

## LED LINEAR ALLROUND SYM I AND SYM II

### IP20 BUILT-IN MODULES



## LED LINEAR ALLROUND INDUSTRY AND HALL LIGHTING

### WU-M-479/xx-C

These LED modules are suitable for illuminating industrial, production, sports and warehouse facilities as well as for petrol station lighting.

These modules were designed for built-in into luminaire casings. They enable a modular luminaire design.

The modules are available in three shapes (4, 8 or 16 LEDs) and in three white colour tones.

#### Typical Applications

- Integration in luminaires
- Indoor lighting
- Industrial lighting for:
  - Production halls
  - Warehouses
- Petrol station lighting
- Lighting for Sports Facilities

#### LED Industry and Hall Lighting

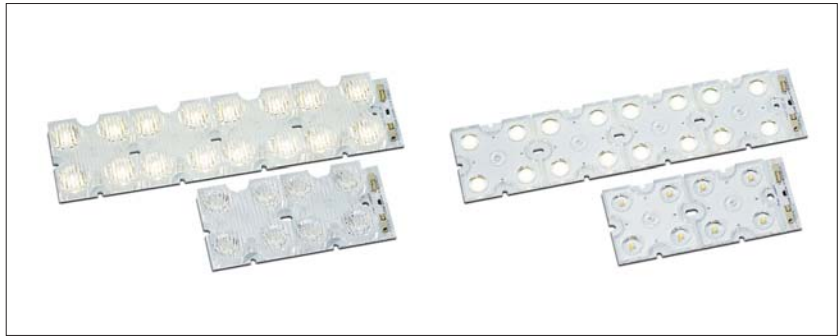
- **HIGHLY EFFICIENT: UP TO 135 LM/W**
- **VERY HOMOGENOUS ILLUMINATION**
- **HUGE RANGE OF CCT & CRI VARIANTS**
- **INITIAL COLOUR ACCURACY: 5 SDCM**
- **VDE APPROVED (ACC. TO EN 62031)**



## LED Linear Allround Industrial and Hall

### Technical Notes

- LED built-in module for integration into luminaires
- 4, 8 or 16 high-efficiency High Power LEDs
- Push-in terminals (WAGO series 2060)
- Design for optimum thermal management
- Degree of protection: IP20
- ESD protection class 2



### Electrical Characteristics at $t_p = 60^\circ\text{C}$

Type	No. of LEDs	Voltage DC (V)												Temperature coefficient mV/K	Power consumption (W)											
		350 mA			700 mA			1050 mA			1400 mA				350 mA			700 mA			1050 mA			1400 mA		
WU-M-479/...		min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.		min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.
.../4-C	4	9.8	11	11.4	10.4	11.5	12	10.8	11.9	12.4	11.2	12.3	12.8	-11.1	3.4	3.9	4	7.3	8.1	8.4	11.3	12.5	13	15.7	17.2	17.9
.../8-C	8	19.7	21.9	22.9	20.7	23	23.9	21.6	23.9	24.8	22.4	24.6	25.6	-22.2	6.9	7.7	8	14.5	16.1	16.7	22.7	25.1	26	31	34.4	35.8
.../16-C	16	39.4	43.9	45.8	41.5	46	47.9	43.3	47.7	49.7	44.8	49.2	51.2	-44.4	13.8	15.4	16	29.1	32.2	33.5	45.5	50.1	52.2	62.7	68.9	71.7

Use of external LED constant current driver required.

### Maximum Ratings Exceeding the maximum ratings can lead to destruction of the module.

Type	Operation current mA	Operation temperature range at $t_c$ point		Storage temperature range		Max. allowed repetitive peak current mA
		$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	
All types	350	-30	+85	-30	+85	1810
All types	700	-30	+85	-30	+85	1670
All types	1050	-30	+80	-30	+85	1580
All types	1400	-30	+60	-30	+85	1510

### Optical Characteristics at $t_p = 60^\circ\text{C}$

Type	Colour	Correlated colour temperature K	Luminous flux* (lm) and typ. efficiency (lm/W)												CRI**	Photo- metric code
			350 mA			700 mA			1050 mA			1400 mA				
			min.	typ.	typ.	min.	typ.	typ.	min.	typ.	typ.	min.	typ.	typ.		
			lm	lm	lm/W	lm	lm	lm/W	lm	lm	lm/W	lm	lm	lm/W		

