VEGA-X1

CE RoHS (UL) UKAS QUALITY MANAGEMENT TÜVRheinland Precisely Right. CONSTANT CURRENT DRIVING SYSTEM

Product description

- LED chain for backlighting in Signage applications
- Optimised for backlighting in light boxes and channel letters
- Standard beam characteristics: 170°
- Integrated current source (PCR) to stabilise luminous flux
- LED chain can be split between any module
- Colour rendering index CRI >75
- Narrow colour tolerance MacAdam[1]: 3 SDCM
- High efficiency of up to 180 lm / W

Illustration 1: VEGA-X1 LED Module

Applications

- Shallow light boxes with 40 - 100 mm depth
- Channel letter with narrow width
- Highlighting contours and lines
- Accent lighting

Technical data

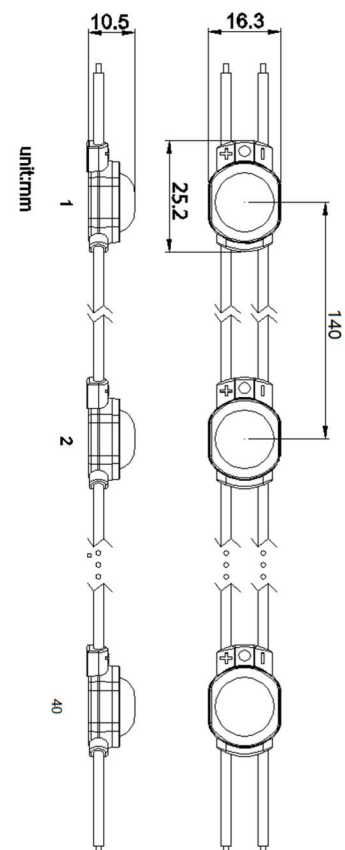| Parameter	Value
Ambient temperature ta	-20 … +45 °C
Max. surface temp. on module tc[2]	+90 °C
Storage temperature ts	-25 … +85 °C
Type of protection[3]	IP67
Risk group (EN 62471:2008)	0
Wiring connection cable	AWG18
Module length	25,2 mm
Module width	16,3 mm
Module height	10,5 mm
Module spacing centre to centre	140 mm
lens spacing centre to centre	-
Weight	4,5 g / LED Modul

Illustration 2: Module dimensionens

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[1] https://en.wikipedia.org/wiki/MacAdam_ellipse

[2] If the temperature limits are exceeded, the lifetime of the module will be greatly reduced or the module may be damaged. The tc temperature of the module must be measured under application circumstances in thermal steady condition. Measurement setup according to IEC/EN 60598-1.

[3] According DIN EN 60529: 1. digit: 6 / dustproof; 2. digit: 7 / Protection against temporary submergence. Not suitable for underwater applications or permanent immergence.

Ordering data

Colour	Colour temp.	Item number	LED modules per chain	Packaging bag	Packaging carton	Packaging outer carton
Daylight white	6500° K	VEGA-X1-W-12V-40-140	40 pcs	200 pcs = 5 chains in 1 bag	1000 pcs = 25 chains in 5 bags	2000 pcs = 50 chains in 10 bags

- ESD-protection bag: 300 x 280 x 0,12 mm (1,5 kg)
- Carton: 35 x 25 x 23 cm (8 kg)
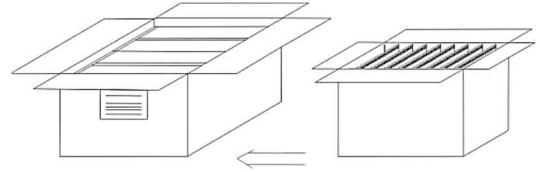- Outer carton: 52 x 37 x 26 cm (15,9 kg)

Illustration 3: 1 outer carton = 2 cartons

Lighting / electro technical data

Type	Photometric code[4]	Colour temp.[5]	Typ. luminous flux per module	Color rendering index CRI	Supply voltage DC[6]	Typ. power per module	Luminous efficiency, max
VEGA-X1-W-12V-40-140	765	6500°K	45 lm	>75	12V	0,26W	180 lm/W

