Constant current independent dimmable driver
PUL-A Series suffix d(DALI-2)

Features

- Support DALI-2 dimming mode
- 10/15-level current output can be realized by DIP-switch
- Soft dimming and flicker-free at any brightness
- Using HPC patented technology at any dimming level, the brightness between lights is same
- Standby power input<0.5W, meets the requirements of ErP certification
- High PF, high efficiency, low THD
- Screw-free and pressing type strain relief, supports thicker cables and is easier to install
- Independent input and output strain relief, stronger wiring
- Intelligent LED hot-plug protection function
- SELV and Class II design, suitable for use outside of the light
- Passed ENEC,CE,RCM,CCC,DALI-2 and other certifications
- IP20 protection grade, indoor use
- Nominal life-time up to 100,000 h
- 5-year guarantee

Interfaces

- DALI-2(DALI-2 DT6)

Functions

- Support central emergency application (dimming normal in DC input)
- Support self-contained emergency application
- Protective features (short-circuit,no-load, hot plug-in protection)

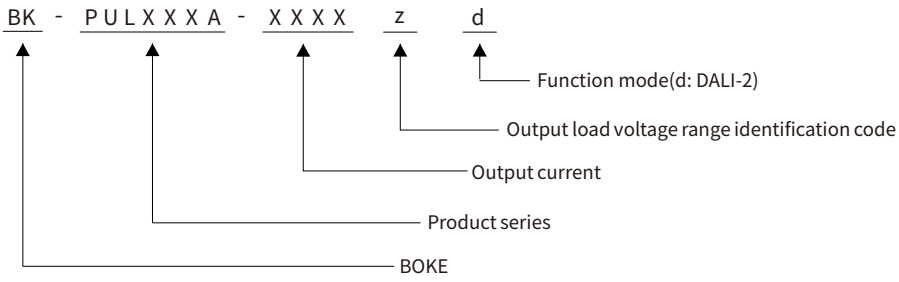
Suitable for lights

- Suitable for lights with independent drivers such as downlights, spotlights, panel lights, etc
- Not suitable for lights with built-in drivers

Typical applications

- LED indoor lighting
- LED office lighting
- LED commercial lighting

Model coding rules of PUL-A series



Function list

Model	Suffix	Wired dimming		
		DALI-2	pushDIM	1-10V 2in1
PUL030A PUL042A PUL060A	D	√	√	√
	d	√	√	
	P		√	√
	M			√

* The description in this specification is only applicable to the products with the suffix d and the model are PUL030A and PUL042A and PUL060A.

Model list

Model	Input voltage	Output power	Output voltage	Output current	Dimension
BK-PUL030A-0700Ad	200-240VAC/DC	29.4W MAX.	3-42VDC	0.25-0.70A	L103*W68*H30mm
BK-PUL042A-0700Bd	200-240VAC/DC	42.0W MAX.	3-60/64/70/76/84VDC	0.25-0.70A	L103*W68*H30mm
BK-PUL042A-1100Ad	200-240VAC/DC	42.0W MAX.	3-38/40/42VDC	0.60-1.10A	L123*W79*H31mm
BK-PUL060A-2000Ad	200-240VAC/DC	61.2W MAX.	3-30/32/34/36/38/40/42VDC	0.80-2.00A	L123*W79*H31mm

Technical data

Product model	BK-PUL030A-0700Ad	
Output parameters		
Regulation method	Constant Current	
Rated output current range	0.25-0.7A	
Rated output voltage range	3-42VDC	
Rated output power	29.4W Max	
Output current adjustment	DIP S.W(10 levels)	
Output current ripple LF	±1%	
Output current accuracy	±2%	
Linear regulation	±1%	
Load regulation	±1%	
No load output voltage	50VDC	
Flicker-free(typical)	Modulation depth =0.106% (100 Hz), Pst LM ⩽ 0.000, SVM ⩽ 0.003,(The above parameters are obtained from testing the panel lights)	
Input parameters		
Rated input voltage range	200-240VAC 200-240VDC	
Input voltage range	180-264VAC 180-264VDC	
Input votage shock	<380V AC	
Input current	<0.2A (Rated input voltage)	
Input frequency	0/50/60Hz	
Input power factor	0.95 (230V AC & Full load)	
Input THD	10% (230V AC & Full load)	
Efficiency(typical)	87% (230V AC & Full load)	
In-rush current	4.33A peak ,164us duration(50 % Ipeak), see the description below for details	
Start/Switchover/Turn off	<0.7s(AC start),<0.7s(DC start),<0.3s(AC/DC switchover),<0.5s(Turn off)	
Switching cycles	> 50,000 switching cycles	
Power consumption	Full load(Pin):33.7W, No load(Pno): N/A, On stand-by(Psb) : <0.5W, Network stand-by(Pnet) : N/A	
Safety		
Withstand voltage	I/P-O/P:3750V AC, I/P-DALI: 1500V AC.	
Mains surge capability	L-N:2KV	
Leakage current	<0.7mA (230V AC & Full load)	
Isolation resistance	I/P-O/P:100MΩ/500Vdc/25°C/70% RH	
Control interface		
DALI dimming port	Voltage range: 9.5-22.5V, typical 16V, interface current consumption: 1.8mA	
pushDIM dimming port	N/A	
1-10V 2in1 dimming port	N/A	
Auxiliary power supply	N/A	
Dimming range	3-100%	
Dimming drive mode	AM(amplitude modulation)	
Emergency support		
Central emergency system	Supported(Under DC input conditions)	
Self-contained emergency	Supported	
Environment & Life time		
Operating temperature	Ta=-20-45°C	
Case temperature	Tc=75°C	
Operating humidity	5-85% RH, not condensed	
Storage temp./humidity	-40-80°C, 5-85% RH, not condensed	
IP grade	IP20	
MTBF	500,000H,MIL-HDBK-217F(25°C)	
Life-time	Nominal life-time up to 100,000 h, see the description below for details	
Vibration resistant	10~500Hz,5G 12min./1cycle,period for 72min. each along X,Y,Z axes	
Acoustic Noise	<25dB(30cm, Normal operation)	
Environmental protection	RoHS	
Certifications and standards		
Certified	ENEC, RCM, EMC, CE, CCC, DALI-2, EL	
Safety	EN61347-1, EN61347-2-13, EN62384	
EMC	EN55015, EN61000-3-2 , EN61000-3-3, EN61000-4-2,3,4,5,6,8,11, EN61547	
DALI-2	IEC 62386-101(DALI-2), IEC 62386-102(DALI-2), IEC 62386-207(DALI-2)	
EL	Compatible IEC 61347-2- 13 Annex J, compatible with EN 60598-2-22 and EN 50172	
RF	N/A	

Remarks

1.By default, all parameter are measured at 230VAC input, full load and 25°C of ambient temperature.
2.The driver can not be installed inside the light. when the driver is used with the light, the EMC of the whole light needs to be tested.