#### LED Linear Allround - 4 LEDs

WU-M-479/4-C-830	warm white	3000 -90/+185	475	490	127	895	925	115	1265	1305	104	1575	1625	94	≥ 80	830/579
WU-M-479/4-C-840	neutral white	4000 -235/+230	510	520	135	965	980	122	1360	1385	111	1700	1730	100	≥ 80	840/579
WU-M-479/4-C-850	cool white	5000 -265/+360	455	500	130	860	945	118	1215	1335	107	1515	1665	97	≥ 80	850/579

#### LED Linear Allround - 8 LEDs

WU-M-479/8-C-830	warm white	3000 -90/+185	945	975	127	1790	1845	115	2525	2605	104	3155	3250	94	≥ 80	830/579
WU-M-479/8-C-840	neutral white	4000 -235/+230	1020	1040	135	1930	1965	122	2720	2770	111	3395	3455	100	≥ 80	840/579
WU-M-479/8-C-850	cool white	5000 -265/+360	910	1000	130	1720	1895	118	2430	2675	107	3030	3335	97	≥ 80	850/579

#### LED Linear Allround - 16 LEDs

WU-M-479/16-C-830	warm white	3000 -90/+185	1895	1955	127	3580	3690	115	5055	5210	104	6305	6500	94	≥ 80	830/579
WU-M-479/16-C-840	neutral white	4000 -235/+230	2040	2075	135	3860	3925	122	5445	5540	111	6790	6910	100	≥ 80	840/579
WU-M-479/16-C-850	cool white	5000 -265/+360	1820	2005	130	3445	3790	118	4860	5345	107	6065	6670	97	≥ 80	850/579

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.

\* Measurement tolerance of luminous flux:  $\pm 7\%$  | \*\* Measurement tolerance CRI:  $\pm 2$  | CRI  $\geq 70$  on request

### Operating Life

Modules	Operating life in hours at measured temperature at $t_p$ point											
	$I_F$ 350 mA			$I_F$ 700 mA			$I_F$ 1050 mA			$I_F$ 1400 mA		
	40 $^\circ\text{C}$	60 $^\circ\text{C}$	85 $^\circ\text{C}$	40 $^\circ\text{C}$	60 $^\circ\text{C}$	85 $^\circ\text{C}$	40 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$
L80/B10*	> 60,000	> 60,000	46,000	> 60,000	> 60,000	30,000	> 60,000	> 60,000	25,000	> 60,000	> 60,000	27,000
L70/B10*	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	58,000	> 60,000	> 60,000	48,000	> 60,000	> 60,000	51,000

These values do not refer to the colour temperature. | \*  $L_{xx}/B_{yy}$  (lumen maintenance at xx%, failure rate yy%)

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## SYM I Linear – Allround

### Technical Notes

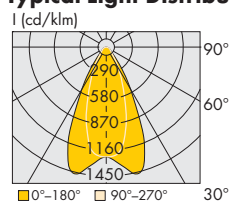
- Dimensions (incl. optics) LxWxH  
4 LEDs: 50x62.3x12 mm  
8 LEDs: 50x113.2x12 mm  
16 LEDs: 50x215x12 mm
- Lenses for high-bay symmetrical lighting
- Optimum illumination - installation ratio: 1:1  
in the 0-180° lengthwise layer and 8:5 in the  
90-270° crosswise layer (ratio of height to the  
distance between luminaires).



