





DOWNLIGHT SYSTEM - MINI SPOT

•	Human Centric Lighting makes the day light.
	Tunable white 1,800K - 16,000K
	Brightness dimmable 1% - 100%
	RGB/CIE-xy adjustable Colour points and sequences
Y WAR	Biorhythmic lighting Vitalisation and recreation
	2 Control modes DALI DT8, ZigBee 3.0
	Excellent CRI CRI>90

*According to IEEE 1789-2015 (valid for all dimming levels, CCT and colour settings)

**CCT values outside the range 2,500-7,000K can be set in the CIE-xy mode

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0 K	2.000 K	3.000 K	4.000 K	5.000	I K	6.000 K	7.000 K	16.000 K
	III TECHNIC	CAL DATA		500mA v	vith mixing	chamber	750mA witho	ut mixing chamber
	Luminous sou	rce			SMD	LED Modul	e (High Power L	EDs)
	Supply voltage					2	4V DC	
	Power Luminous flux Efficiency Control mode Dimmable		11.2W 17.8		17.8			
			780lm 1		1,300			
			typ. 70lm/W typ. 73lm/W			73lm/W		
			ZigBee 3.0 (certified from October 2019), DALI DT8					
				1% - 100% Modular Dimming* / Camera-Ready *				eady*
	CCT and colou	r control		1,800 - 16,000K** / adjustable CIE-xy points and RGB cold				and RGB colours
	Ambient / stor	age temperatu	ire	+10°C +45°C / -20°C +80°C				°C
	t _{c max} LED Module			+85°C				
	Lifetime		50,000h L80B10					
	Additional features			Low tolerance for colour temperature MacAdam 1 (typical/initial Integrated overtemperature protection				am 1 (typical/initial) ection





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Last Revision: 09.07.2019 PI-LED-Downlight_System_Mini_Spot_LMU2_en

Notes concerning cabling, configuration, installation and operation of the PI-LED DOWNLIGHT SYSTEM Mini Spot can be found in the associated Application Note. The Application Note is enclosed with the product and can be downloaded from the Lumitech website.



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DOWNLIGHT SYSTEM - MINI SPOT

III ORDERING DATA AND TECHNICAL DATA - PI-LED DOWNLIGHT SYSTEM MINI SPOT

Туре	Description	Control mode	Cable [mm]	Lum. flux [lm]	Voltage [V DC]	Power (W)
LTS-00820-15-CR	PI-LED Mini Spot 780LM Mixed / DALI DT8 / 140mm	DALI DT8	140	780	24	11.2
LTS-00820-15-CR1	PI-LED Mini Spot 780LM Mixed / DALI DT8 / 400mm	DALI DT8	400	780	24	11.2
LTS-00820-16-CR	PI-LED Mini Spot 780LM Mixed / ZigBee 3.0 / 140mm	ZigBee 3.0	140	780	24	11.2
LTS-00820-16-CR1	PI-LED Mini Spot 780LM Mixed / ZigBee 3.0 / 400mm	ZigBee 3.0	400	780	24	11.2
LTS-01320-15-CR1	PI-LED Mini Spot 1300LM Pure / DALI DT8 / 400mm	DALI DT8	400	1,300	24	17.8
LTS-01320-16-CR1	PI-LED Mini Spot 1300LM Pure / ZigBee 3.0 / 400mm	ZigBee 3.0	400	1,300	24	17.8



The Mini Spot System is available in two luminous flux and power levels called "Mixed" and "Pure":

Variant "Mixed": The LED Module is delivered with mixing chamber (cover and diffuser).

All subsequent illumination data of the "Mixed" variant refer to the LED Module with plugged-on mixing chamber.

All subsequent illumination data of the "Pure" variant refer to the LED module.

III TECHNICAL DRAWINGS AND DATA - LED MODULE AND LMU



Notes:

- All values apply at ta=25°C, tc=65°C and 3000K
- Tolerance ranges: illumination data: +/-10% | electrical data: +/-15% | supply voltages: 24V +/-5%

• Illumination specifications in accordance with CIE1931

- If the supply voltage exceeds the max. permitted operating voltage, the PI-LED system will be overstressed. This will result in a highly reduced service life.
- If the maximum temperature limits are exceeded, the lifetime of the PI-LED system will be greatly reduced or the system may be damaged. Temperature measurements of the LED module or PI-LED

system have to be taken in the thermally stable state by means of a temperature sensor as per EN60598-1.