Technical data

Product model	BK-PUL042A-0700Bd	BK-PUL042A-1100Ad	
Output parameters			
Regulation method	Constant Current	Constant Current	
Rated output current range	0.25-0.7A	0.6-1.1A	
Rated output voltage range	3-60/64/70/76/84VDC	3-38/40/42VDC	
Rated output power	42W Max	42W Max	
Output current adjustment	DIP S.W(10 levels)	DIP S.W(10 levels)	
Output current ripple LF	±1%	±1%	
Output current accuracy	±2%	±2%	
Linear regulation	±1%	±1%	
Load regulation	±1%	±1%	
No load output voltage	100VDC	50VDC	
Flicker-free(typical)	Modulation depth =0.440% (100 Hz), Pst LM ⩽ 0.003, SVM ⩽ 0.007,(The above parameters are obtained from testing the panel lights)		
Input parameters			
Rated input voltage range	200-240VAC 200-240VDC		
Input voltage range	180-264VAC 180-264VDC		
Input votage shock	<380V AC		
Input current	<0.3A (Rated input voltage)		
Input frequency	0/50/60Hz		
Input power factor	0.95 (230V AC & Full load)		
Input THD	10% (230V AC & Full load)		
Efficiency(typical)	88% (230V AC & Full load)		
In-rush current	4.88A peak ,154us duration(50 % Ipeak), see the description below for details		
Start/Switchover/Turn off	<0.7s(AC start),<0.7s(DC start),<0.3s(AC/DC switchover),<0.5s(Turn off)		
Switching cycles	> 50,000 switching cycles		
Power consumption	Full load(Pin):48W, No load(Pno): N/A, On stand-by(Psb) : <0.5W, Network stand-by(Pnet) : N/A		
Safety			
Withstand voltage	I/P-O/P:3750V AC, I/P-DALI: 1500V AC.		
Mains surge capability	L-N:2KV		
Leakage current	<0.7mA (230V AC & Full load)		
Isolation resistance	I/P-O/P:100MΩ/500Vdc/25°C/70% RH		
Control interface			
DALI dimming port	Voltage range: 9.5-22.5V, typical 16V, interface current consumption: 1.8mA		
pushDIM dimming port	N/A		
1-10V 2in1 dimming port	N/A		
Auxiliary power supply	N/A		
Dimming range	3-100%	2-100%	
Dimming drive mode	AM(amplitude modulation)		
Emergency support			
Central emergency system	Supported(Under DC input conditions)		
Self-contained emergency	Supported		
Environment & Life time			
Operating temperature	Ta=-20-45°C		
Case temperature	Tc=75°C		
Operating humidity	5-85% RH, not condensed		
Storage temp./humidity	-40-80°C, 5-85% RH, not condensed		
IP grade	IP20		
MTBF	500,000H,MIL-HDBK-217F(25°C)		
Life-time	Nominal life-time up to 100,000 h, see the description below for details		
Vibration resistant	10~500Hz,5G 12min./1cycle,period for 72min. each along X,Y,Z axes		
Acoustic Noise	<25dB(30cm, Normal operation)		
Environmental protection	RoHS		
Certifications and standards			
Certified	ENEC, RCM, EMC, CE, CCC, DALI-2, EL		
Safety	EN61347-1, EN61347-2-13, EN62384		
EMC	EN55015, EN61000-3-2 , EN61000-3-3, EN61000-4-2,3,4,5,6,8,11, EN61547		
DALI-2	IEC 62386-101(DALI-2), IEC 62386-102(DALI-2), IEC 62386-207(DALI-2)		
EL	Compatible IEC 61347-2- 13 Annex J, compatible with EN 60598-2-22 and EN 50172		
RF	N/A		

Remarks

1.By default, all parameter are measured at 230VAC input, full load and 25°C of ambient temperature.
2.The driver can not be installed inside the light. when the driver is used with the light, the EMC of the whole light needs to be tested.

Technical data

Product model	BK-PUL060A-2000Ad	
Output parameters		
Regulation method	Constant Current	
Rated output current range	0.8-2.0A	
Rated output voltage range	3-30/32/34/36/38/40/42VDC	
Rated output power	61.2W Max	
Output current adjustment	DIP S.W(15 levels)	
Output current ripple LF	±1%	
Output current accuracy	±2%	
Linear regulation	±1%	
Load regulation	±1%	
No load output voltage	50VDC	
Flicker-free(typical)	Modulation depth =0.183% (100 Hz), Pst LM ⩽ 0.002, SVM ⩽ 0.006,(The above parameters are obtained from testing the panel lights)	
Input parameters		
Rated input voltage range	200-240VAC 200-240VDC	
Input voltage range	180-264VAC 180-264VDC	
Input votage shock	<380V AC	
Input current	<0.4A (Rated input voltage)	
Input frequency	0/50/60Hz	
Input power factor	0.95 (230V AC & Full load)	
Input THD	10% (230V AC & Full load)	
Efficiency(typical)	90% (230V AC & Full load)	
In-rush current	9.51A peak ,178us duration(50 % Ipeak), see the description below for details	
Start/Switchover/Turn off	<0.7s(AC start),<0.7s(DC start),<0.3s(AC/DC switchover),<0.5s(Turn off)	
Switching cycles	> 50,000 switching cycles	
Power consumption	Full load(Pin):69W, No load(Pno): N/A, On stand-by(Psb) : <0.5W, Network stand-by(Pnet) : N/A	
Safety		
Withstand voltage	I/P-O/P:3750V AC, I/P-DALI: 1500V AC.	
Mains surge capability	L-N:2KV	
Leakage current	<0.7mA (230V AC & Full load)	
Isolation resistance	I/P-O/P:100MΩ/500Vdc/25°C/70% RH	
Control interface		
DALI dimming port	Voltage range: 9.5-22.5V, typical 16V, interface current consumption: 1.8mA	
pushDIM dimming port	N/A	
1-10V 2in1 dimming port	N/A	
Auxiliary power supply	N/A	
Dimming range	1-100%	
Dimming drive mode	AM(amplitude modulation)	
Emergency support		
Central emergency system	Supported(Under DC input conditions)	
Self-contained emergency	Supported	
Environment & Life time		
Operating temperature	Ta=-20-45°C	
Case temperature	Tc=80°C	
Operating humidity	5-85% RH, not condensed	
Storage temp./humidity	-40-80°C, 5-85% RH, not condensed	
IP grade	IP20	
MTBF	500,000H,MIL-HDBK-217F(25°C)	
Life-time	Nominal life-time up to 100,000 h, see the description below for details	
Vibration resistant	10~500Hz,5G 12min./1cycle,period for 72min. each along X,Y,Z axes	
Acoustic Noise	<25dB(30cm, Normal operation)	
Environmental protection	RoHS	
Certifications and standards		
Certified	ENEC, RCM, EMC, CE, CCC, DALI-2, EL	
Safety	EN61347-1, EN61347-2-13, EN62384	
EMC	EN55015, EN61000-3-2 , EN61000-3-3, EN61000-4-2,3,4,5,6,8,11, EN61547	
DALI-2	IEC 62386-101(DALI-2), IEC 62386-102(DALI-2), IEC 62386-207(DALI-2)	
EL	Compatible IEC 61347-2- 13 Annex J, compatible with EN 60598-2-22 and EN 50172	
RF	N/A	

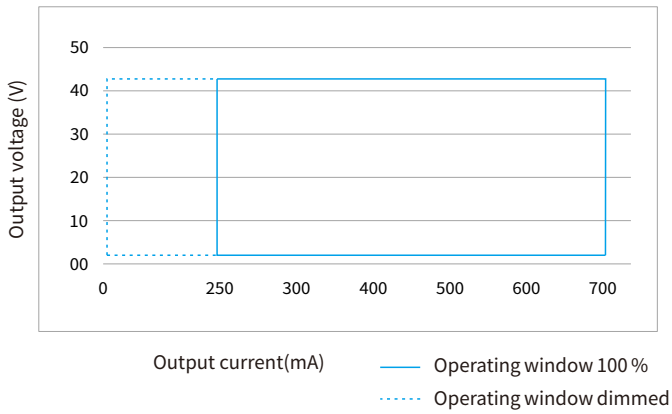
Remarks

1.By default, all parameter are measured at 230VAC input, full load and 25°C of ambient temperature.
2.The driver can not be installed inside the light. when the driver is used with the light, the EMC of the whole light needs to be tested.

