

Product Datasheet



The global certified TLD-400-C is a dual stage extremely wide input smart LED driver. 10kV surge protection level, 100khour long life and 7-year warranty provide high confidence to luminaire users. It supports not only traditional 4-in-1 control, but also DALI2.0 and other protocols. NFC and cable programming are both available for users. All around protections including digital OTP (internal and external by NTC) with auto-recovery secure 24hour non-stop operation for luminaires.

- Horticultural
- Stadium
- Flood
- Harbor
- UV
- Fishing



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400W, 200-480Vac Input, Isolated Dimming LED Driver

■ Features

- Supply Voltage: 180-528Vac or 250-740Vdc
- Great Surge Immunity 10kV
- -60°C Cold Ambient Startup (Optional)
- 100,000Hour Life @ Tc=75°C
- 7 Year Warranty @ Tc<=75°C
- Customized Endcap for Grow Light
- Active Daisy Chain and Master Mode
- Airset™ NFC Programmability
- +/-2% Output Current Accuracy
- Isolated 0-10V/PWM/Time/DALI2.0/DMX/RDM Dimmable
- Dim Off with 1.5W Standby Power
- 12V 300mA Auxiliary Power to Power Controllers and Fans (Optional)
- UL Class P, ENEC/CB/CCC SELV Output
- Global Certified Model Available
- Safety according to EN 61347-1, 61347-2-3, 61347-2-13, 62384

■ Model List

Model Number	Input Voltage Range	Output Power	Output Voltage	Full Power Settable Current Min	Full Power Settable Current Max
TLD-400-C210-XYZ	180-528Vac	400 W	114-286Vdc	1400mA	2100mA
TLD-400-C420-XYZ	180-528Vac	400 W	57-143Vdc	2800mA	4200mA
TLD-400-C990-XYZ	180-528Vac	400 W	24-58Vdc	6900mA	9900mA

XY=	Dimming Method	Programmable	12Vaux	Dim-off
NN	-	-	-	-
DN	0-10V/PWM/Time	Cable	-	No Dim-off as default status, programmed to have Dim-off
EN	0-10V/PWM/Time	Cable	300mA	√
TR	Time/Set Current	NFC Wireless	-	-
DR	0-10V/PWM/Time	NFC Wireless	-	No Dim-off as default status, programmed to have Dim-off
ER	0-10V/PWM/Time	NFC Wireless	300mA	√
AR	DALI2.0	NFC Wireless	-	√
MR	DMX512 + RDM	NFC Wireless	-	√

Z=	U	V	S	S-GLB000	W	D
Input Cable	3 pin UL cable with ground	3 pin UL cable with ground	3 pin VDE cable with ground	3 pin Global cable with ground	3 pin VDE cable with ground	2 pin VDE cable without ground
Output Cable	2 pin UL cable without Ground	3 pin UL cable with ground	2 pin VDE cable without ground	2 pin Global cable with ground	3 pin VDE cable with ground	2 pin VDE cable without ground
Certified Input Voltage Range	UL Listed Class P 200-480Vac	UL Listed Class P 200-480Vac	ENEC CB RCM Class I 220-480Vac	UL Recognized 200-480Vac ENEC CB RCM Class I 220-480Vac	ENEC CB RCM Class I 220-480Vac	Class II 200-480Vac

