

## PERFECT LIGHTING



## LED MODULES FOR RETAIL AREA

**WU-M-403-XP/NV, WU-M-404-NV, WU-M-405-NV**

LED modules are used for the most diverse applications in the field of retail lighting, e.g. shop windows, refrigerated display counters or vending trucks at weekly markets. The rapid pace of technological progress is giving rise to new application options on a daily basis.

### Typical Applications

- Integration in reflector luminaires
- Shop lighting
- Furniture lighting
- Flat surface-mounting luminaires
- Cladding illumination
- Stairway and corridor illumination
- Suspended luminaire with external control gear

### LED-Module Shop

- **HIGH QUALITY SMD TECHNOLOGY**
- 
- **AVAILABLE IN DIFFERENT CCT'S**
- 
- **TEMPERATURE FAIL-SAFE CIRCUIT**
- 
- **EASY HANDLING**
- **RESISTANT AGAINST SHOCK AND VIBRATIONS**
- **INTEGRATED 12 V INTERFACE FOR ACTIVE COOLING ELEMENT**
- **VDE APPROVED (ACC. TO EN 62031)**



## LED Modules for Retail Area

### Technical Notes Ø 50 mm

- Dimensions: Ø 50 mm
- Use of external LED constant current driver
- WU-M-403: Wide radiation angle (115°) optimal for reflector solutions
- Temperature fail-safe circuit (activation temperature:  $t_c \approx 105 \text{ °C}$ )
- On-board push-in connector
- ESD protection class 2

### Technical Notes Ø 56 mm

- Dimensions: Ø 56 mm
- Use of external LED constant current driver
- WU-M-404 und -405: Wide radiation angle (115°) optimal for reflector solutions
- Temperature fail-safe circuit (activation temperature:  $t_c \approx 105 \text{ °C}$ )
- On-board push-in connector
- 12 V DC interface for active cooling element (e.g. fan):  
I = 120 mA; temperature-dependent rotation speed control
- ESD protection class 2

### Electrical Characteristics

at PCB temperature  $t_c = 25 \text{ °C}$

Type	Ref. No.	Colour	Number of LEDs	Max. current per module mA	Typ. voltage DC		Typ. power consumption	
					700 mA V	1050 mA V	700 mA W	1050 mA W
<b>LED modules Ø 50 mm – XP</b>								
WU-M-403-XP...	<b>All types</b>	Warm white/ Neutral white	12	700	39.6	not allowed	27.7	not allowed
<b>LED modules Ø 50 mm – NV</b>								
WU-M-403-NV...	<b>All types</b>	Warm white/ Neutral white	12	1050	39.4	42	27.6	44.1
<b>LED modules Ø 56 mm</b>								
WU-M-404-NV...	<b>All types</b>	Warm white/ Neutral white	14	1050	46	49	32.2	51.5
WU-M-405-NV...	<b>All types</b>	Warm white/ Neutral white	16	1050	52.5	56	36.8	58.8

**Use of external LED constant current driver with max. 700 mA or with max. 1050 mA required.**

### Maximum Ratings

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

Type	Operation temperature range at $t_c$ -point		Storage temperature range		Max. permitted output voltage of operating device V
	°C min.	°C max.	°C min.	°C max.	
All types	-10	+90	-40	+80	60

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 for Retail Area

### Optical Characteristics

at PCB temperature  $t_c = 65\text{ }^\circ\text{C}$

Type	Ref. No.	Colour	Correlated colour temperature K	Luminous flux at 700 mA*		Luminous flux at 1050 mA*		Typ. radiation angle (°)	Typ. CRI $R_g$
				min. lm	typ. lm	min. lm	typ. lm		
<b>LED modules Ø 50 mm – XP</b>									
WU-M-403-XPE-2700K W1	<b>545185</b>	Warm white	2700 (-120/+175)	1300	1400	not allowed	not allowed	115	80
WU-M-403-XPE-3000K W1	<b>545187</b>	Warm white	3000 (-130/+220)	1400	1500	not allowed	not allowed	115	80
WU-M-403-XPE-4000K W1	<b>545189</b>	Neutral white	4000 (-300/+260)	1400	1500	not allowed	not allowed	115	80
WU-M-403-XPE-4000K W2	<b>545680</b>	Neutral white	4000 (-300/+260)	1600	1700	not allowed	not allowed	115	80
<b>LED modules Ø 50 mm – NV</b>									
WU-M-403-NV-2700K W1	<b>546283</b>	Warm white	2700 (-120/+175)	1702	1776	2300	2400	115	80
WU-M-403-NV-3000K W1	<b>546271</b>	Warm white	3000 (-130/+220)	1850	2072	2500	2800	115	80
WU-M-403-NV-4000K W1	<b>546284</b>	Neutral white	4000 (-300/+260)	1850	2072	2500	2800	115	80
<b>LED modules Ø 56 mm</b>									
WU-M-404-NV-2700K W1	<b>546285</b>	Warm white	2700 (-120/+175)	2072	2220	2800	3000	115	80
WU-M-404-NV-3000K W1	<b>546272</b>	Warm white	3000 (-130/+220)	2220	2405	3000	3250	115	80
WU-M-404-NV-4000K W1	<b>546286</b>	Neutral white	4000 (-300/+260)	2220	2405	3000	3250	115	80
WU-M-405-NV-2700K W1	<b>546287</b>	Warm white	2700 (-120/+175)	2405	2590	3250	3500	115	80
WU-M-405-NV-3000K W1	<b>546273</b>	Warm white	3000 (-130/+220)	2590	2775	3500	3750	115	80
WU-M-405-NV-4000K W1	<b>546288</b>	Neutral white	4000 (-300/+260)	2590	2775	3500	3750	115	80