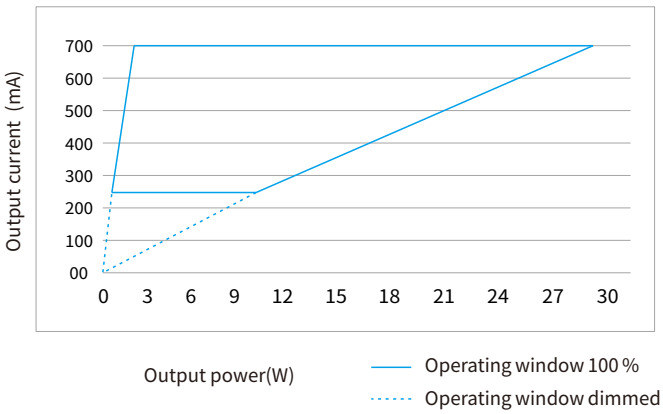
Electrical values

BK-PUL030A-0700Ad

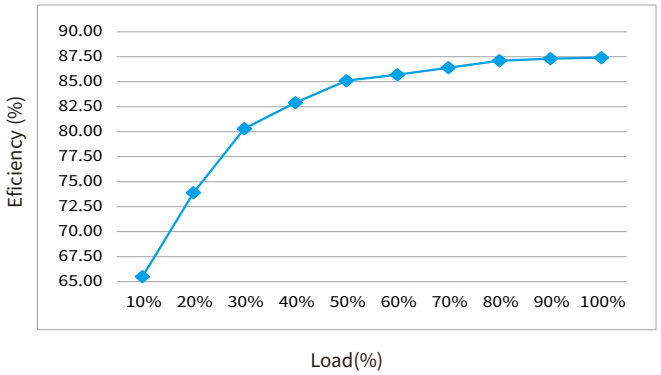
Operating window



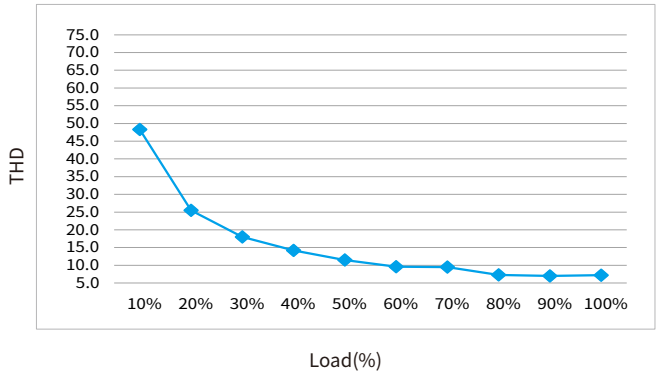
Operating window



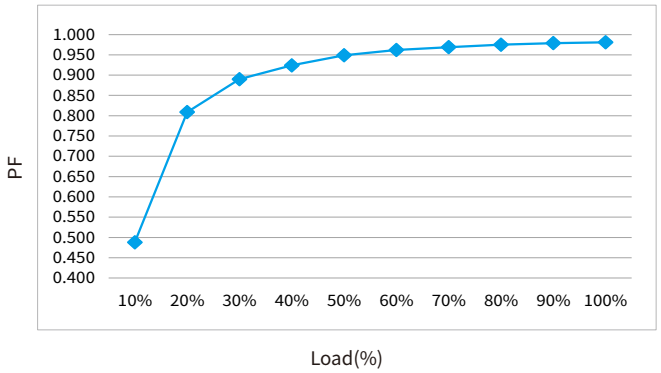
Efficiency vs load



THD vs. Load

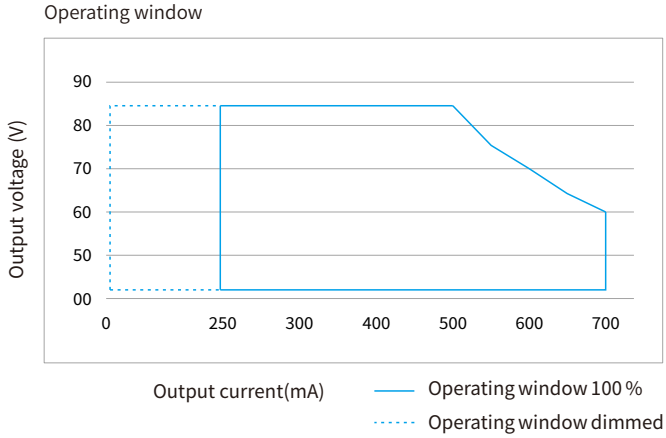


Power factor vs. Load

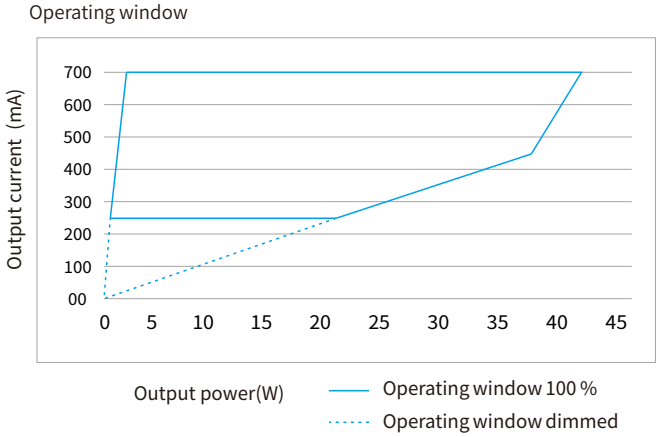


BK-PUL042A-0700Bd

Operating window

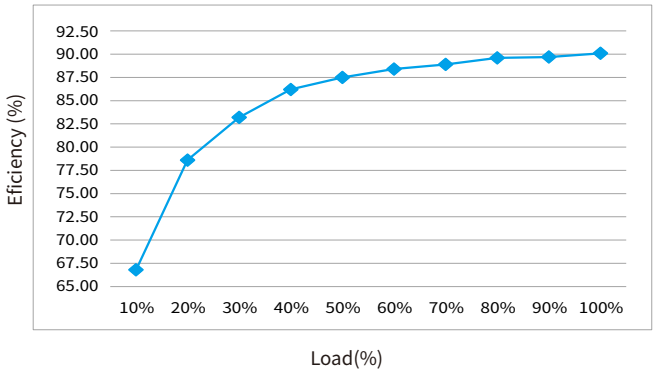


Operating window

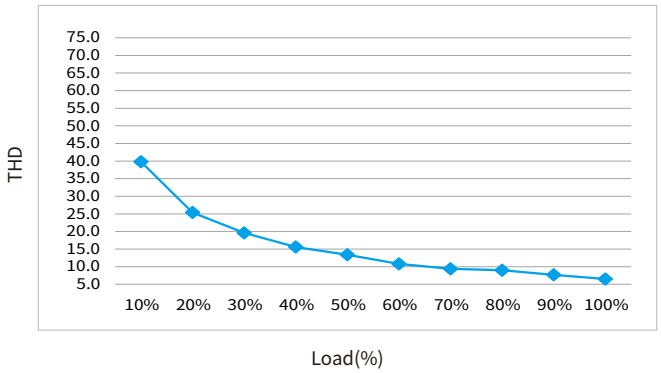