400W, 200-480Vac Input, Isolated Dimming LED Driver

■ Technical Data

Input Voltage	180-528Vac or 250-740Vdc
Input Frequency	47~63Hz
Power Factor	>0.9@60-100%load, refer to PF vs. Load curve
THD	<15%@60-100%load, refer to THD vs. Load curve
Input Current	1.8 Amax@277Vac & Full-Load, 0.9Amax@480Vac & Full-Load
Inrush Current	See Inrush Current Section in the datasheet
Leakage Current	0.75MIU max @480Vac 60Hz, UL8750 0.7mA max @400Vac 50/60Hz, IEC60598-1
Input Under Voltage	Shut down and auto-restart
Surge Protection	Line to line 6kV, line to ground 10kV, IEC 61000-4-5
Current Accuracy	±2%lo for programmable model, ±5%lo for non-programmable model
Ripple Current	Ip-p:5%lo max
Setup Time	1.2s max
Overshoot	10% Io max & LED Load
Output Over Voltage	120% Vomax, typ.
Short Circuit	Auto recovery. The output recovers when short is removed.
Over Temperature	Lower the output current when $T_c \geq 105 \pm 10^\circ\text{C}$; Auto Recovery When $T_c \leq 70 \pm 10^\circ\text{C}$
Auxiliary Power (Vaux)	12V+/-5%, 300mA max
Operating Temperature	Case Temperature $T_c = -40^\circ\text{C} \sim +90^\circ\text{C}$; 10%RH~100%RH
Storage Temperature	$-40^\circ\text{C} \sim +85^\circ\text{C}$; 5%RH~100%RH
MTBF	≥280,000 hours, 75°C case temperature (MIL-HDBK-217F)
Lifetime	≥100,000 hours, 75°C case temperature, refer to life vs. Tc curve
Case Temperature	90°C max, marked in the Tc point of label
Dimensions	8.82x3.54x1.63 by inch (body), 9.88x3.54x1.63 by inch (endcaps included) 224 x 90 x 41.5 by mm (body), 251 x 90 x 41.5 by mm (endcaps included)
Net Weight	1650g
Packing	See Package Information Section in the datasheet

Notes: Unless specified, all the test results are measured in 25°C room temperature.

Safety/EMC Compliance

Safety Standards	Description
UL8750	Light emitting diode(LED) equipment for use in lighting products
UL1012/1310	Power units other than class 2 / Class 2 power units
IEC 61347-1	Lamp control gear Part 1: general and safety requirements
IEC 61347-2-13	Lamp control gear Part 2-13: particular requirement for d.c. or a.c. supplied electronic control gear for LED modules
IEC 62384	DC or AC supplied electronic control gear for LED modules - Performance requirements
IEC 55015/FCC Part 15	Conducted emission test & radiated emission test; ANSI C63.4:2009 Class B
IEC 61000-3-2	Harmonic current emissions; Class C
IEC 61000-3-3	Voltage fluctuations & flicker
IEC 61000-4-2	Electrostatic discharge (ESD): 8 kV air discharge, 4 kV contact discharge
IEC 61000-4-3	Radio frequency electromagnetic field susceptibility test (RS)
IEC 61000-4-4	Electrical fast transient (EFT)
IEC 61000-4-5	Surge immunity test
IEC 61000-4-6	Conducted radio frequency disturbances test (CS)
IEC 61000-4-8	Power frequency magnetic field test
IEC 61000-4-11	Voltage dips
IEC 61547	Electromagnetic immunity requirements applies to lighting equipment

Dimming

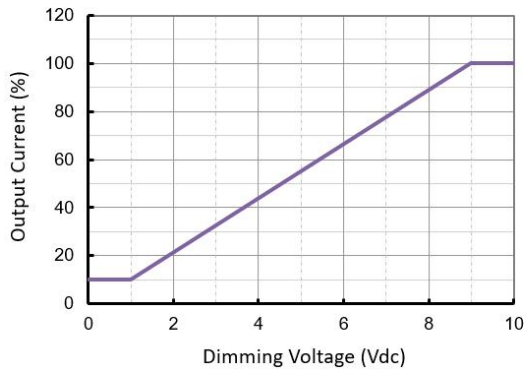
Parameter	Min.	Typ.	Max.
Vdim Sourcing Current	100uA	150uA	200uA
Vdim Allowed Input Voltage	-20 V		20 V
0-10V Dimming Range	10% (Vdim=1V)	Linear	100% (Vdim=9~10V)
PWM Dimming Range	10% (Duty=10%)	Linear	100% (Duty=90-100%)
Default Dim off Threshold	0.4V or 4%	0.5V or 5%	0.6V or 6%
Default Dim off Threshold	0.6V or 6%	0.7V or 7%	0.8V or 8%
PWM High	3.8V		9V
PWM Low	0V		0.6V
PWM Frequency	300Hz		2kHz
DALI Interface Standard	IEC62386, part 101,102,207		
DA1,DA2 High Level	9.5	16	22.5
DA1,DA2 Low Level	-6.5	0	6.5
DA1,DA2 Current	0		2mA
DMX+ & DMX- Voltage	-6V		6V
DMX to Ground Resistance	25Mohm		
Logic 0/1 (DMX+ to DMX-) Threshold		0.2V	
Communication Baud Rate		250kbps	
Fast Dimming ^[1] On-Off Transition		300ms	
Fast Dimming 10-100% Io Transition		70ms	

