

Constant current independent dimmable driver
TCL(E) Series suffix T(Triac)



Features

- Support Triac dimming mode
- Multi-level current output can be realized by DIP-switch
- Soft dimming and flicker-free at any brightness
- Optional Junction box: support up to 2.5mm² cable and loop-through function
- Screw-free and pressing type strain relief, supports thicker cables and is easier to install
- Independent input and output strain relief, stronger wiring
- SELV and Class II design, suitable for use outside or inside of the luminaires
- IP20 protection grade, indoor use
- 5.5-year guarantee

Functions

- Support central emergency application
- Support self-contained emergency application
- Protective features
(short-circuit, no-load, overload, over temperature protection)

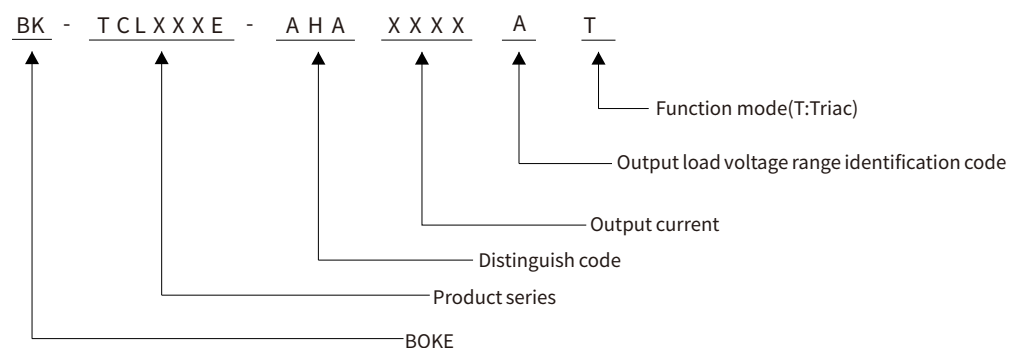
Suitable for lights

- Suitable for lights with independent drivers such as downlights, spotlights, panel lights, etc
- It is necessary to evaluate the chamber temperature of the light when it is used in the built-in

Typical applications

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

Model coding rules of TCL(E) series



Model list

Model	Input voltage	Output power	Output voltage	Output current	Dimension
BK-TCL030E-AHA0750AT	200-240VAC/DC	30W MAX.	24-42VDC	0.4-0.75A	L97.5*W44*H23.4mm(Built-in) L137.5*W44*H23.4mm(Independent)
BK-TCL040E-AHA1050AT	200-240VAC/DC	40W MAX.	24-42VDC	0.7-1.05A	L97.5*W44*H29mm(Built-in) L137.5*W44*H29mm(Independent)

Technical data

Product model	BK-TCL030E-AHA0750AT
Output parameters	
Regulation method	Constant Current
Rated output current range	0.4-0.75A,see the operating window for details
Rated output voltage range	24-42VDC,see the operating window for details
Rated output power	30W Max,see the operating window for details
Output current adjustment	DIP S.W(8 levels)
Output current ripple(typ.)	±5%(100Hz)
Output current accuracy	±5%
Linear regulation	±5%
Load regulation	±5%
No load output voltage	55VDC
Flicker-free(typ.)	Flickering percent(IEEE 1789)=2.402%(100Hz), Flicker index(IEEE 1789)=0.01(100Hz), Pst LM = 0.26, SVM = 0.48, (The above parameters are obtained from testing the panel lights)
Input parameters	
Rated input voltage range	200-240VAC 200-240VDC
Input voltage range	198-264VAC 198-264VDC
Input votage shock	<380 V AC
Input current	<0.18A (Rated input voltage)
Input frequency	0/50/60Hz
Input PF/Input DF(typ.)	PF: 0.97,DF:0.98 , see the electrical values below for details
Input THD(typ.)	17% , see the electrical values below for details
Efficiency(typ.)	88% , see the electrical values below for details
In-rush current(typ.)	1.46A peak ,26us duration(50 % Ipeak), see the description below for details
Start/Switchover/Turn off	<0.5s(AC start),<0.3s(AC switchover),<0.5s(Turn off)
Switching cycles	> 100,000 switching cycles
Power consumption(typ.)	Full load(Pin):33.4W, No load(Pno):N/A, On stand-by(Psb) : N/A, Network stand-by(Pnet) : N/A
Safety	
Withstand voltage	I/P-O/P(LED):3750V AC
Mains surge capability	L-N:2KV(90°/270°, 5 times each with an interval of 60s)(Performance criterion:B)
Leakage current(typ.)	0.46mA
Isolation resistance	I/P-O/P:100MΩ/500Vdc/25°C/70%RH
Control interface	
DALI dimming port	N/A
pushDIM dimming port	N/A
3in1 dimming port	N/A
Auxiliary power supply	N/A
Dimming range	5-100%(different dimmers have different ranges)
Dimming drive mode	Triac Phase Dimmable(trailing-edge)
Emergency support	
Central emergency system	Support
Self-contained emergency	Support
Environment & Life time	
Operating temperature	Ta=-20-50/55/60°C,see the operating temperature for details
Case temperature	Tc=90°C
Operating humidity	5-85% RH, non-condensing
Storage temp./humidity	-40-80°C, 5-85% RH, non-condensing
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	<28dB(30cm, Normal operation)
Environmental protection	RoHS
Certifications and standards	
Certification	CE, ENEC, UKCA, RCM, CCC, EL
Safety	GB/T 19510.1, GB/T 19510.213, EN61347-1, EN61347-2-13, EN62384
EMC	GB/T 17743 , GB17625.1, EN55015, EN61000-3-2 , EN61000-3-3, EN61000-4-2,3,4,5,6,8,11, EN61547
DALI-2	N/A
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, 50Hz, full load and 25°C of ambient temperature.
- 2.When the driver is used with the luminaire, the EMC of the whole luminaire needs to be tested.