BK-PUL042A-0700Bd (Continue)

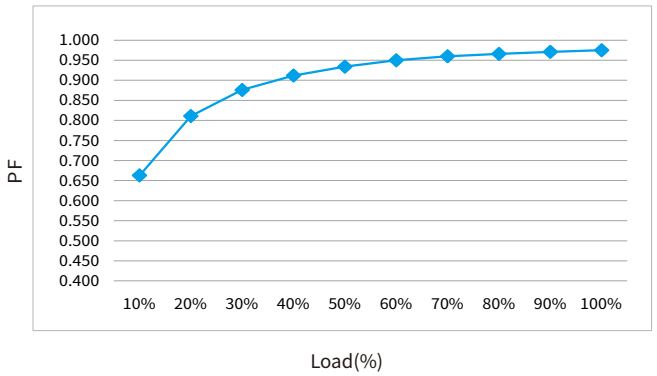
Efficiency vs load



THD vs. Load

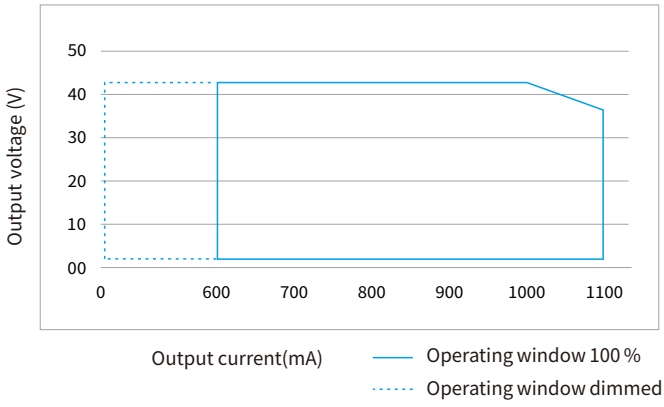


Power factor vs. Load

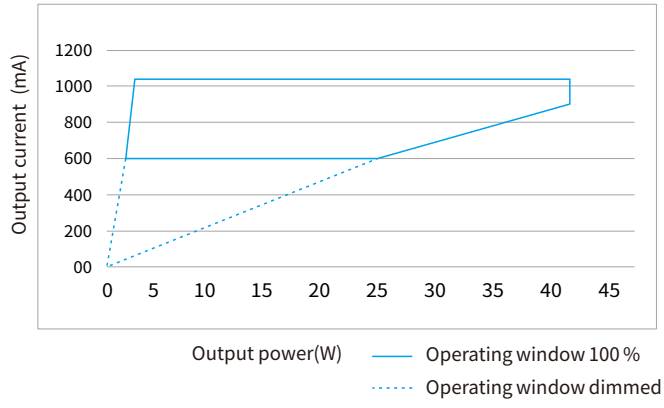


BK-PUL042A-1100Ad

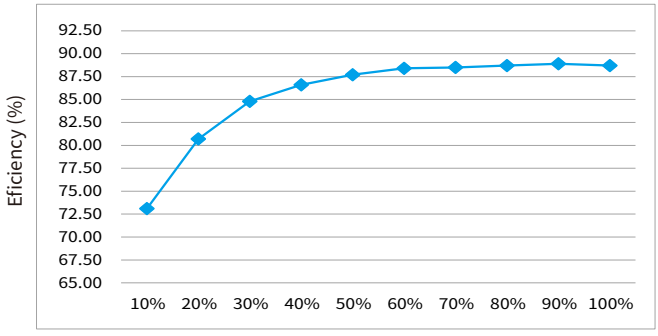
Operating window



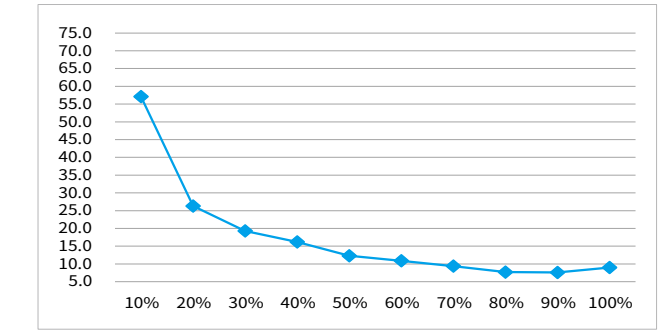
Operating window



Efficiency vs load

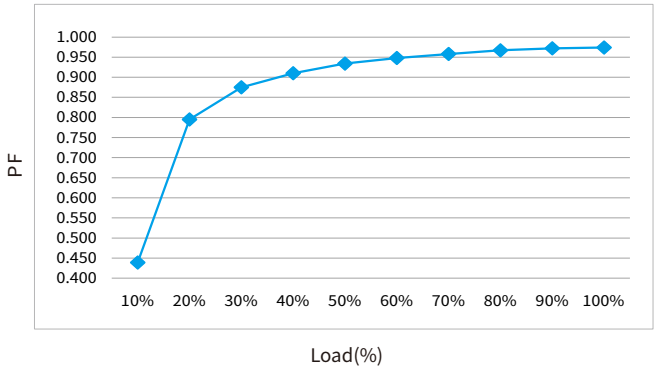


THD vs. Load



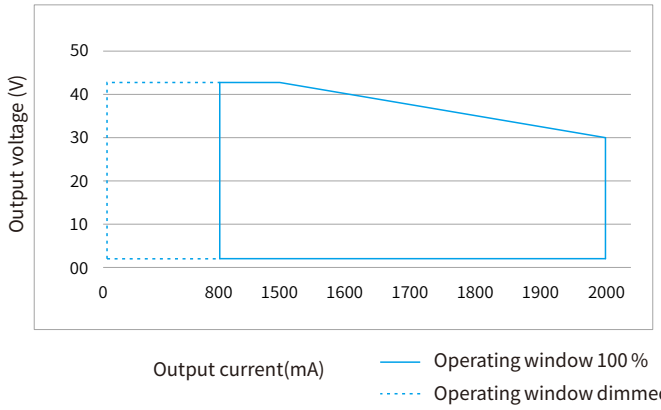
BK-PUL042A-1100Ad (Continue)