- The maximum system power of the PI-LED DOWNLIGHT SYSTEM Minispot is limited to 13W ("Mixed") and 20W ("Pure") due to its software
- According to colour temperature and temperature of the PI-LED system, the Mac Adam tolerance takes on values < 4

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Variant "Pure": The LED Module is delivered without mixing chamber.

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DOWNLIGHT SYSTEM - MINI SPOT

CONNECTION - DALI DT8



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Terminal connection

Terminal No.	Function
1	+ 24V DC
2	- OV DC
3	DALI IN
4	DALI IN
5	DALI OUT
6	DALI OUT

III FUNCTIONAL DESCRIPTION - DALI DT8*

Mode	ССТ	RGB	CIE	
Colour	1,800K-16,000K	Channels separately controllable	PI-LED colour space	
Brightness	1% - 100%			

Information:

Colour accuracy in the colour mode is given only for CIE-xy points.

Possible assignment to a maximum of 16 groups and 16 light scenes

Recommended control units:

- LTP-1028 (DALI Touchpanel DT8)
- LTP-1029 (DALI Display 7" DT8)
- K-WDALI-USB (DALI USB Stick), together with the PC-App myPI-LED
- K-DALI-CDC (DALI control for daylight curves)
- K-DALI-SEQ (DALI control for colour sequences)
- LTP-DARA0x (DARA L Device in various versions, x = 1-6)

A complete list of compatible DALI DT8 control devices is available on request.

*PI-LED systems with DALI interface are DALI1 / DALI Device Type 8 registered where colour control with regard to DALI Device Type 8 is fully implemented according to the underlying DALI standard. Since there is currently no possibility for testing products for compliance with the DALI Device Type 8 standard (no official DALI tester exisiting or available), a formal verification can not be provided.

"The DALI colour control functionality (part 209/Device Type 8) of this product has not been verified."

III CONNECTION - ZIGBEE 3.0

Terminal No

1



III FUNCTIONAL DESCRIPTION - ZIGBEE 3.0

Mode	ССТ	RGB	CIE
Colour	1,800K-16,000K	Channels separately controllable	PI-LED colour space
Brightness		1% - 100%	

Possible assignment to groups and light scenes depending on control unit

Possible control units:

- LTP-1026 (NeoLink Box) together with the myPI-LED App for Android/iOS
- K-ZWALLY-1.2/2.2/3.2/4.2/5.2
- K-Z1001014 (ZigBee USB Stick), together with the PC-App myPI-LED

A complete list of compatible ZigBee 3.0 control devices is available on request.

Information:

Depending on the assembly situation of the LMU, the range of the ZigBee module can vary.

Mounting the LMU inside of a sealed metal case can dramatically reduce the ZigBee range!

III NOTES ON STANDARDS AND SECURITY POLICIES

Function

+ 24V DC

- OV DC

EOS/ESD security police	The PI-LED DOWNLIGHT SYSTEM MINI SPOT contains components that are sensitive to electrostatic discharge. It may only be installed if appropriate EOS/ESD protection in manufacturing and in application is applied.					
CE - marking of the luminaire	The PI-LED DOWNLIGHT SYSTEM MINI SPOT is tested according to the applicable standards (see Standards). Corresponding standard tests of the final product must be carried out separately.					
Fulfilled standards Underlying standards	EN62031: 2013-09 EN62471: 2009-03 EN61347-2-13 ETSI EN 300 328 V2.1.1 EN 301 489-3 IEEE 1789-2015	LED modules for general lighting - Safety specifications Photobiological safety of lamps and lamp systems Particular requirements for d.c. or a.c. supplied electronic control gear for LED modules Wideband transmission systems - Data transmission equipment operating in the 2,4 GHz ISM band Electromagnetic compatibility and Radio spectrum Matters (ERM) IEEE Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers				

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DOWNLIGHT SYSTEM - MINI SPOT