Technical data

Product model	BK-TCL040E-AHA1050AT
Output parameters	
Regulation method	Constant Current
Rated output current range	0.7-1.05A,see the operating window for details
Rated output voltage range	24-42VDC,see the operating window for details
Rated output power	40W Max,see the operating window for details
Output current adjustment	DIP S.W(8 levels)
Output current ripple(typ.)	±5%(100Hz)
Output current accuracy	±5%
Linear regulation	±5%
Load regulation	±5%
No load output voltage	55VDC
Flicker-free(typ.)	Flickering percent(IEEE 1789)=2.325%(100Hz), Flicker index(IEEE 1789)=0.011(100Hz), Pst LM = 0.18, SVM = 0.23, (The above parameters are obtained from testing the panel lights)
Input parameters	
Rated input voltage range	200-240VAC 200-240VDC
Input voltage range	198-264VAC 198-264VDC
Input votage shock	<380 V AC
Input current	<0.24A (Rated input voltage)
Input frequency	0/50/60Hz
Input PF/Input DF(typ.)	PF: 0.97,DF:0.98 , see the electrical values below for details
Input THD(typ.)	14% , see the electrical values below for details
Efficiency(typ.)	90% , see the electrical values below for details
In-rush current(typ.)	1.596A peak,38us duration(50 % Ipeak), see the description below for details
Start/Switchover/Turn off	<0.5s(AC start),<0.3s(AC switchover),<0.5s(Turn off)
Switching cycles	> 100,000 switching cycles
Power consumption(typ.)	Full load(Pin):44.4W, No load(Pno):N/A, On stand-by(Psb) : N/A, Network stand-by(Pnet) : N/A
Safety	
Withstand voltage	I/P-O/P(LED):3750V AC
Mains surge capability	L-N:2KV(90°/270°, 5 times each with an interval of 60s)(Performance criterion:B)
Leakage current(typ.)	0.43mA
Isolation resistance	I/P-O/P:100MΩ/500Vdc/25°C/70%RH
Control interface	
DALI dimming port	N/A
pushDIM dimming port	N/A
3in1 dimming port	N/A
Auxiliary power supply	N/A
Dimming range	5-100%(different dimmers have different ranges)
Dimming drive mode	Triac Phase Dimmable(trailing-edge)
Emergency support	
Central emergency system	Support
Self-contained emergency	Support
Environment & Life time	
Operating temperature	Ta=-20-55/60°C,see the operating temperature for details
Case temperature	Tc=85°C
Operating humidity	5-85% RH, non-condensing
Storage temp./humidity	-40-80°C, 5-85% RH, non-condensing
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	<28dB(30cm, Normal operation)
Environmental protection	RoHS
Certifications and standards	
Certification	CE, ENEC, UKCA, RCM, CCC, EL
Safety	GB/T 19510.1, GB/T 19510.213, EN61347-1, EN61347-2-13, EN62384
EMC	GB/T 17743 , GB17625.1, EN55015, EN61000-3-2 , EN61000-3-3, EN61000-4-2,3,4,5,6,8,11, EN61547
DALI-2	N/A
EL	Compatible IEC 61347-2- 13 Annex J , compatible with EN 60598-2-22 and EN 50172
RF	N/A