Power factor vs. Load

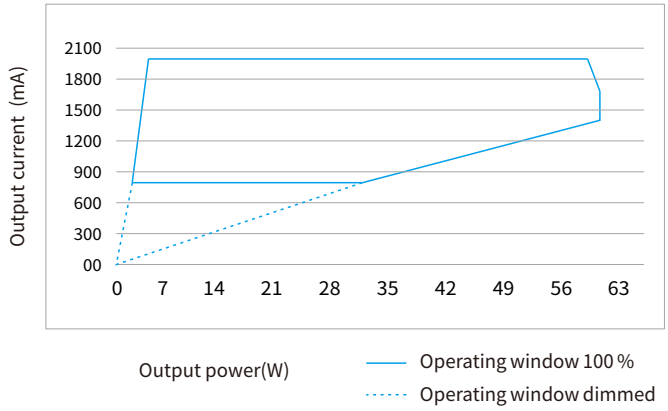


BK-PUL060A-2000Ad

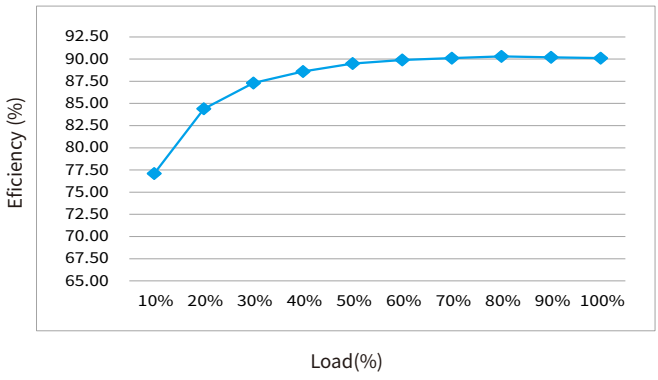
Operating window



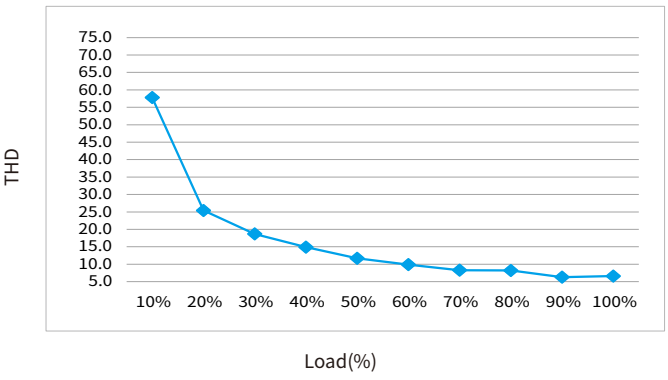
Operating window



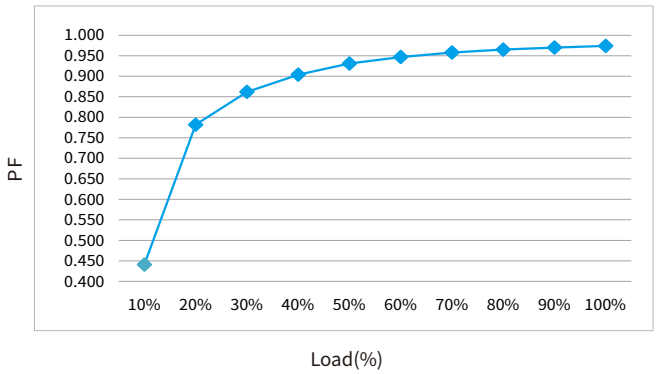
Efficiency vs load



THD vs. Load



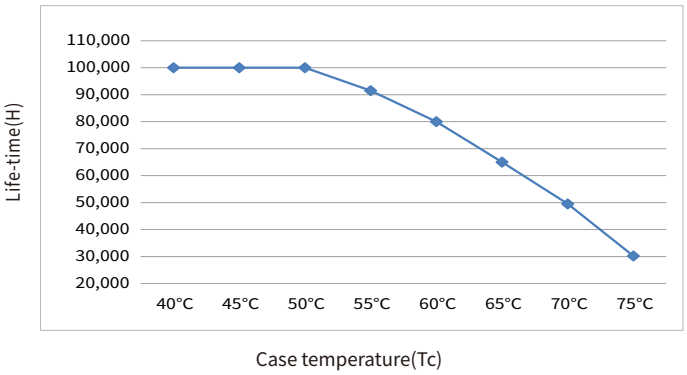
Power factor vs. Load



Expected life-time

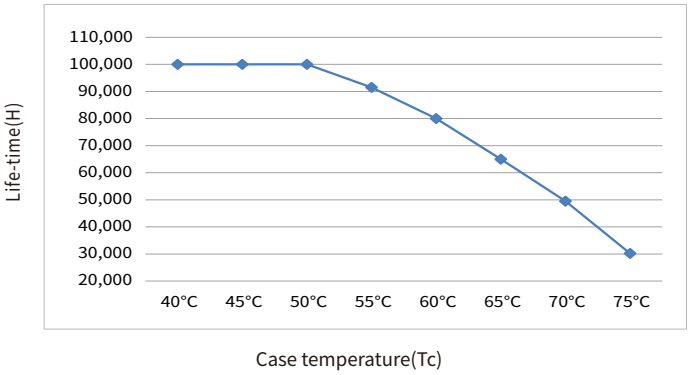
BK-PUL030A-0700Ad

Life-time vs. case temperature



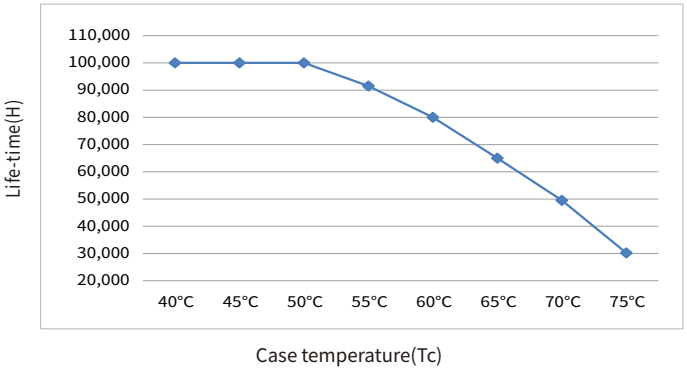
BK-PUL042A-0700Bd

Life-time vs. case temperature



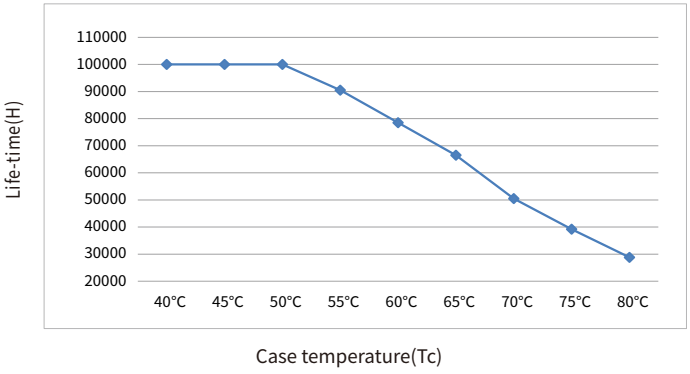
BK-PUL042A-1100Ad

Life-time vs. case temperature



BK-PUL060A-2000Ad

Life-time vs. case temperature



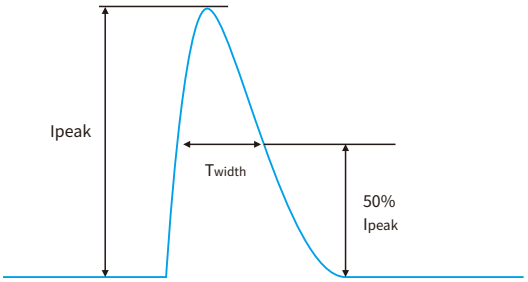
-The life-time of the LED driver is shown in the figure above (calculated based on the 90% survival rate).
- The relation of tc to ta temperature depends also on the luminaire design.

