – Line / Spot / Mini

## Technical Notes

Dimensions:

Line HC: 200x15 mm

Spot HC: Ø 45 mm

Mini HC: 50x10 mm

- Pre-assembled with 2 leads
- Aluminium-PCB for optimum thermal management
- ESD protection class 2

## Electrical Characteristics

at junction temperature  $t_j = 25\text{ °C}$

Type	Ref. No	350 mA				500 mA				700 mA			
		Voltage DC (V)		Power (W)		Voltage DC (V)		Power (W)		Voltage DC (V)		Power (W)	
		typ.	max.	typ.	max.	typ.	max.	typ.	max.	typ.	max.	typ.	max.
<b>Line HC</b>													
WU-M-395-VWW-H3	<b>All types</b>	25.6	29.6	9.0	10.4	26.4	30.4	13.2	15.2	28.0	32.0	19.6	22.4
WU-M-395-VWW-H1	<b>All types</b>	28.0	32.0	9.8	11.2	–	–	–	–	–	–	–	–
<b>Spot HC</b>													
WU-M-396-VWW-H3	<b>All types</b>	12.8	14.8	4.5	5.2	13.2	15.2	6.6	7.6	14.0	16.0	9.8	11.2
WU-M-396-VWW-H1	<b>All types</b>	14.0	16.0	4.9	5.6	–	–	–	–	–	–	–	–
<b>Mini HC</b>													
WU-M-397-VWW-H3	<b>All types</b>	12.8	14.8	4.5	5.2	13.2	15.2	6.6	7.6	14.0	16.0	9.8	11.2
WU-M-397-VWW-H1	<b>All types</b>	14.0	16.0	4.9	5.6	–	–	–	–	–	–	–	–

**Use of external LED constant current driver with max. 350 mA or max. 700 mA required.**

## Maximum Ratings

Exceeding the maximum ratings can lead to reduction of lifetime or destruction of the module.

Type	Operation current mA	Operation temperature range at $t_c$ -point		Storage temperature range		Reverse voltage V
		°C min.	°C max.	°C min.	°C max.	
All types	350	-20	+85	-20	+85	5
All types	500	-20	+80	-20	+85	5
All types	700	-20	+65	-20	+85	5

## Optical Characteristics

at junction temperature  $t_j = 25\text{ °C}$

Type	Ref. No.	Colour	Correlated colour temp. K	Bright- ness bin**	Luminous flux at			Radiation angle* °	Typ. CRI $R_a$
					350 mA lm	500 mA lm	700 mA lm		
<b>Line HC</b>									
WU-M-395-VWW-H3	<b>542812</b>	Warm white	2850...3200	C140	616.0...682.0	806.4... 892.8	1120.0...1240.0	120	85
WU-M-395-VWW-H3	<b>543902</b>	Warm white	2850...3200	C155	682.0...748.0	892.8... 979.2	1240.0...1360.0	120	85
WU-M-395-VWW-H3	<b>543903</b>	Warm white	2850...3200	C170	748.0...814.0	979.2...1065.6	1360.0...1480.0	120	85
WU-M-395-VWW-H3	<b>543904</b>	Warm white	2850...3200	C185	814.0...880.0	1065.6...1152.0	1480.0...1600.0	120	85
WU-M-395-VWW-H1	<b>545007</b>	Warm white	2850...3200	B06	480.0...560.0	–	–	120	92
WU-M-395-VWW-H1	<b>545008</b>	Warm white	2850...3200	B07	560.0...640.0	–	–	120	92
WU-M-395-VWW-H1	<b>545009</b>	Warm white	2850...3200	B08	640.0...720.0	–	–	120	92
WU-M-395-VWW-H1	<b>545010</b>	Warm white	2850...3200	B09	720.0...800.0	–	–	120	92

\* On account of the complex manufacturing process of the modules the above values only represent statistical variables.

The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.

\*\* The reference numbers represent a single brightness group. In order to ensure availability please contact your sales prior to order.

Minimum order quantities: Line HC 100 pcs. | Spot HC 120 pcs. | Mini HC 100 pcs. | lower quantities on request, when available from stock.

# LED Modules HC – Line / Spot / Mini

## Optical Characteristics

at junction temperature  $t_j = 25\text{ °C}$

Type	Ref. No.	Colour	Correlated colour temp. K	Brightness bin**	Luminous flux at			Radiation angle* °	Typ. CRI $R_a$
					350 mA lm	500 mA lm	700 mA lm		