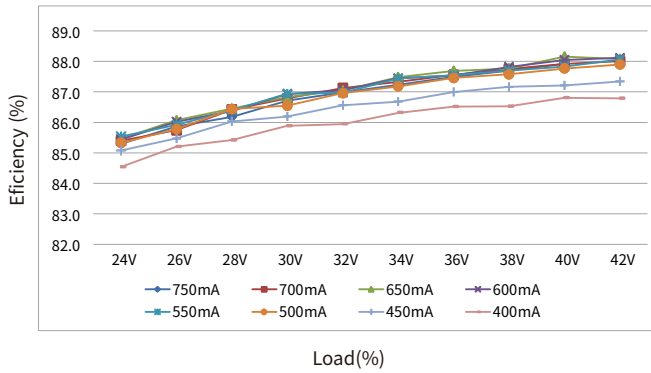
Remarks

- 1.By default, all parameter are measured at 230VAC input, 50Hz, full load and 25°C of ambient temperature.
- 2.When the driver is used with the luminaire, the EMC of the whole luminaire needs to be tested.

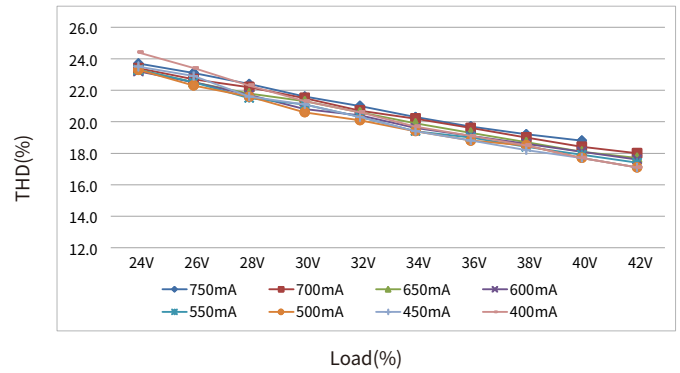
Electrical values

BK-TCL030E-AHA

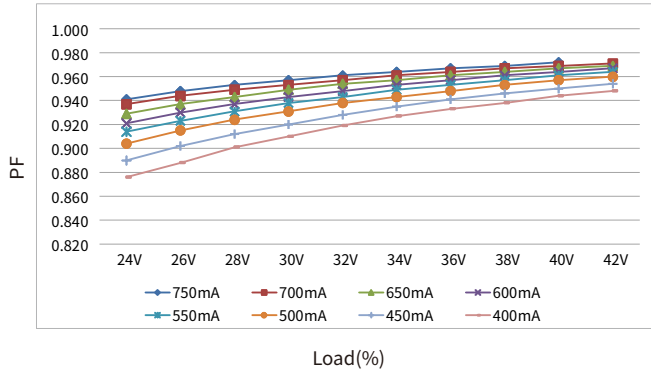
Efficiency vs load



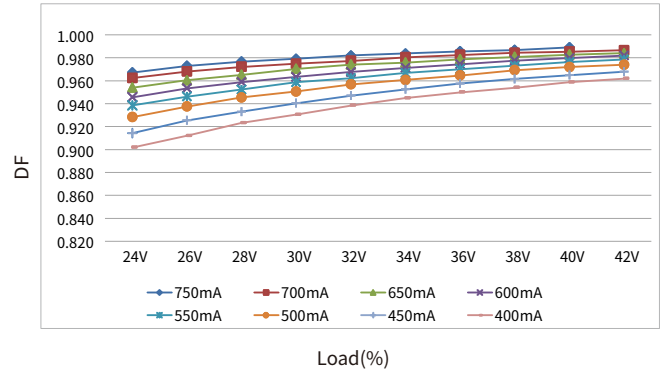
THD vs. Load



Power factor vs. Load

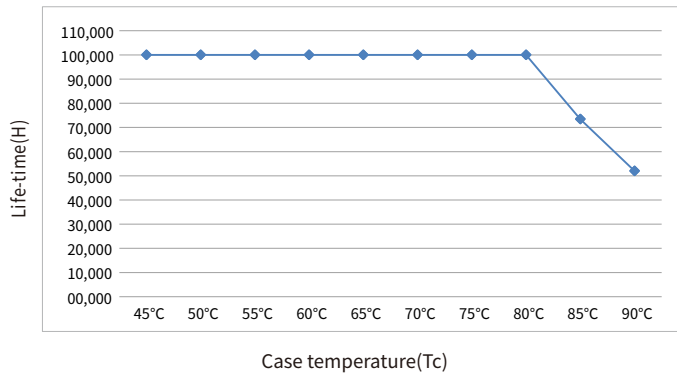


Displacement factor vs. Load



Expected life-time

Life-time vs. case temperature