Surge

Model	Ipeak	Twidth	Condition	Relative number of MCB														
				B10	B13	B16	B20	B25	C10	C13	C16	C20	C25	D10	D13	D16	D20	D25
BK-PUL030A-0700Ad	4.33A	164us	AC 230V,Full load, Cold start,Ta≤30°C, MCB is not installed side by side	46	60	74	92	116	46	60	74	92	116	46	60	74	92	116
BK-PUL042A-1100Ad	4.88A	154us		33	43	52	65	82	33	43	52	65	82	33	43	52	65	82
BK-PUL060A-2000Ad	9.51A	178us		23	30	37	46	57	23	30	37	46	57	23	30	37	46	57

Remarks

- The number of drives mounted under different MCBs in the table is the maximum value. Please do not exceed this number during installation.
- Calculation uses typical values from ABB series S200 as a reference.
- Different brands and models of miniature circuit breakers, the number of drives mounted will be slightly different.
- If the ambient temperature of the MCB installation exceeds 30°C or multiple MCBs are installed side by side, the number of drives mounted will be reduced and the calculation needs to be recalculated.
- Electrician's usually consider Type B for household lighting and Type C for commercial lighting application.



Functions

Output short-circuit behaviour

- In case of a short-circuit at the LED output ,the LED output is switched off.
- After restart of the LED driver ,the output will be activated again.

Output no-load operation

- The LED driver will not be damaged in no-load operation.
- The output will be deactivated and is therefore free of voltage.
- If a LED load is connected , the device has to be restarted before the output will be activated again.

Output hot plug-in

In the following two cases,the LED driver will automatically turn off the output to protect the LED

- When the driver is powered on first and the LED is connected later.
- When the driver is powered on,disconnected and connecred again.
- After restart of the LED driver the output will be activated again.

Driver restart method

There are two ways to restart the device:

- Through the AC input portr:disconnect the AC of the driver and power it again.
- Through dimming interface.

DALI:send “OFF” command first,then send “MAX” command.

DIP-switch & output current

BK-PUL030A-0700Ad

PIN(W) typ.	Output Irated(W)	Output Voltage(mA)	Output Prated(VDC)	1	2	3	4
12.7	10.5	250	3-42	--	ON	ON	ON
14.9	12.6	300	3-42	ON	--	ON	ON
17.4	14.7	350	3-42	--	--	ON	ON
19.5	16.8	400	3-42	--	ON	--	ON
21.9	18.9	450	3-42	--	--	--	ON
24.3	21.0	500	3-42	ON	ON	ON	--
26.5	23.1	550	3-42	--	--	ON	--
28.9	25.2	600	3-42	--	ON	--	--
31.3	27.3	650	3-42	ON	--	--	--
33.7	29.4	700 ★	3-42	--	--	--	--

BK-PUL042A-0700Bd

PIN(W) typ.	Output Irated(W)	Output Voltage(mA)	Output Prated(VDC)	1	2	3	4
24	21.0	250	3-84	--	ON	ON	ON
29	25.2	300	3-84	ON	--	ON	ON
33	29.4	350	3-84	--	--	ON	ON
38	33.6	400	3-84	--	ON	--	ON
42	37.8	450	3-84	--	--	--	ON
47	42.0	500	3-84	ON	ON	ON	--
47	41.8	550	3-76	--	--	ON	--
47	42.0	600	3-70	--	ON	--	--
47	41.6	650	3-64	ON	--	--	--
48	42.0	700 ★	3-60	--	--	--	--

BK-PUL042A-1100Ad

PIN(W) typ.	Output Irated(W)	Output Voltage(mA)	Output Prated(VDC)	1	2	3	4
29	25.2	600	3-42	--	ON	ON	ON
34	29.4	700	3-42	ON	--	ON	ON
36	31.5	750	3-42	--	--	ON	ON
39	33.6	800	3-42	--	ON	--	ON
41	35.7	850	3-42	--	--	--	ON
43	37.8	900	3-42	ON	ON	ON	--
46	39.9	950	3-42	--	--	ON	--
48	42.0	1000	3-42	--	ON	--	--
48	42.0	1050	3-40	ON	--	--	--
48	41.8	1100 ★	3-38	--	--	--	--

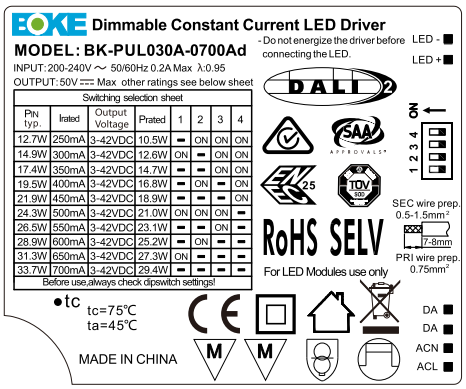
BK-PUL060A-2000Ad

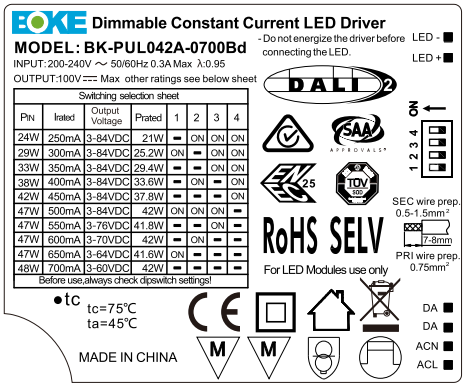
PIN(W) typ.	Output Irated(W)	Output Voltage(mA)	Output Prated(VDC)	1	2	3	4	5	6
38	33.6	800	3-42	ON	--	ON	--	ON	ON
43	37.8	900	3-42	--	--	--	--	--	ON
47	42.0	1000	3-42	ON	ON	ON	--	ON	--
52	46.2	1100	3-42	--	ON	ON	--	ON	--
54	48.3	1150	3-42	--	--	--	--	ON	--
56	50.4	1200	3-42	--	ON	ON	ON	--	--
59	52.5	1250	3-42	ON	--	ON	ON	--	--
61	54.6	1300	3-42	--	--	ON	ON	--	--
65	58.8	1400	3-42	--	ON	--	ON	--	--
68	60.0	1500	3-40	--	--	--	ON	--	--
69	60.8	1600	3-38	ON	ON	ON	--	--	--
69	61.2	1700	3-36	--	--	ON	--	--	--
69	61.2	1800	3-34	--	ON	--	--	--	--
69	60.8	1900	3-32	ON	--	--	--	--	--
69	60.0	2000 ★	3-30	--	--	--	--	--	--