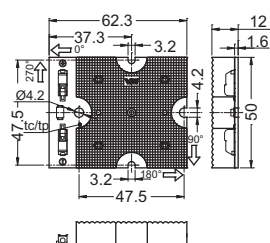
### Reference Numbers

Type	Ref.-No.	Number of LEDs
WU-M-479/4-C-830	<b>561972</b>	4
WU-M-479/4-C-840	<b>561979</b>	4
WU-M-479/4-C-850	<b>561986</b>	4
WU-M-479/8-C-830	<b>561993</b>	8
WU-M-479/8-C-840	<b>562000</b>	8
WU-M-479/8-C-850	<b>562007</b>	8
WU-M-479/16-C-830	<b>562014</b>	16
WU-M-479/16-C-840	<b>562021</b>	16
WU-M-479/16-C-850	<b>562028</b>	16

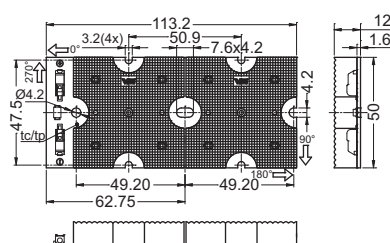
### Typical Light Distribution Curve



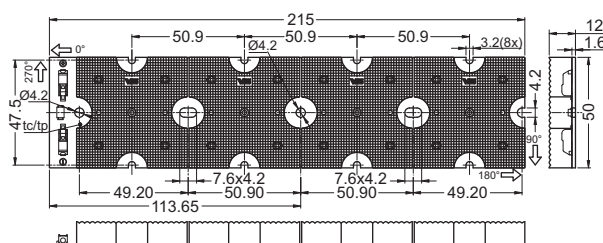
### Mechanical Dimensions



WU-M-479/4



WU-M-479/8



WU-M-479/16

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## SYM II Linear – Allround

### Technical Notes

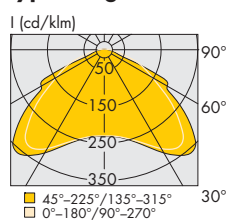
- Dimensions (incl. optics) LxWxH  
4 LEDs: 50x62.3x6.2 mm  
8 LEDs: 50x113.2x6.2 mm  
16 LEDs: 50x215x6.2 mm
- Lenses for high-bay symmetrical lighting
- Optimum illumination - installation ratio: 1:2  
(ratio of height to the distance between luminaires)



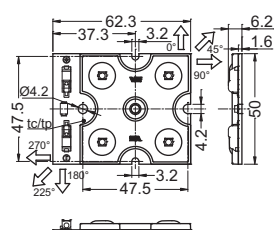
### Reference Numbers

Type	Ref.-No.	Number of LEDs
WU-M-479/4-C-830	<b>561973</b>	4
WU-M-479/4-C-840	<b>561980</b>	4
WU-M-479/4-C-850	<b>561987</b>	4
WU-M-479/8-C-830	<b>561994</b>	8
WU-M-479/8-C-840	<b>562001</b>	8
WU-M-479/8-C-850	<b>562008</b>	8
WU-M-479/16-C-830	<b>562015</b>	16
WU-M-479/16-C-840	<b>562022</b>	16
WU-M-479/16-C-850	<b>562029</b>	16