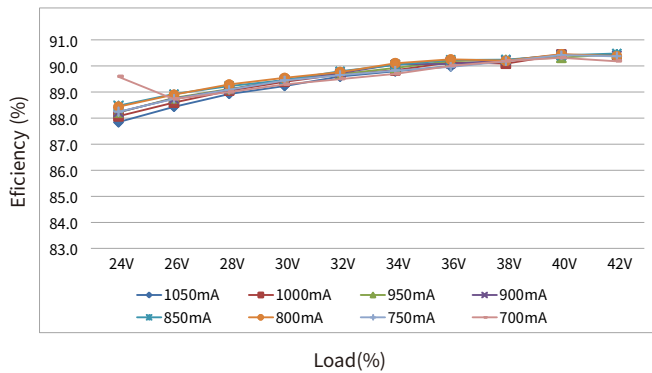
-The life-time of the LED driver is shown in the figure above (calculated based on the 90% survival rate).

- The relation of tc to ta temperature depends also on the luminaire design.

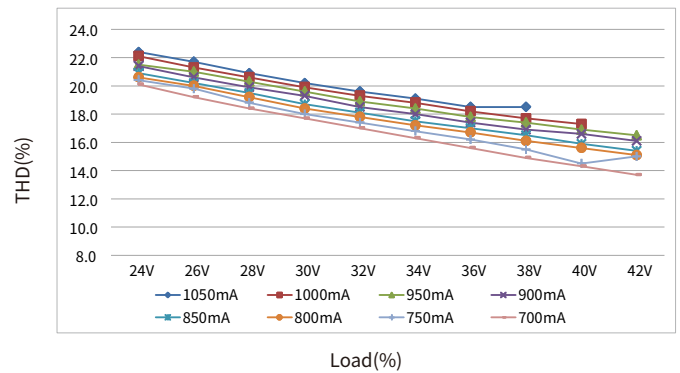
Electrical values

BK-TCL040E-AHA

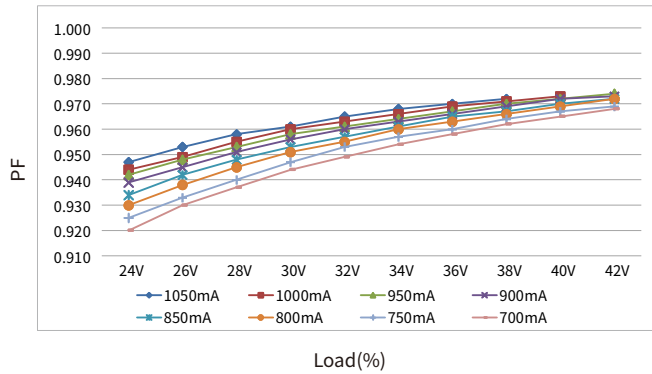
Efficiency vs load



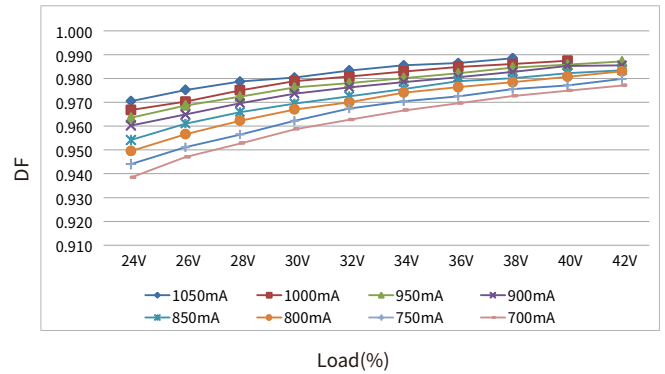
THD vs. Load



Power factor vs. Load

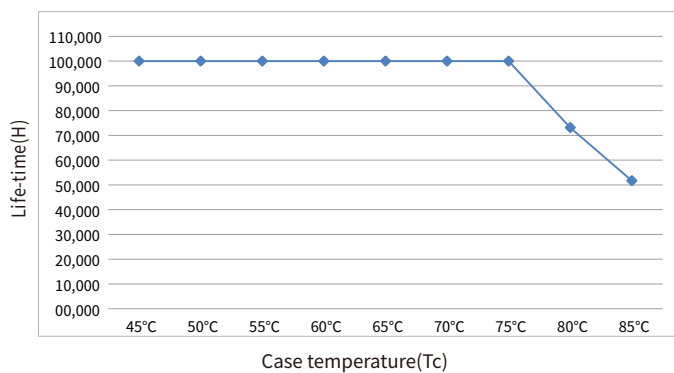


Displacement factor vs. Load



Expected life-time

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).