Type code

- e.g.: VEGA-X1-W-12V-40-120

Parameter	Value
VEGA	Type of LED module series
1	Number of light points
765	Photometric CRI >80 6500°K
12	DC supply voltage
40	Number of modules per chain
140	Module spacing centre in mm

Photometric code

- Key for photometric code, e.g.: 765

1. digit		2. and 3. digit
Code	CRI	Colour temperature in °K divided by 100
7	70-79	
8	80-89	
9	90-99	

Norms & Standards

- EN 62031
- EN 62471
- The product meets the "inbuilt LED module" classification according to EN 62031.
- The product passed the glow-wire test with 850 °C according to EN 62031.
- The product complies with EN 62471: 2008 of the risk group "0" (Exempt Group)

Maintenance

- The product is maintenance free.
- Cleaning only with clear water without detergent.
- Do not clean product with high pressure cleaner.

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[4] Tolerance range for optical and electrical data: ±15 % (except electrical data for light colours red and blue: +15 / -30 %).

[5] Valid colours see "CIE tolerances and colour coordinates"

[6] Exceeding the max. approved supply voltage leads to overload on the LED module. This can lead to reduction in lifetime or destruction.
Tolerance range for the supply voltage: 12V: +2V / -0V.

LED power supply – load matrix

Typ. power LED module	4W	3W	2,8W	2,4W	2,16W	1,5W	1,2W	0,96W	0,6W	0,48W	0,36W	0,3W	0,26W	0,15W
Rated power driver	max. number of LED modules per rated power (at <80% driver load)													
12W	2	3	3	4	4	6	8	10	16	20	26	32	36	64
18W	3	4	5	6	6	9	12	15	24	30	40	48	55	96
24W	4	6	6	8	8	12	16	20	32	40	53	64	73	128
30W	6	8	8	10	11	16	20	25	40	50	66	80	92	160
36W	7	9	10	12	13	19	24	30	48	60	80	96	110	192
40W	8	10	11	13	14	21	26	33	53	66	88	106	123	213
60W	12	16	17	20	22	32	40	50	80	100	133	160	184	320
72W	14	19	20	24	26	38	48	60	96	120	160	192	221	384
80W	16	21	22	26	29	42	53	66	106	133	177	213	246	426
100W	20	26	28	33	37	53	66	83	133	166	222	266	307	533
150W	30	40	42	50	55	80	100	125	200	250	333	400	461	800
168W	33	44	48	56	62	89	112	140	224	280	373	448	516	896
192W	38	51	54	64	71	102	128	160	256	320	426	512	590	1024
216W	43	57	61	72	80	115	144	180	288	360	480	576	664	1152
264W	52	70	75	88	97	140	176	220	352	440	586	704	812	1408

- Note the maximum number of linkable LED modules per strand and type
- Minimum power may vary per device (e.g. 0-60%).
- Fall below the minimum power can lead to overvoltage on the output side of the driver and result in excessive luminous flux, overheating, shortening of the lifetime or destruction of the LED module.

Wiring example

Cable colour	Polarity
red-white	positive pole (+)
white	negative pole (-)
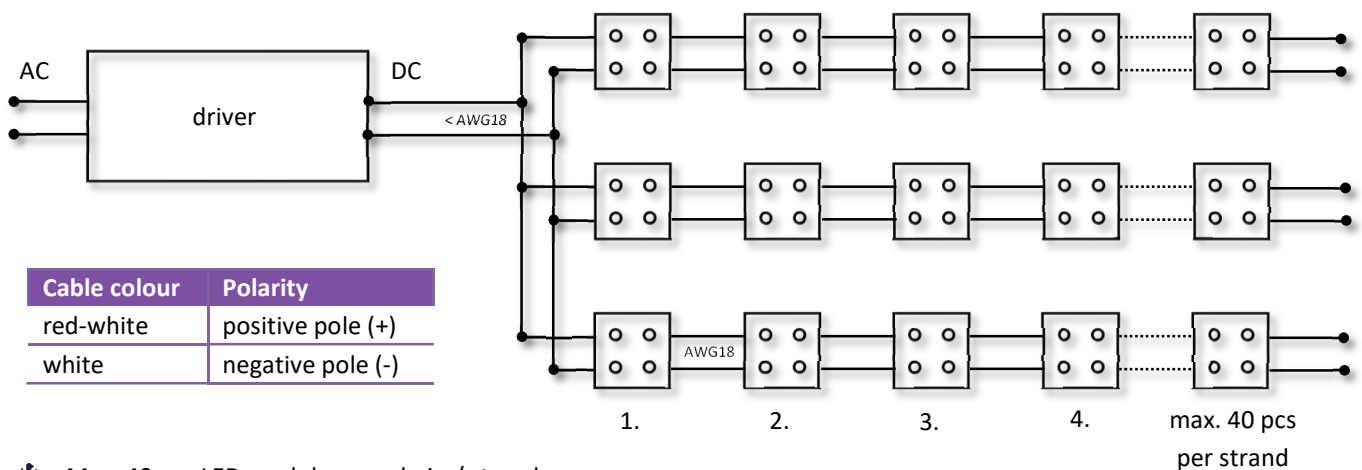
- Max. 40 pcs LED modules per chain / strand
- Apply supply voltage only to one side per strand[7]
- Reverse polarity can lead to the defect of the product
- The connection cables between the LED modules are implemented in AWG18
- Connect the cables to the individual strings with a larger cable cross-section (<AWG18)
- Do not detach the end cable directly at the LED module housing, but isolate it after approx. 5cm against moisture (e.g. 3M Scotchlok® or shrink tube)