\* Measurement tolerance of luminous flux:  $\pm 7\%$

**Minimum order quantity: 100 pcs. per LED module**

### Operating Life

50,000 hrs. (lumen maintenance at 70%, failure rate 10%,  $t_c \leq 65\text{ }^\circ\text{C}$ )

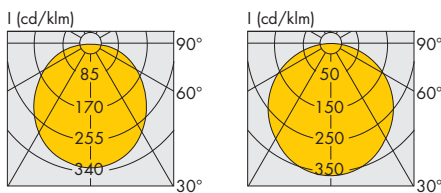
This value does not refer to the colour temperature.

### Thermal Characteristics

Type	Thermal resistance, $t_c$ point to bottom of PCB K/W
All types	0.2

For improved thermal management VS recommends an additional cooling element, which is suitable for the application. You will find detailed information in "Application Notes" for LED modules.

### Typical Light Distribution Curve



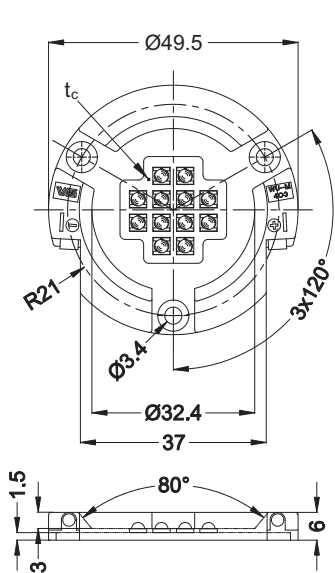
**XPE modules**

**NV modules**

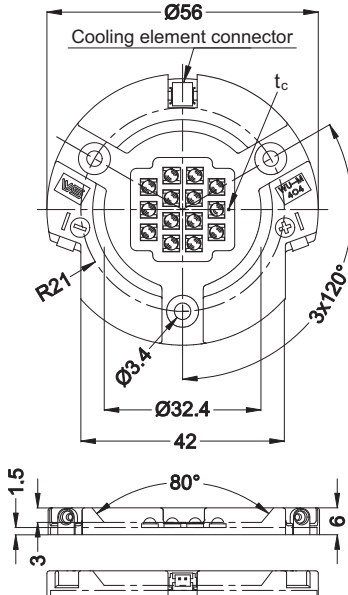
The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification. Please find further detailed information at [www.vs-optoelectronic.com](http://www.vs-optoelectronic.com).

## LED Modules for Retail Area

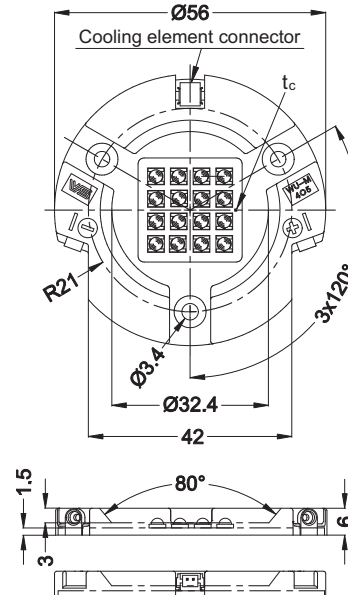
### Mechanical Dimensions



WU-M-403



WU-M-404



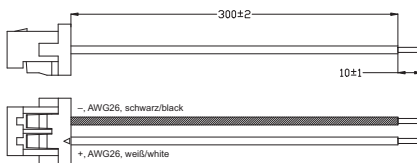
WU-M-405

## Accessories for LED Modules for Retail Area

### Connection cable for active cooling element

Type: WU-VB-009-300 mm

Ref. No.: 545356

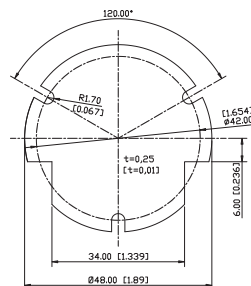


### Thermal conductive graphite tape

Type: Thermal tape Ø 48 mm Graphite

Thermal resistance:  $R_{th} \leq 0.04 \text{ K/W}$

Ref. No.: 545689



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 for Retail Area

### LED Constant Current Drivers

Mains voltage: 220 - 240 V  $\pm$  10%  
 Mains frequency: 0 Hz, 50 - 60 Hz  
 SELV