Notes [1]: Fast dimming feature is only available by models with -FD0000 suffix.

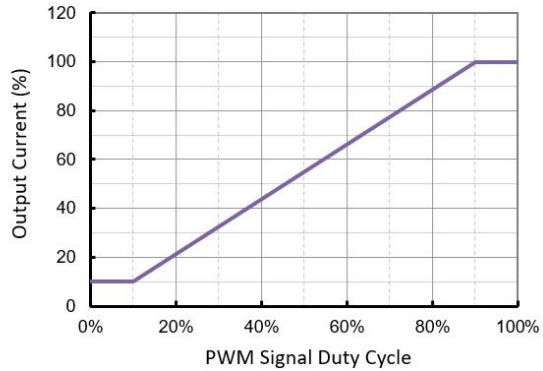
- Default Dimming Curves

a. 0-10V dimming without dim-off

0-10V Dimming Curve

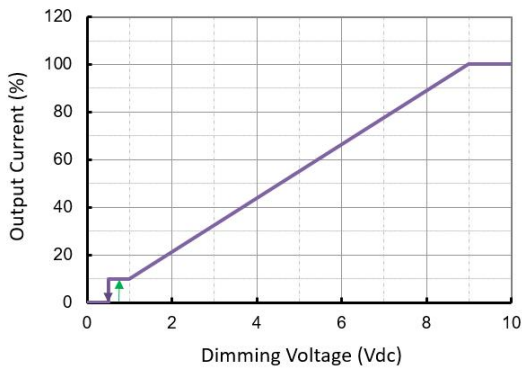


PWM Dimming Curve

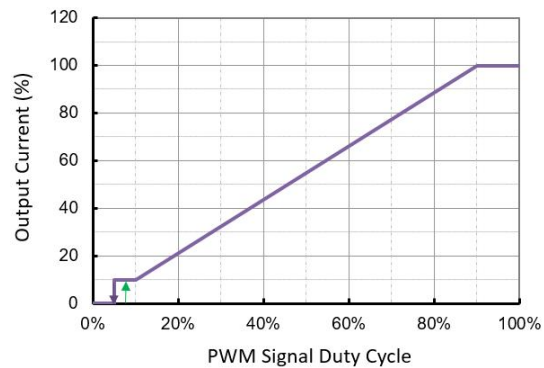


b. 0-10V dimming with dim-off

0-10V Dimming Curve with Dim Off

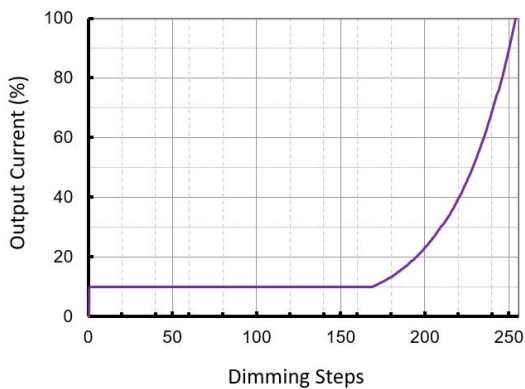


PWM Dimming Curve

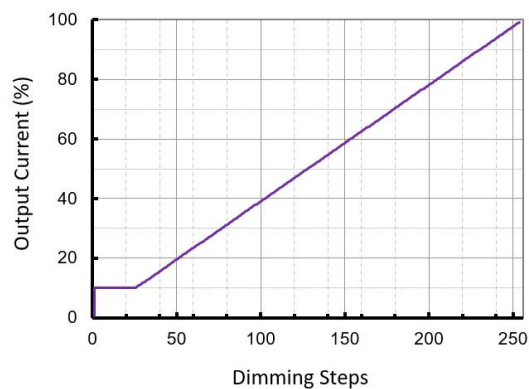


c. DALI and DMX dimming curves

DALI Dimming Curve



DMX/RDM Dimming Curve

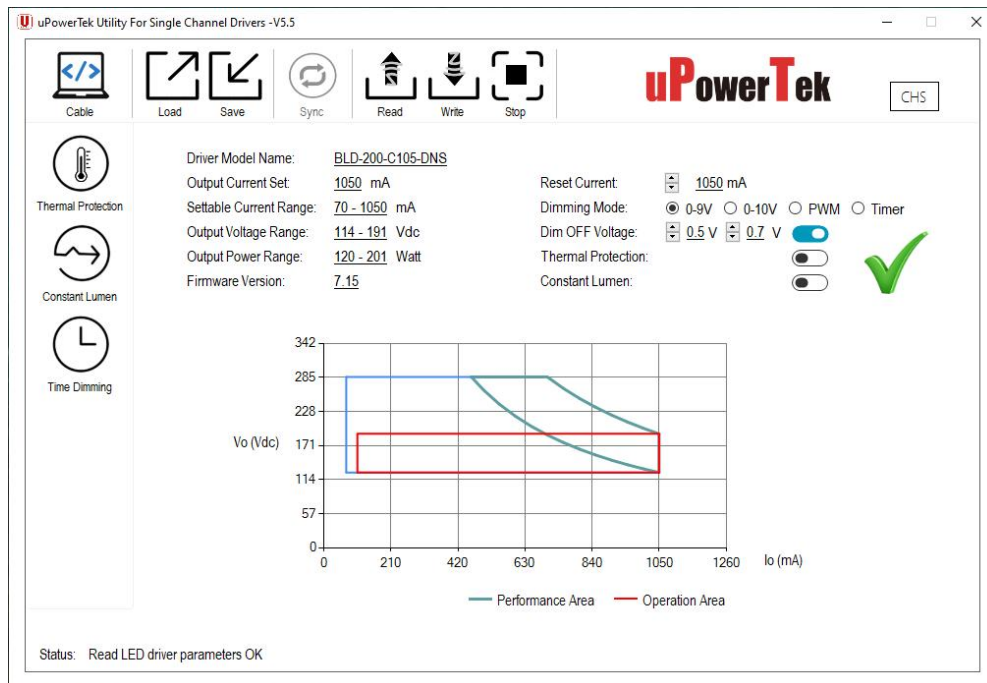


Note: Both DALI and DMX dimming curves can be customized to be linear or logarithmic as default.

■ Programming

- Programmable Functions

uPowerTek LED drivers offer a range of configurable functions to meet specific lighting requirements. The Output Current, Dimming Mode, Dim Off/On Voltage Threshold, and Timer Dimming can be set as basic programming functions. Constant Lumen Output (CLO) can also be customized to ensure consistent light performance. Additionally, depending on the different product model numbers, users can benefit from programming Thermal Protection by external NTC (with extra cable), DALI/D4i Features, and DMX addressing.



uPowreTek Programming Software Interface

- Required Equipment

To program uPowerTek LED drivers, users will need specific equipment based on their preferred method. For wired programming, the uPowerTek Cable Programmer is essential. For NFC wireless programming, users can use a smartphone with either IOS or Android, the uPowerTek NFC Programmer, or the FEIG NFC Programmers. These tools ensure a seamless and efficient setup process, realizing precise customization of the LED driver settings.