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[7] Both-sided supply voltage (on both beg. and end of strand) can lead to current overflow and can result in destruction of LED modules.

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Empirical values for decrease of luminous flux over the chain

Typ	Number of LED modules	Module spacing 500mm
VEGA-X1-W-12V-40-140	40	5-6%

- Each LED module has an integrated constant current source to compensate the DC voltage drop over the cable length and to stabilize the luminous flux.

Recommendation cable cross section for secondary supply cable to 1st LED module

AC — driver — DC — max. 5m — Check AWG! — 1.
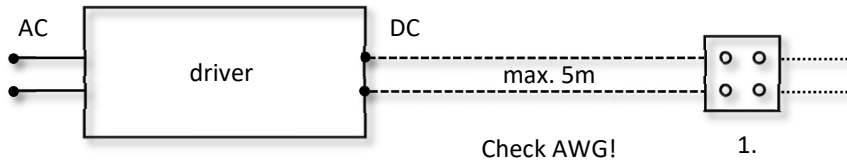
- The length of the supply line from the output side of the driver to the first LED module must not exceed 5 m.
- The exact calculation of the cable section must be carried out by a licensed electrician.
- To calculate the cross-section, please use the following table as a non-binding recommendation:

Power	Current	Cable cross-section
12 W	1 A	0,75 mm²
24 W	2 A	1,0 mm²
48 W	4 A	1,5 mm²
72 W	6 A	2,0 mm²
96 W	9 A	2,5 mm²

Mechanical fixing

- The product has a double-sided adhesive tape
- Permissible ambient temperature for processing double-sided adhesive tape: 10-30 ° C
- For processing the double-sided adhesive tape, free the substrate of grease residues
- Do not use acetone or acetic acid cleaning agents

Nominal lifetime / luminous flux decrease

- L70 extrapolations per IESNA TM-21-11[8]

Type	Lum. flux	t_s = Ambient temperature t_a	at I_f = 100mA
VEGA-X1-W-12V-40-140	L70	105° C	> 60.000 h
VEGA-X1-W-12V-40-140	L70	85° C	> 60.000 h

limited byTM-21 6x rule

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[8] IESNA LM-80 test report generated on Fri Jun 03 16:45:38 2016

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Beam characteristics

- Beam characteristics: 170°
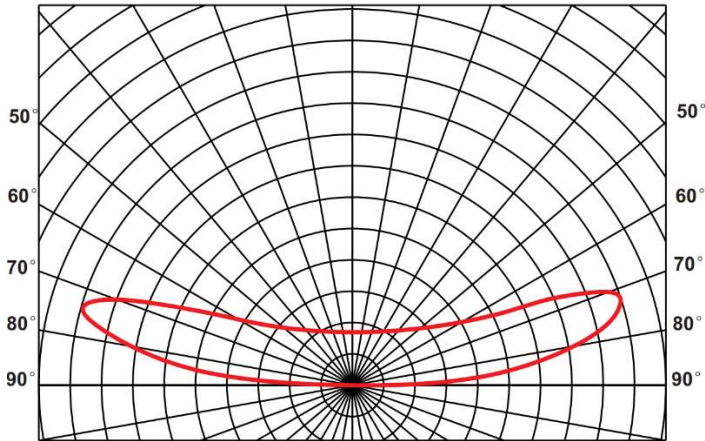- Relative light distribution lv/lv$_{max}$ in (%)