### Constant current drivers

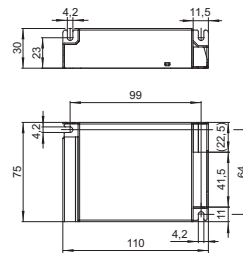
#### 700 mA and 1050 mA

Type: ECXe 700.022  
 Current output: 700 mA  
 Voltage output: 20 - 57 V

#### Ref. No.: 186200

Type: ECXe 1050.021  
 Current output: 1050 mA  
 Voltage output: 20 - 57 V

#### Ref. No.: 186198



### Dimmable constant current drivers

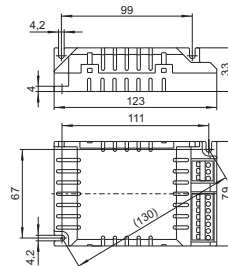
#### 700 mA und 1050 mA – DALI

Type: ECXd 700.017  
 Current output: 700 mA  
 Voltage output: 9 - 48 V

#### Ref. No.: 186177

Type: ECXd 1050.020  
 Current output: 1050 mA  
 Voltage output: 20 - 57 V

#### Ref. No.: 186196



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 for Retail Area

### 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
- The module must be fixed onto a thermally conductive surface with three M3 screws. A minimum torque of 0.6 Nm is required.
- 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);  
 $U_{max} \leq 60 V$
- Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- The LED modules are connected via two on-board push-in connectors for rigid or tinned conductors.  
Conductor section:  
tinned: 0.25 - 0.8 mm<sup>2</sup>  
rigid: 0.5 - 0.75 mm<sup>2</sup>.  
The contacts can be released with a flat-headed screwdriver with a width of 3 mm.
- Safety regulations acc. to EN 60598 (or further standards) has to be observed if the maximum output voltage exceed the permitted touchable value.
- A parallel or serial connection of the modules is not allowed.
- 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. For optimized thermal heat transfer, a thermal conductive graphite foil is available (Ref. No.: 545689).
- The modules WU-M-404 and WU-M-405 are assembled with a 12 V DC ( $I_{max.} = 120 mA$ ) interface for an active cooling element (e.g. fan). A special cable for interconnection is available (Ref. No.: 545356).
- If a PWM signal is used for dimming purposes, care must be taken to ensure that the admissible  $t_c$  temperature is not exceeded at every dimming level. (Test the start behaviour of active cooling components.)
- 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.
- Tests have shown the following chemicals to be harmful to LEDs used on the modules. It is recommended not to use these chemicals anywhere in an LED system. The fumes from even small amounts of these chemicals may damage the LEDs.
  - Chemicals that might outgas aromatic hydrocarbons (e.g., toluene, benzene, xylene)
  - Methyl acetate or ethyl acetate
  - (i.e., nail polish remover)
  - Cyanoacrylates (i.e., "Superglue")
  - Glycol ethers (including Radio Shack<sup>®</sup>, Precision Electronics Cleaner - dipropylene glycol monomethyl ether)
  - Formaldehyde or butadiene (including Ashland PLIOBOND<sup>®</sup> adhesive)
  - Dymax 984-UVUF conformal coating
  - Loctite Sumo glue
  - Gorilla glue
  - Clorox bleach
  - Clorox Clean-Up cleaner spray
  - Loctite 384 adhesive
  - Loctite 7387 activator
  - Loctite 242 threadlockeror other outgassing substances
- 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-403/404/405
  - other applications  
risk group 1:  
WU-M-403-XP-2700K/3000K  
WU-M-403/404/405-NV-2700K  
risk group 2:  
WU-M-403-XP-4000K  
WU-M-403/404/405-NV-3000K/4000K

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 for Retail Area

### Applied Standards

EN 62031

LED modules for general lighting – Safety specifications



EN 62471

Photobiological safety of lamps and lamp systems

### Accessories

Reflectors:

- ACL-Lichttechnik GmbH  
[www.reflektor.com](http://www.reflektor.com)
- Alux-Luxar GmbH & Co. KG  
[www.alux.de](http://www.alux.de)
- JORDAN REFLEKTOREN GmbH & Co. KG  
[www.jordan-reflektoren.de](http://www.jordan-reflektoren.de)

Heat sinks with active cooling:

- Nuventix, Inc.  
[www.nuventix.com](http://www.nuventix.com)
- Sunon  
[www.sunon.com](http://www.sunon.com)
- AVC  
[www.avc-erupe.eu](http://www.avc-erupe.eu)

Heat sinks with passive cooling:

- ALPHA-Numerics GmbH  
[www.alpha-numerics.de](http://www.alpha-numerics.de)
- Fischer Elektronik GmbH & Co. KG  
[www.fischerelektronik.de](http://www.fischerelektronik.de)
- AVC  
[www.avc-erupe.eu](http://www.avc-erupe.eu)

Fans:

- Arctic Cooling AG  
[www.arctic.ac](http://www.arctic.ac)
- ebn-papst Mulfingen GmbH & Co. KG  
[www.ebmpapst.com](http://www.ebmpapst.com)
- Sunon  
[www.sunon.com](http://www.sunon.com)
- AVC  
[www.avc-erupe.eu](http://www.avc-erupe.eu)

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).