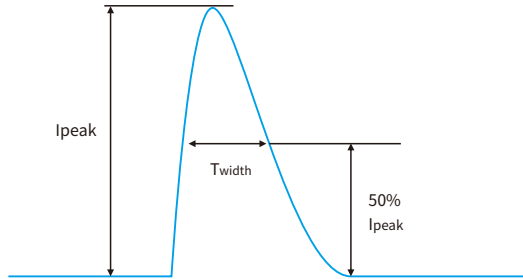
- The relation of tc to ta temperature depends also on the luminaire design.

Surge

Model	Ipeak	Twidth	Condition	Relative number of MCB/pcs															
				B10	B13	B16	B20	B25	C10	C13	C16	C20	C25	D10	D13	D16	D20	D25	
BK-TCL030E-AHA	1.46A	26us	AC 230V,Full load, Cold start,Ta≤30°C,	90	117	144	180	225	90	117	144	180	225	90	117	144	180	225	
BK-TCL040E-AHA	1.596A	38us	MCB is not installed side by side	45	58	72	90	112	45	58	72	90	112	45	58	72	90	112	

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

- Output short-circuit will not damage the driver. After removing the short circuit fault, the driver will automatically resume output.

Output no-load operation

- Output no-load will not damage the driver. Please turn off the driver first if you need to connect the LED load.

Driver restart method

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

Output overload protection

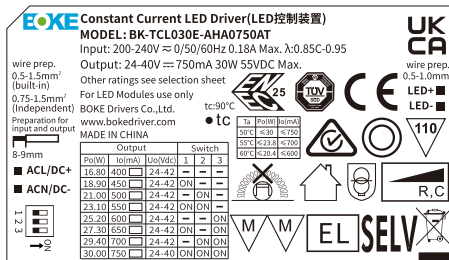
- The LED driver turns off the output if the output voltage range is exceeded. The output will be activated again after restart the LED driver.

Output over temperature

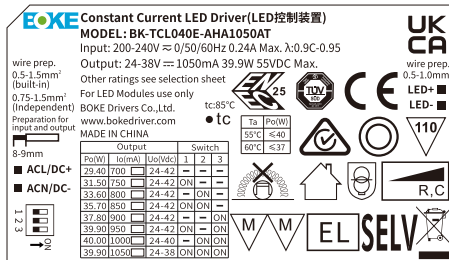
- When the operating temperature exceeds the over temperature protection point inside the power supply IC, the power supply enters protection state such as output derating, output hiccup or output shutdown. After the external temperature is normal, restart and resume operation.

Label

BK-TCL030E-AHA0750AT



BK-TCL040E-AHA1050AT



DIP-switch & output current

BK-TCL030E-AHA0750AT

Output			1	2	3
Prated(W)	Irated(mA)	Voltage(Vdc)			
16.80	400	24-42	--	--	--
18.90	450	24-42	ON	--	--
21.00	500	24-42	--	ON	--
23.10	550	24-42	ON	ON	--
25.20	600	24-42	--	--	ON
27.30	650	24-42	ON	--	ON
29.40	700	24-42	--	ON	ON
30.00	750 ★	24-40	ON	ON	ON

BK-TCL040E-AHA1050AT

Output			1	2	3
Prated(W)	Irated(mA)	Voltage(Vdc)			
29.40	700	24-42	--	--	--
31.50	750	24-42	ON	--	--
33.60	800	24-42	--	ON	--
35.70	850	24-42	ON	ON	--
37.80	900	24-42	--	--	ON
39.90	950	24-42	ON	--	ON
40.00	1000	24-40	--	ON	ON
39.90	1050 ★	24-38	ON	ON	ON

Remarks:

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

Operating temperature & output current

BK-TCL030E-AHA0750AT

Tc	Ta	Po(W)	Io(mA)
90°C	50°C	≤30	≤750
	55°C	≤23.8	≤700
	60°C	≤20.4	≤600

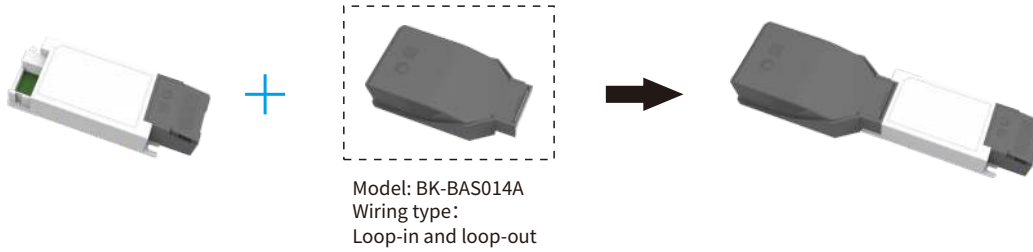
BK-TCL040E-AHA1050AT

Tc	Ta	Po(W)
85°C	55°C	≤40
	60°C	≤37

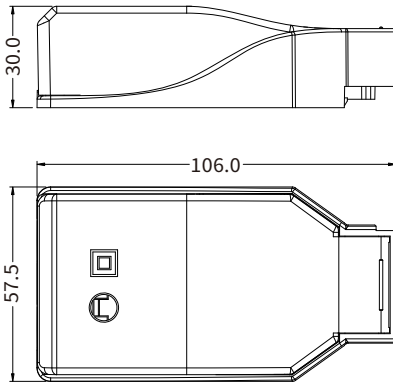
Insulation between circuits

Isolation	Input	Output	Case
Input	-	Double	Double
Output	Double	-	Basic
Case	Double	Basic	-

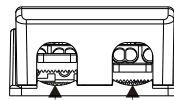
Optional accessories (See the parts specification for details)



size(mm)



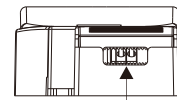
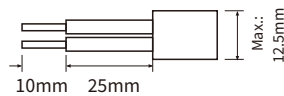
Cable diameter limit



$\phi 2-\phi 12.5\text{mm}$

The allowable diameter of the input cable sheath is 2-12.5mm

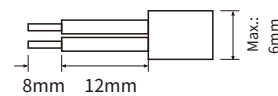
Input wire:
0.75-2.5mm²



$\phi 2-\phi 6\text{mm}$

The allowable diameter of the output cable sheath is 2-6mm

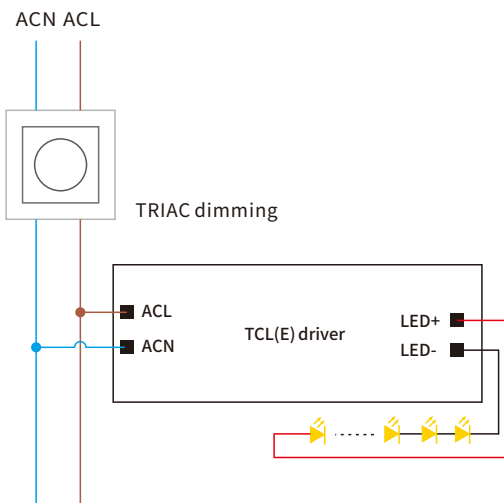
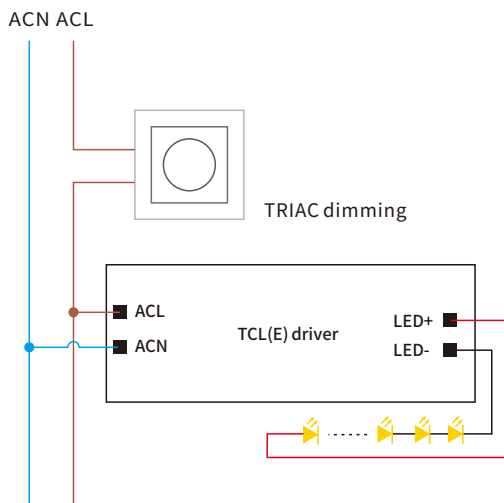
Output wire:
0.5-1.0mm²



Attention: This accessory needs to be purchased separately.