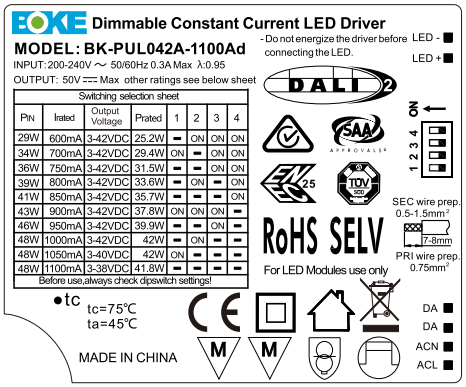
Remarks:

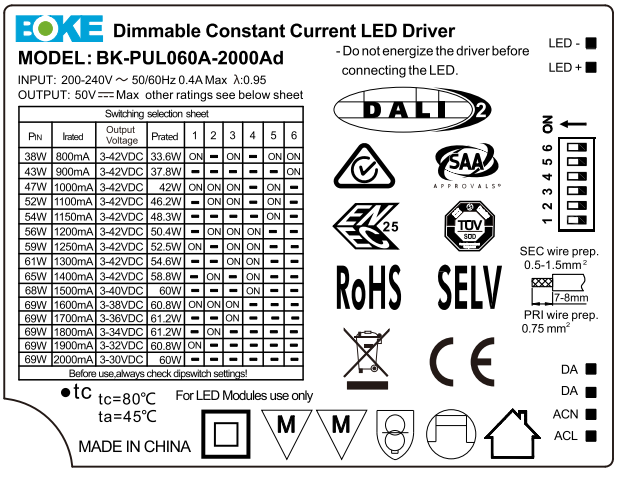
1. ★ It means that this item is the factory default current.
2. -- It means that this channel is OFF.

Label



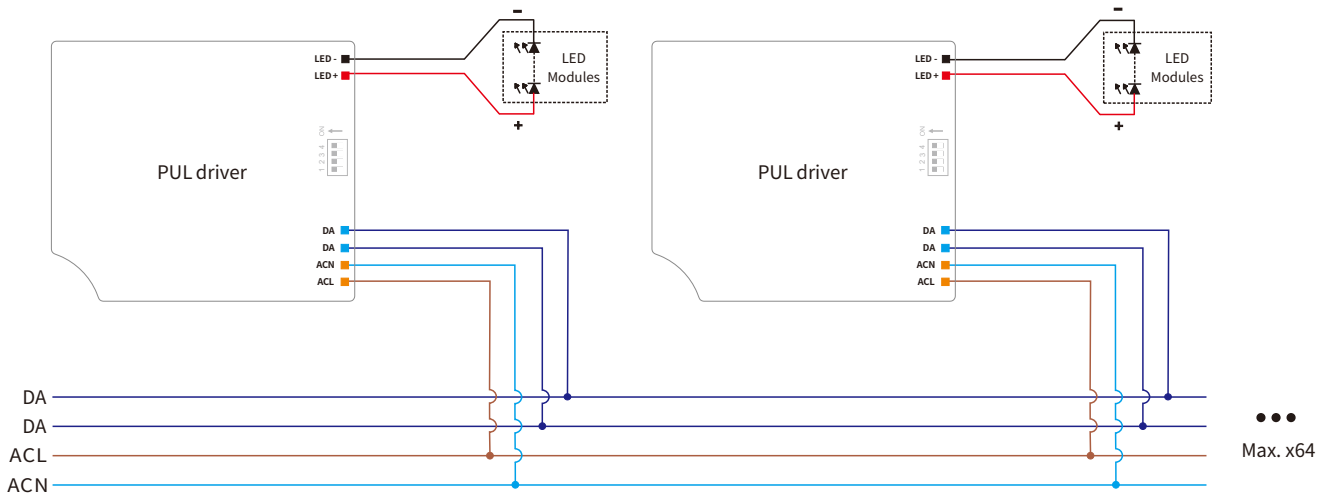






DALI dimming application

Wiring diagram



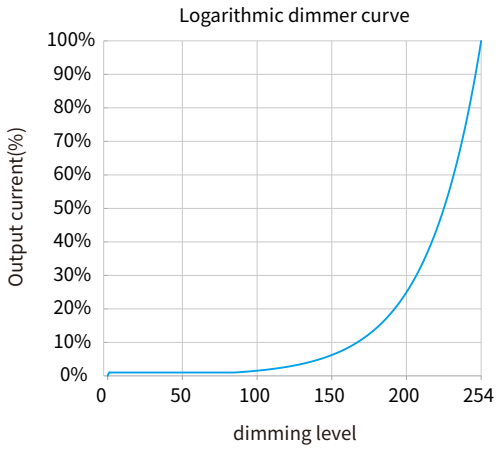
Remarks:

- Standard DALI control line voltage range:9.5V to 22.5V ,type 16V.
- The two DALI control lines polarity-reversible.
- Max. 64 DALI drivers per DALI control line.
- The maximum distance length of the DALI control line is 300m at 2×1.5mm^2.
- DALI bus can be wired together with any mains voltage cables, but separate wiring is recommended.

Please refer to the table below

Cable size	Distance
2×0.50mm^2	max.100m
2×0.75mm^2	max.150m
2×1.00mm^2	max.200m
⩾2×1.50mm^2	max.300m

Dimming curve



Remarks:

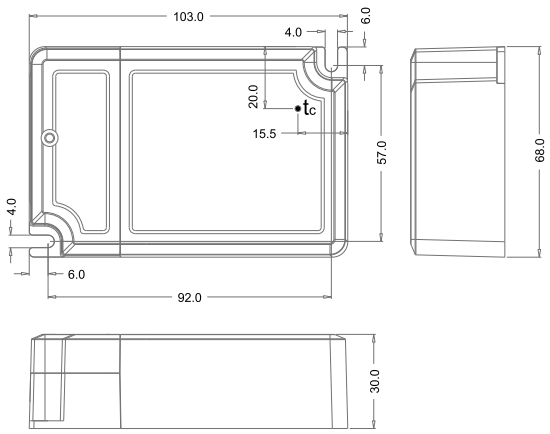
The dimming curve can be selected by DALI configuration. The default is logarithmic dimming curve.