Illustration 5: Relative light distribution lv/lvmax in (%)

CIE tolerances & colour coordinates

- LED chip: SMD 2835 series
- Colour space according to CIE 1931[9]
- Colour tolerance MacAdam Ellipse[10]: 3SDCM
- Binning 1D and 1F in use

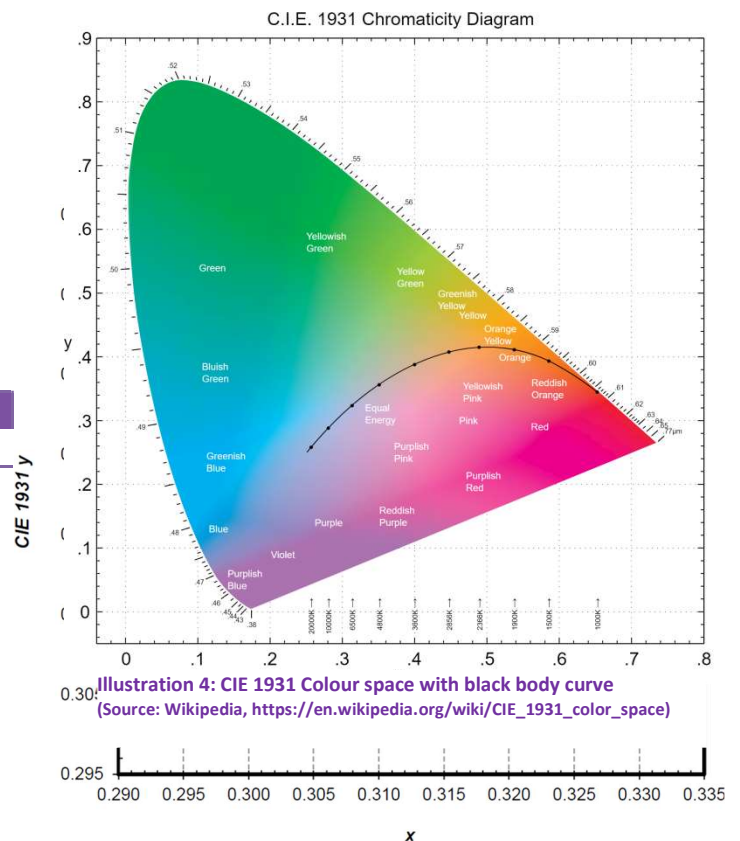| Type	Light colour	X/Y coordinates
VEGA-X1-W-12V-40-140	6500°K	0,3123 / 0,3282

Illustration 4: CIE 1931 Colour space with black body curve
(Source: Wikipedia, https://en.wikipedia.org/wiki/CIE_1931_color_space)

Illustration 6: MacAdam 3 SDCM ellipse with ANSI °K details. The tangents to the black body curve correspond to the respective color temperatures.
(Source: Lumileds)

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[9] https://en.wikipedia.org/wiki/CIE_1931_color_space

[10] https://en.wikipedia.org/wiki/MacAdam_ellipse

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Warranty

- The warranty period for the product is 60 months from date of purchase. The purchase date is determined using the purchase document.
- The guarantee covers only those defects which were identified during the warranty period and are attributable to production and construction factors.
- In the guarantee case, the product is repaired, replaced or the manufacturer replaces the value at the manufacturer's option.
- The guarantee obligations do not cover:
  - Mechanical damage and damage caused by the action of attacking medium and temperatures outside the permissible parameters.
  - Faults due to incorrect connection and incorrect operation. As well as for cases of improper use.
  - Incorrect power supply parameters, overvoltage including due to incorrect calculation of power supply performance or use of faulty power supply.
  - Cases where the power supplies used have an output voltage which does not meet the requirements of the product and which exceed or exceed the specified range.

Warranty

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