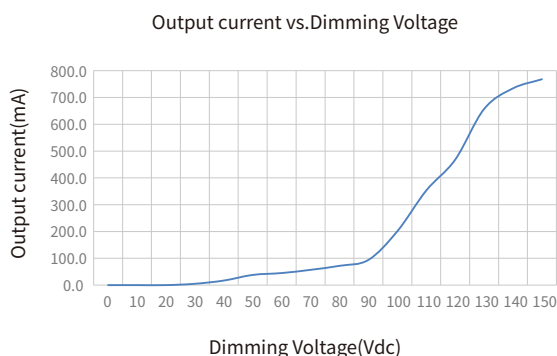
Triac dimming application

Wiring diagram

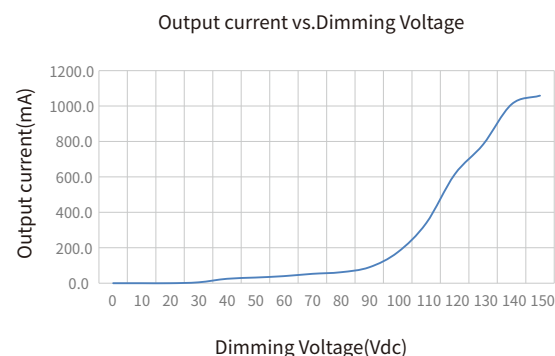


Dimming curve

TCL030E-AHA



TCL040E-AHA



Phase Control dimmer compatible list

No.	Brand	Model	Relative number/pcs	
			TCL030E-AHA	TCL040E-AHA
1	Schneider	CS30323	9	7
2	Dimpale DIMR	0921	10	8
3	DETA	6035	10	8
4	DIGINET	B1918-N	10	8
5	TR	TED-400U	10	8
6	sg	LEDDIM 400	10	8

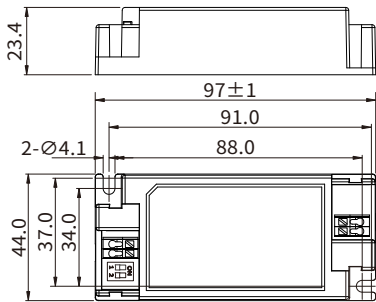
Note

- 1.The above dimmers are the models we tested compatible with our drivers.
- 2.Please test the driver samples with your dimmers about the compatibility,whatever the dimmers you will use is on our list.
Purchase batch order after sample test.
- 3.If the dimmers not included in the above list,any failure and risk caused by the compatible problem, we do not assume responsibility.
- 4.We accept batch order after sample confirm.
- 5.Our drivers only compatible with trailing-edge dimmers,and not compatible with leading-edge dimmers. few of the dimmers may not compatible, it is normal,please confirm with us.
- 6.There will be some noise when use the drivers, it is normal, the noise will be smaller if use trailing edge dimmer.
- 7.From the dimming effect, stability, noise, etc, trailing edge dimmers are recommended.
- 8.Dimmers with rating power according to different load, please choose the right power which the dimmer need to load.
- 9.Dimmers will have minimum maintain power demand, when there is less than or critical to maintain power, could adjust the minimum brightness of the dimmer output(some of the dimmers without minimum brightness adjust function).

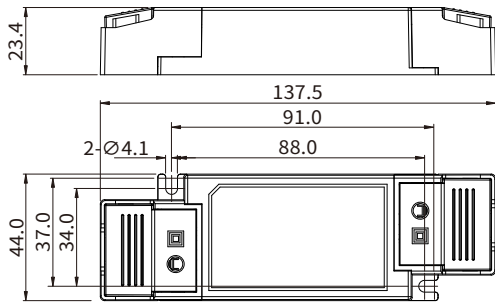
Mechanical Specification

Unit:mm

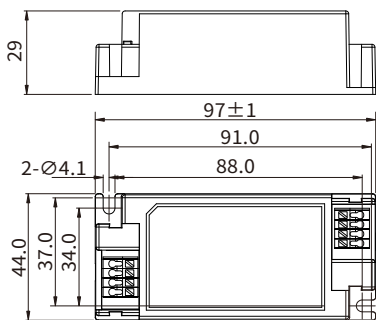
TCL030E-AHA(built-in)



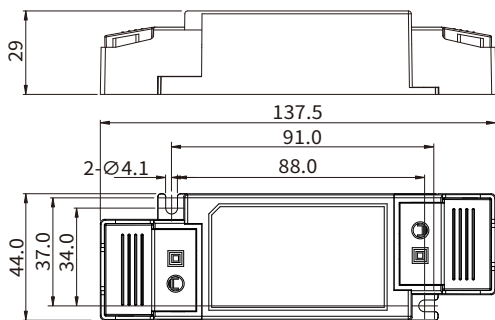
TCL030E-AHA(independent)



TCL040E-AHA(built-in)



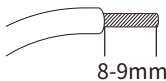
TCL040E-AHA(independent)



INPUT

numbering	function	colour
1	ACL	grey
2	ACN	grey

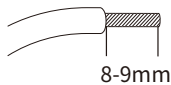
Input wire
0.5-1.5mm²(Built-in)
0.75-1.5mm²(Independent)