Cable Programmer



NFC Programmer V1



NFC Programmer V2



FEIG NFC Programmer



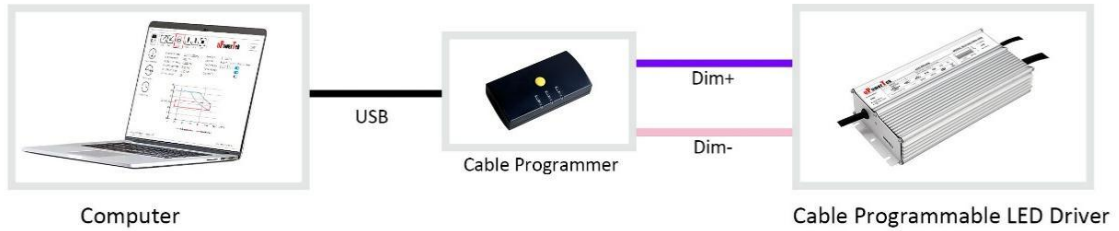
Android or iPhone

400W, 200-480Vac Input, Isolated Dimming LED Driver

- Connection Guide

This guide provides simple connection diagrams to help users understand the programming system. For more detailed operating instructions, including step-by-step procedures and additional configurations, please visit our website. You can download the comprehensive user manual and necessary software from the following link:

<https://www.upowertek.com/download-2/>.