Installation

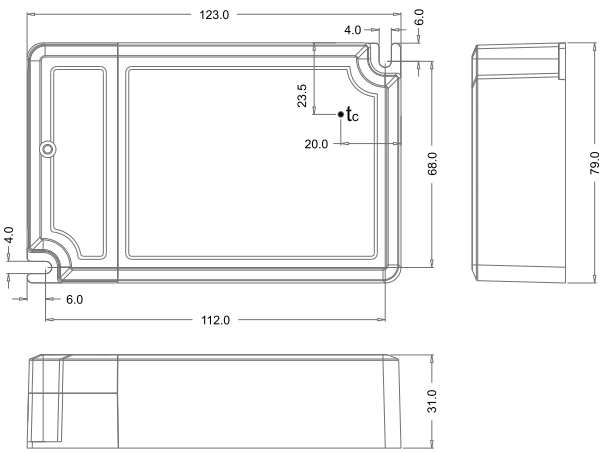
Mechanical dimensions

Unit:mm

PUL030A/PUL042A



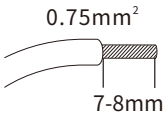
PUL060A



INPUT

Numbering	function	colour
1	ACL	orange
2	ACN	orange
3	DA	blue
4	DA	blue

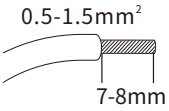
Input wire



OUTPUT

Numbering	function	colour
1	LED-	black
2	LED+	red

Output wire



Installation note

Hot plug-in

- Hot plug-in is not supported due to residual output voltage of > 0 V.
- If a LED load is connected the device has to be restarted.
- Restart can be achieved by re-powering the driver or executing a on/off command (action) through the control interface (DALI)

Wiring guidelines

- All connections must be kept as short as possible to ensure good EMI behaviour.
- Mains leads should be kept apart from LED Driver and other leads (ideally 5 – 10 cm distance)
- Max. lenght of output wires is 2 m.
- Incorrect wiring can damage LED modules.

Mounting screw specifications and torque

- Max. torque at the clamping screw: 0.5 Nm / M4

Replace LED module

1. Mains off
2. Remove LED module
3. Wait for 5 seconds
4. Connect LED module again

Installation requirements

- The driver should be installed in a dry, acid-free, oil-free, fat-free environment.
- The installation ambient temperature of the drive shall not exceed the value of Ta at any time.
- The driver should keep a certain distance from the heating stuff (such as the luminaire radiator).
- If the driver is used externally (it needs to be used with the accessories), the installation of the driver should also meet the following conditions:
  1.The driver should be a certain distance between the drivers, as shown in Figure 1.
  2.The driver keeps a certain distance from surrounding objects, as shown in Figure 2.

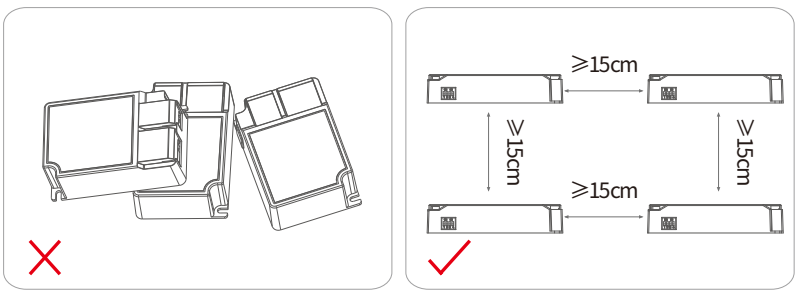


Figure 1

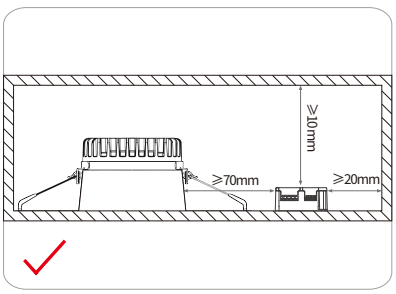
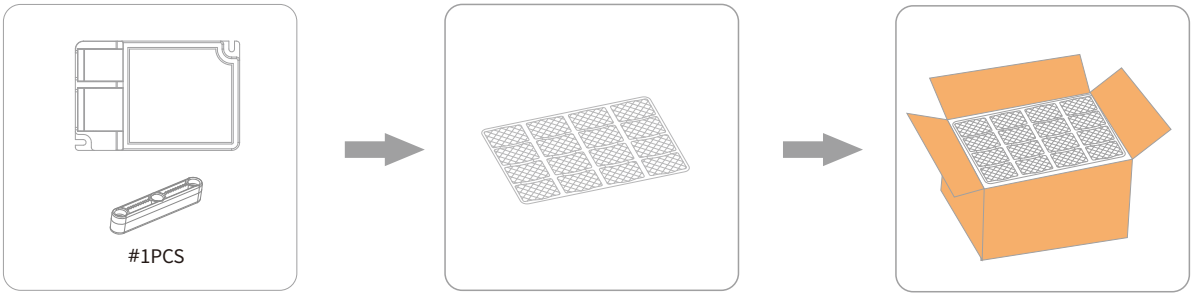


Figure 2

Packaging

Optional 1: factory default



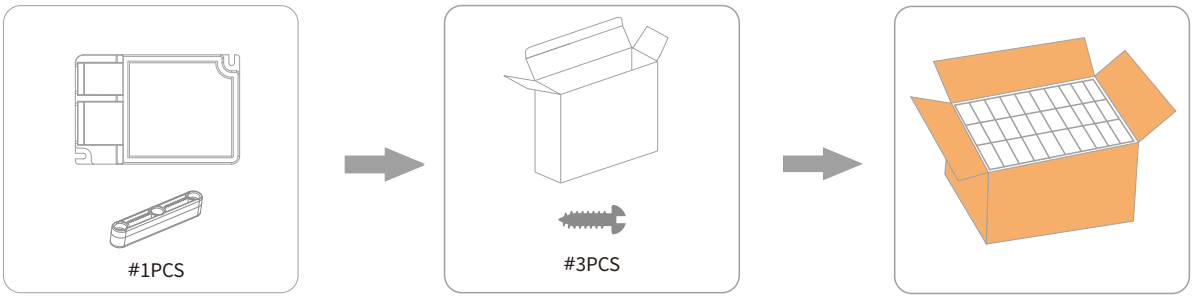
Product　　Blister　　16pcs×4layer=64pcs/CIN
9pcs×4layer=36pcs/CIN

Model	Product size	Weight	Blister size	Carton size	Qty/carton	N.W	G.W
PUL030A	L103*W68*H30mm	140g	L480*W330*H40mm	L490*W340*H165mm	64 pcs	8.96kg	9.8kg
PUL042A	L103*W68*H30mm	168g	L480*W330*H40mm	L490*W340*H165mm	64 pcs	10.8kg	11.1kg
PUL060A	L123*W79*H31mm	248g	L435*W345*H40mm	L450*W350*H180mm	36 pcs	9.00kg	10.0kg


Screw

Remarks: accessories will be packed in PE bags separately

Optional 2:



Product　　Packaging　　24pcs×2layer=48pcs/CIN

Model	Product size	Weight	Packaging size	Carton size	Qty/carton	N.W	G.W
PUL030A	L103*W68*H30mm	140g	L130*W38*H85mm	L415*W330*H190mm	48 pcs	6.8kg	7.8kg
PUL042A	L103*W68*H30mm	168g	L130*W38*H85mm	L415*W330*H190mm	48 pcs	8.1kg	9.5kg
PUL060A	L123*W79*H31mm	248g	L130*W38*H85mm	L415*W330*H190mm	48 pcs	11.9kg	13.5kg

Additional information

1. This product can only be used outside the light body, Can not be used inside of the light, and it must be used within the specified working environment.
2. The life and MTBF of the product are for reference only, and do not represent a warranty statement.
3. For more information, please send an email to info@bokedriver.com.