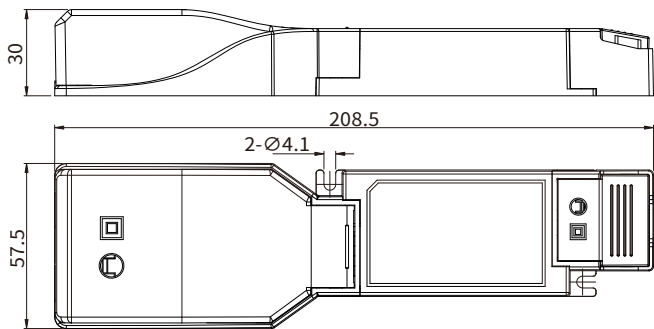
OUTPUT

numbering	function	colour
1	LED+	red
2	LED-	black

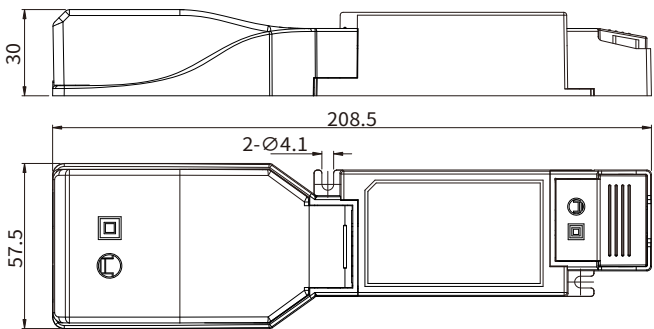
Output wire
0.5-1.0mm²
8-9mm



TCL030E-AHA(optional accessory)



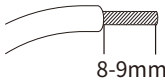
TCL040E-AHA(optional accessory)



INPUT

Numbering	function	colour
1	ACN	white
	ACN	white
2	E	white
	E	white
3	ACL	white
	ACL	white

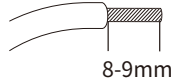
Input wire
0.75-2.5mm²
8-9mm



OUTPUT

Numbering	function	colour
1	LED+	red
2	LED-	black

Output wire
0.5-1.0mm²
8-9mm



Installation note

- Hot plug-in**

 - Hot plug-in is not supported due to residual output voltage of > 0 V.

Installation requirements

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

- 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. length of output wires is 2m.
 - Incorrect wiring can damage LED modules.

Replace LED module

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

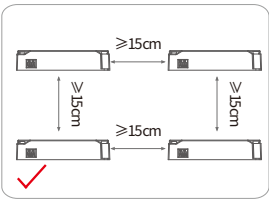
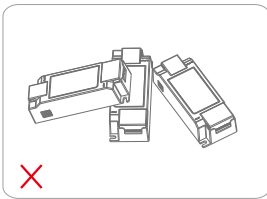


Figure 1

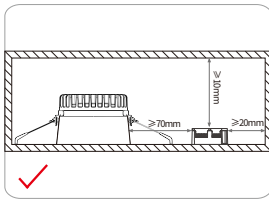
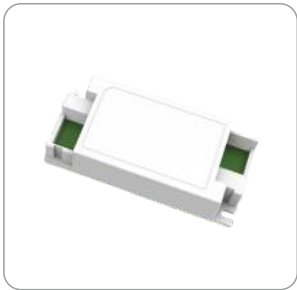


Figure 2

Packaging



Product

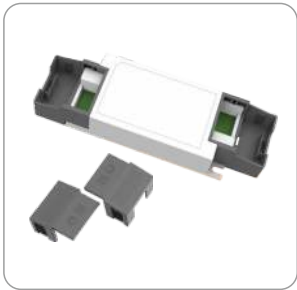


Packaging



20pcs×2boxes=40pcs/CTN

Model	Product size	Weight	Packaging size	Carton size	Qty/carton	N.W	G.W
TCL030E-AHA(Built-in)	L97.5*W44*H23.4mm	91g	L240*W102*H94mm	L257*W215*H130mm	40pcs	3.64KG	4.45KG
TCL040E-AHA(Built-in)	L97.5*W44*H29mm	144g	L208*W150*H94mm	L320*W225*H115mm	40pcs	5.76KG	7.01KG



Product



Packaging



20pcs×2boxes=40pcs/CTN
16pcs×2boxes=32pcs/CTN

Model	Product size	Weight	Packaging size	Carton size	Qty/carton	N.W	G.W
TCL030E-AHA(Independent)	L137.5*W44*H23.4mm	109g	L288*W168*H94mm	L355*W305*H115mm	40pcs	4.36KG	5.16KG
TCL040E-AHA(Independent)	L137.5*W44*H29mm	162g	L245*W181*H94mm	L380*W265*H115mm	32pcs	5.18KG	6.55KG

Additional information

1. The life and MTBF of the product are for reference only, and do not represent a warranty statement.
2. For more information, please send an email to info@bokedriver.com.