III PHOTOMETRICAL PROPERTIES - System variant "Mixed" (500mA with mixing chamber)





	general data		visual		alaba	
ССТ [K]	CRI	CIE-x	CIE-y	lumin. flux [lm]	efficiency [lm/W]	(smel)
1,800	83.5	0.5492	0.4082	417	67	0.233
2,000	87.5	0.5268	0.4133	493	71	0.256
2,500	93.5	0.4770	0.4137	700	78	0.342
2,700	94.6	0.4599	0.4106	795	80	0.378
3,000	95.6	0.4369	0.4041	780	70	0.431
3,500	94.4	0.4053	0.3907	750	70	0.514
4,000	92.0	0.3804	0.3767	733	70	0.591
4,500	90.4	0.3608	0.3635	723	70	0.660
5,000	89.3	0.3451	0.3516	717	69	0.723
5,500	88.8	0.3324	0.3410	714	68	0.780
6,000	87.9	0.3221	0.3318	712	67	0.831
6,500	87.1	0.3135	0.3236	712	66	0.876
7,000	86.4	0.3064	0.3165	712	65	0.916
8,000	85.3	0.2952	0.3048	714	63	0.984
9,000	84.0	0.2869	0.2956	716	62	1.040
10,000	82.8	0.2806	0.2883	709	63	1.084
12,000	81.3	0.2718	0.2776	644	63	1.153
14,000	80.0	0.2659	0.2702	604	65	1.202
16,000	79.1	0.2618	0.2648	576	72	1.238





Remark:

The coefficient alpha(smel) describes the melanopic effectiveness of the light source on humans and their circadian rhythm.

To give the natural human biorhythm the best possible support, the melatonin production can be minimized by higher values of alpha(smel) throughout the day and stimulated by lower values in the evening.



Remark:

The diagrams show typical curves and not the exact behaviour of single LED modules.

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DOWNLIGHT SYSTEM - MINI SPOT

III PHOTOMETRICAL PROPERTIES - System variant "Pure" (750mA without mixing chamber)





	general data		visual		alaba	
ССТ [K]	CRI	CIE-x	CIE-y	lumin. flux [lm]	efficiency [lm/W]	(smel)
1,800	83.5	0.5492	0.4082	575	57	0.240
2,000	87.5	0.5268	0.4133	678	61	0.265
2,500	93.5	0.4770	0.4137	987	70	0.326
2,700	94.6	0.4599	0.4106	1120	71	0.361
3,000	95.6	0.4369	0.4041	1300	73	0.412
3,500	94.4	0.4053	0.3907	1250	74	0.493
4,000	92.0	0.3804	0.3767	1218	74	0.567
4,500	90.4	0.3608	0.3635	1200	74	0.635
5,000	89.3	0.3451	0.3516	1187	73	0.697
5,500	88.8	0.3324	0.3410	1180	72	0.752
6,000	87.9	0.3221	0.3318	1175	71	0.802
6,500	87.1	0.3135	0.3236	1173	70	0.846
7,000	86.4	0.3064	0.3165	1172	69	0.885
8,000	85.3	0.2952	0.3048	1172	67	0.952
9,000	84.0	0.2869	0.2956	1173	65	1.007
10,000	82.8	0.2806	0.2883	1175	68	1.051
12,000	81.3	0.2718	0.2776	1180	74	1.118
14,000	80.0	0.2659	0.2702	1100	77	1.166
16,000	79.1	0.2618	0.2648	1040	85	1.201





Remark:

The coefficient alpha(smel) describes the melanopic effectiveness of the light source on humans and their circadian rhythm.

To give the natural human biorhythm the best possible support, the melatonin production can be minimized by higher values of alpha(smel) throughout the day and stimulated by lower values in the evening.



Remark:

The diagrams show typical curves and not the exact behaviour of single LED modules.

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III COORDINATES AND TOLERANCES ACCORDING TO CIE 1931



Representable PI-LED colour space in the CIĖ 1931 system If a colour point outside of the triangle (PI-

LED colour space) is set, the closest colour point within the triangle is referenced.

III LIFETIME

tp [°C]	L80B10 [h]
75°C	50,000

Notes:

 Value L is a statistical value, the actual drop in the luminous flux can vary across the delivered LED modules.

• tp-position = tc-position LED Module

III THERMAL CHARACTERISTICS

Ambient temperature	+10°C +45°C
Storage temperature	-20°C+80°C
t _{c, max} LED Module	+85°C
t _{c max} LMU	+65°C

Lumitech PI-LED systems are equipped with integrated overtemperature protection that protects the LED module against thermal overloads.

If the temperature tc at the LED module reaches 85°C, power is reduced by lowering the brightness. If the temperature remains at that level or reaches 90°C, the LED is totally switched off. The LED module is switched on again when the temperature tc drops to below 65°C again.









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PI-LED Mini Spot system variant "Mixed"