### Spot HC

WU-M-396-VVV-H3	<b>542813</b>	Warm white	2850...3200	C140	308.0...341.0	403.2... 446.4	560.0... 620.0	120	85
WU-M-396-VVV-H3	<b>543905</b>	Warm white	2850...3200	C155	341.0...374.0	446.4... 489.6	620.0... 680.0	120	85
WU-M-396-VVV-H3	<b>543906</b>	Warm white	2850...3200	C170	374.0...407.0	489.6... 532.8	680.0... 740.0	120	85
WU-M-396-VVV-H3	<b>543907</b>	Warm white	2850...3200	C185	407.0...440.0	532.8... 576.0	740.0... 800.0	120	85
WU-M-396-VVV-H1	<b>545011</b>	Warm white	2850...3200	B06	240.0...280.0	—	—	120	92
WU-M-396-VVV-H1	<b>545012</b>	Warm white	2850...3200	B07	280.0...320.0	—	—	120	92
WU-M-396-VVV-H1	<b>545013</b>	Warm white	2850...3200	B08	320.0...360.0	—	—	120	92
WU-M-396-VVV-H1	<b>545015</b>	Warm white	2850...3200	B09	360.0...400.0	—	—	120	92

### Mini HC

WU-M-397-VVV-H3	<b>542814</b>	Warm white	2850...3200	C140	308.0...341.0	403.2... 446.4	560.0... 620.0	120	85
WU-M-397-VVV-H3	<b>543908</b>	Warm white	2850...3200	C155	341.0...374.0	446.4... 489.6	620.0... 680.0	120	85
WU-M-397-VVV-H3	<b>543909</b>	Warm white	2850...3200	C170	374.0...407.0	489.6... 532.8	680.0... 740.0	120	85
WU-M-397-VVV-H3	<b>543910</b>	Warm white	2850...3200	C185	407.0...440.0	532.8... 576.0	740.0... 800.0	120	85
WU-M-397-VVV-H1	<b>545016</b>	Warm white	2850...3200	B06	240.0...280.0	—	—	120	92
WU-M-397-VVV-H1	<b>545017</b>	Warm white	2850...3200	B07	280.0...320.0	—	—	120	92
WU-M-397-VVV-H1	<b>545018</b>	Warm white	2850...3200	B08	320.0...360.0	—	—	120	92
WU-M-397-VVV-H1	<b>545019</b>	Warm white	2850...3200	B09	360.0...400.0	—	—	120	92

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Minimum order quantities: Line HC 100 pcs. | Spot HC 120 pcs. | Mini HC 100 pcs. | lower quantities on request, when available from stock.

## Operating Life

50,000 hrs. (lumen maintenance at 70 %)

$t_c = 85\text{ °C}$ ,  $I_F = 350\text{ mA}$

$t_c = 75\text{ °C}$ ,  $I_F = 700\text{ mA}$

These values do not refer to the colour temperature.

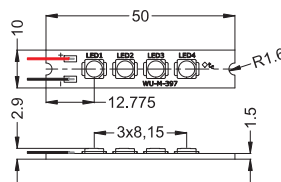
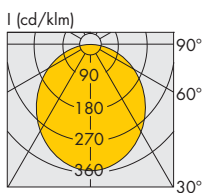
## Mechanical Dimensions

The PCB is pre-assembled with 2 leads of 400 mm in length:

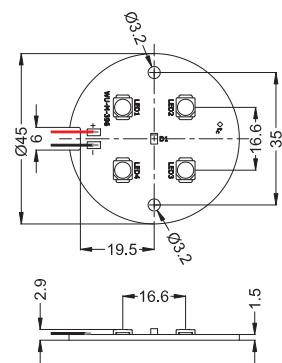
red: anode (+); 22AWG/0.34 mm<sup>2</sup>

black: cathode (-); 22AWG/0.34 mm<sup>2</sup>

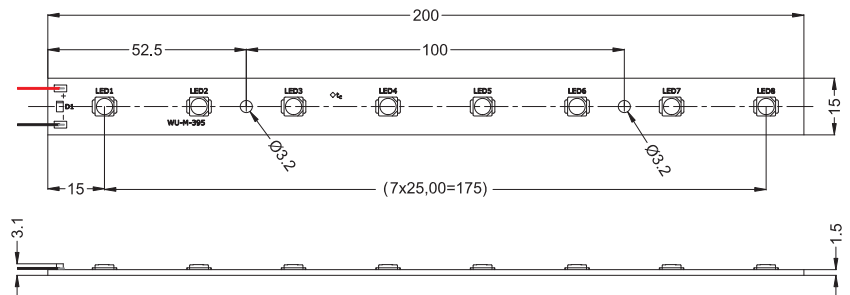
## Light Distribution Curve



Mini HC



Spot HC



Line HC

Attachment optics with various radiation characteristics are available at Vossloh-Schwabe. Please find further information at [www.vs-optoelectronic.com](http://www.vs-optoelectronic.com).

The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification. Please find further detailed information at [www.vs-optoelectronic.com](http://www.vs-optoelectronic.com).