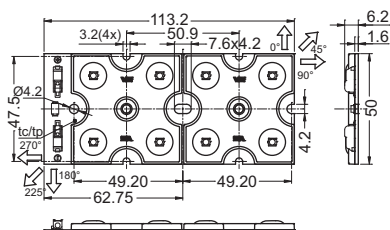
### Typical Light Distribution Curve



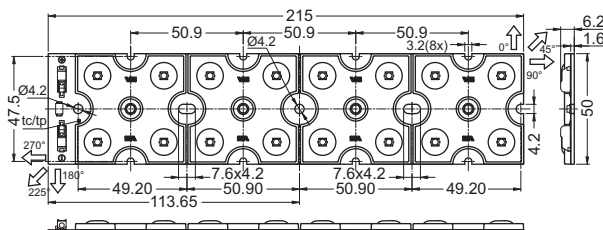
### Mechanical Dimensions



WU-M-479/4



WU-M-479/8

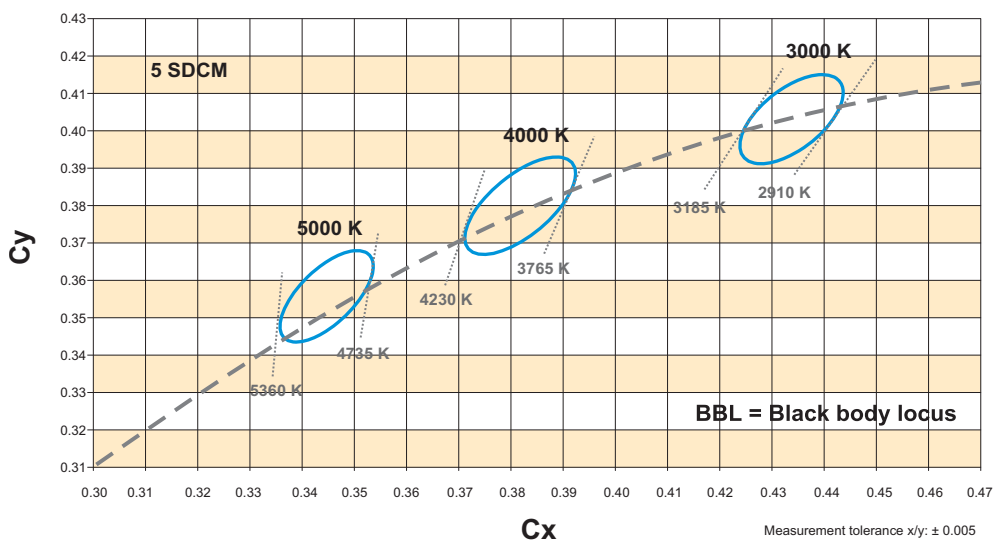


WU-M-479/16

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## LED Linear Allround – Industrial and Hall

### Assembly and Safety Information



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## LED Linear Allround – Industrial and Hall

### 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. Safety regulations acc. to EN 60598 has to be observed. Installation must be carried out in a voltage-free state (i.e. disconnection from the mains).

- LED built-in modules must not be subjected to any undue mechanical stress, e. g.:
  - handle LED modules carefully
  - avoid shear and compressive forces onto
  - the optics during handling and installation
  - avoid vibrations of more than 2 kHz, 40 G
- The module must be fixed onto a thermally conductive surface with 4 to 13 (M3 respectively M4) screws. Recommended torque: 0.6–0.8 Nm.
- When installing/screwing the module into a luminaire, please ensure that the cables are not squeezed between luminaire/heat-sink and LED module.
- Safe operation only possible by the use of external constant current sources ( $I_{\max}$  see table "Electrical Characteristics").
- Operation is dependent on constant current drivers that should provide the following protective measures:
  - short-circuit protection
  - overload protection
  - overheating protection
- 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.
- The clearance and creepage distances of LED modules WU-M-479/xx-C are designed for working voltages up to 450 V DC (acc. to EN 62031/EN 60598).
- Insulation of LED modules WU-M-479/xx-C is designed at basic insulation for working voltages of up to max. 450 V.
- Please ensure standard ESD (electrostatic discharge) protection measures are employed when handling and installing LED modules. Electrostatic discharge can damage LEDs.
- To ensure problem-free operation, the specified maximum temperature at the  $t_c$  and  $t_p$  point (see "Operating Life") must be observed (measured in accordance with EN 60598-1). To satisfy this point, it is necessary to put measures in place to ensure any heat is dissipated from the LED module 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.
- A parallel connection of the modules is not allowed.
- Operating LED modules in the presence of certain chemical substances or in chemically enriched (aggressive) environments can impair module functionality or even cause total module failure. Detailed information can be found in our "Chemical Incompatibility" PDF on our website [www.vossloh-schwabe.com/en/home/products/led-lighting-technology/notes-on-led-technology.html](http://www.vossloh-schwabe.com/en/home/products/led-lighting-technology/notes-on-led-technology.html)
- 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-479/xx-C
- other applications  
risk group 2:  
WU-M-479/xx-C



Assessment in acc. with IEC/TR 62778:

Given a clearance of more than  $d_{\min}$ , within which the lighting intensity limit of  $E_{\text{thr}} = 1200 \text{ lx}$  is attained, the classification goes down to Risk Group 1.

### Applied Standards

EN 62031

LED modules for general lighting – Safety specifications



pending

EN 62471

Photobiological safety of lamps and lamp systems

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