# LED Modules HC – Line / Spot / Mini

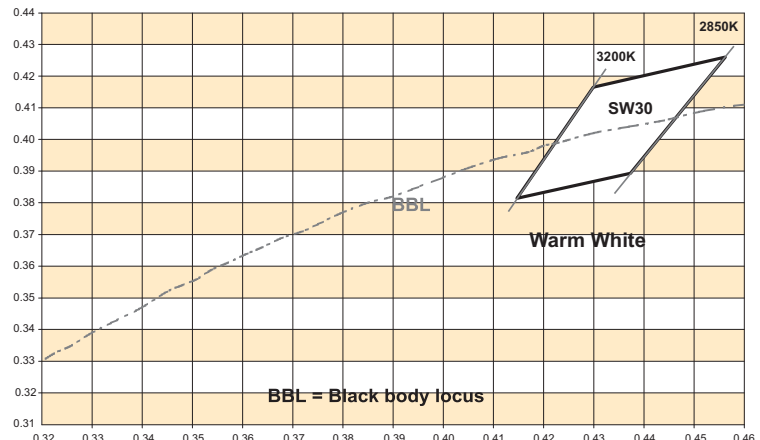
## Bins

The standard shipping format regarding the reference numbers on page 2 includes all chromaticity coordinate groups.

## Assembly and Safety Information

Installation must be carried out under observation of the relevant regulations and standards. The LED modules are designed for operation within a casing or luminaire. Installation must be carried out in a voltage-free state (i.e. disconnection from the mains). The following advice must be observed; non-observance can result in the destruction of the LED assembly modules, fire and/or other hazards.

- ESD (electrostatic discharge) protection measures must be observed when handling and installing the LED modules. See VS's application notes on ESD protection.
- LED assembly modules must not be subjected to any undue mechanical stress, e. g.:
  - do not treat as bulk cargo
  - avoid shear and compressive forces during handling and installation
  - do not damage circuit paths
- LED assembly modules are designed for attachment using a thermally conductive adhesive, an adhesive foil (Ref. No. 544509 for Line; Ref. No. 544511 for Spot; Ref. No. 544510 for Mini) or M3 screws. Please observe the manufacturer's technical data provided at [www.3M.com/converter](http://www.3M.com/converter). Products equipped with adhesive transfer tape must only be applied to dry and clean surfaces that are free from grease, oil, silicone or other soiling. It is therefore recommended to clean the substrate with isopropyl alcohol (IPA). Please ensure a full-surface bond over the entire contact area when sticking the module to the substrate. The following substances are regarded as critical for creating an adhesive bond:
  - Polyefins (polyethylene, polypropylene)
  - Rubber
  - Powder-coated materials
  - Silicone rubber
  - Teflon



Owing to the varying application options and different types of surface as well as ambient conditions, VS accepts no liability for the quality of the adhesive bond achieved when mounting these products. Prior to sticking a VS product, care must be taken to check whether the material in question is actually suitable for the intended purpose under consideration of all possible application-relevant influences. Supplementary holders must be used if necessary. If opting for screw attachment, plastic screws or suitably insulated, non-loosening metal screws must be used.

- Safe operation only possible by the use of external constant current sources ( $I_{max}$ , see table "Electrical Characteristics").
- Power supply units must be used for operation, in which the following protective measures are ensured:
  - Short-circuit protection
  - Overload protection
  - Overheating protection
  - SELV equiv. (Safety Extra Low Voltage)
- Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- The maximum output of the power supply must be observed.
- For optimal load of used constant current driver the modules can only be connected in series. The quantity of LED modules is limited by the sum of forward voltage and the capacity of used constant current driver. Safety regulations acc. to EN 60598 has to be observed if the sum of forward voltage exceed the permitted touchable value.
- A parallel connection of the modules is not allowed.

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# LED Modules HC – Line / Spot / Mini

## Assembly and Safety Information

- Due to the manufacturing process, the PCBs of the LED assembly modules can have sharp edges and corners. Care must therefore be taken during handling and installation to avoid injury.
  - To ensure problem-free operation, the specified maximum temperature at the  $t_c$  point (see "Operating Life") must be observed (and measured in accordance with EN 60598-1). To satisfy this point, it may be necessary to put measures in place to ensure any heat is dissipated from the PCB to the environment.
  - In the event of outdoor applications or applications in damp locations, care must be taken to protect LED assembly modules against humidity, splashes and jets of water. Any corrosion damage resulting from humidity or contact with condensation will not be recognised as a defect or manufacturing fault. LED assembly modules are not specially protected against foreign bodies or dust. Depending on the type of application, further protection must be ensured to prevent dust and foreign bodies from entering.
  - The photobiological safety of the LED modules must be classified into risk groups in accordance with EN 62471: 2008.
    - general lighting  
exempt group:  
WU-M-395/396/397
    - other applications  
risk group 1:  
WU-M-395/396/397
- Use of standard VS optics (544031, 544032, 544033, 544034, 544035) does not affect the need to classify LED modules for "general lighting" into the above mentioned risk groups. For "other applications" LED modules with standard VS optics have to be assigned to risk group 2.

## Applied Standards

EN 62031  
LED modules for general lighting – Safety specifications



EN 62471  
Photobiological safety of lamps and lamp systems