Wired Programming

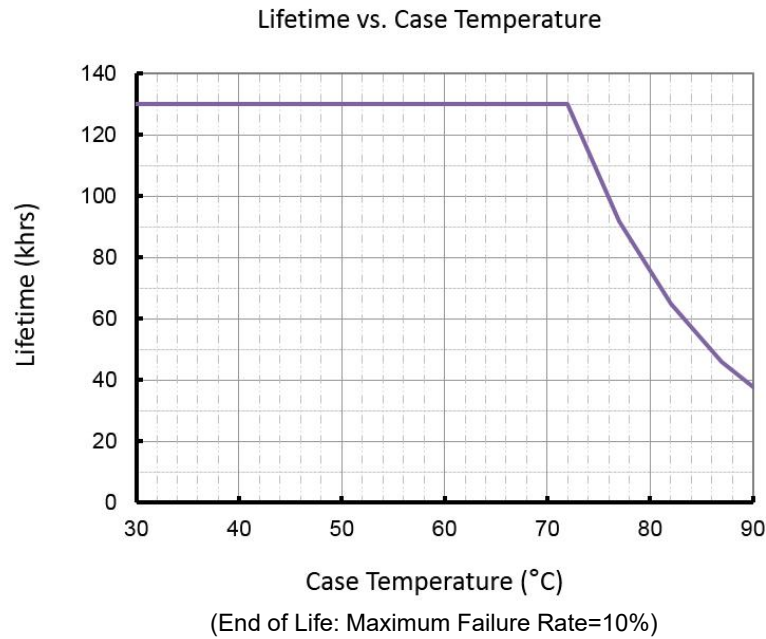


Wireless Programming

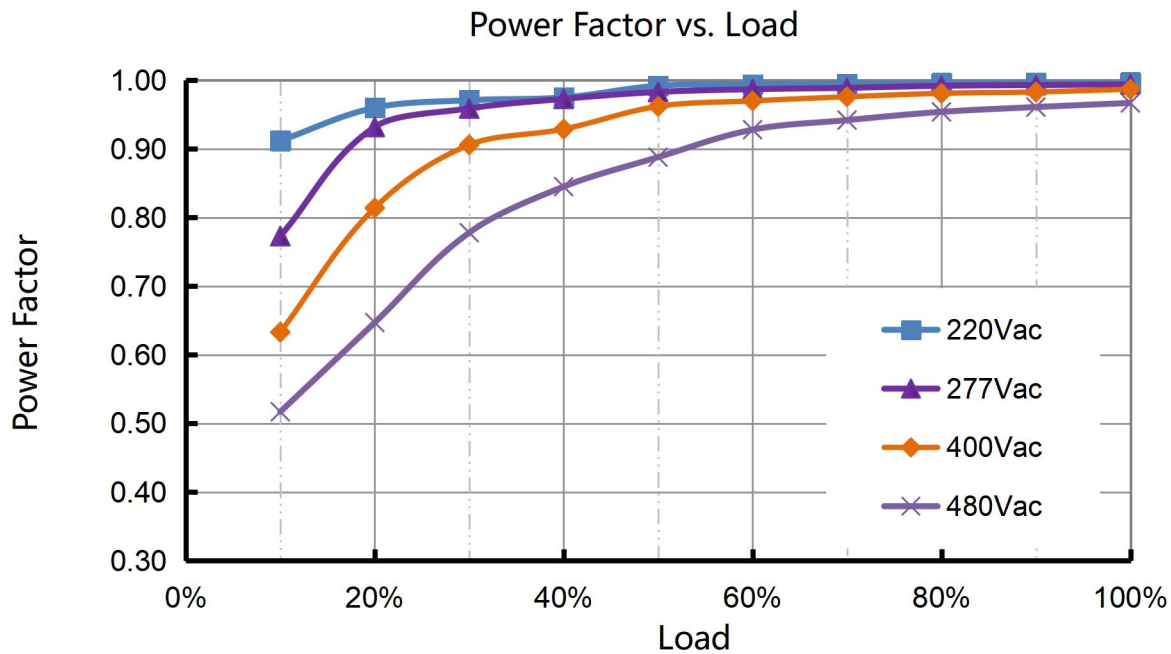


Cellphone Programming

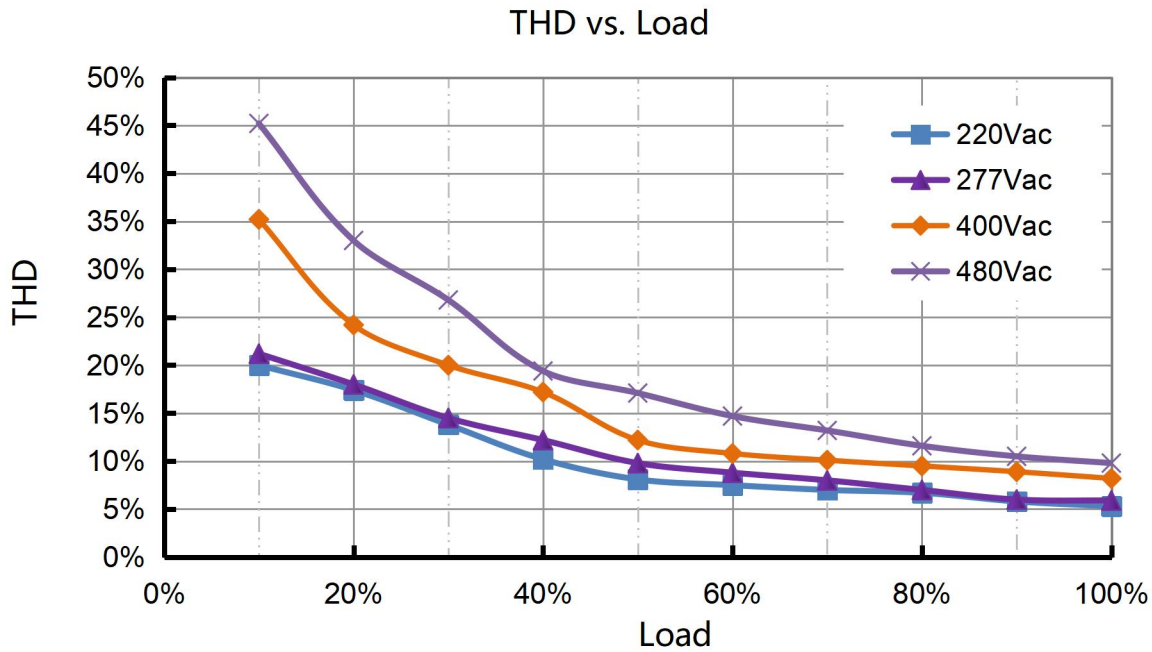
■ Lifetime vs. Case Temperature



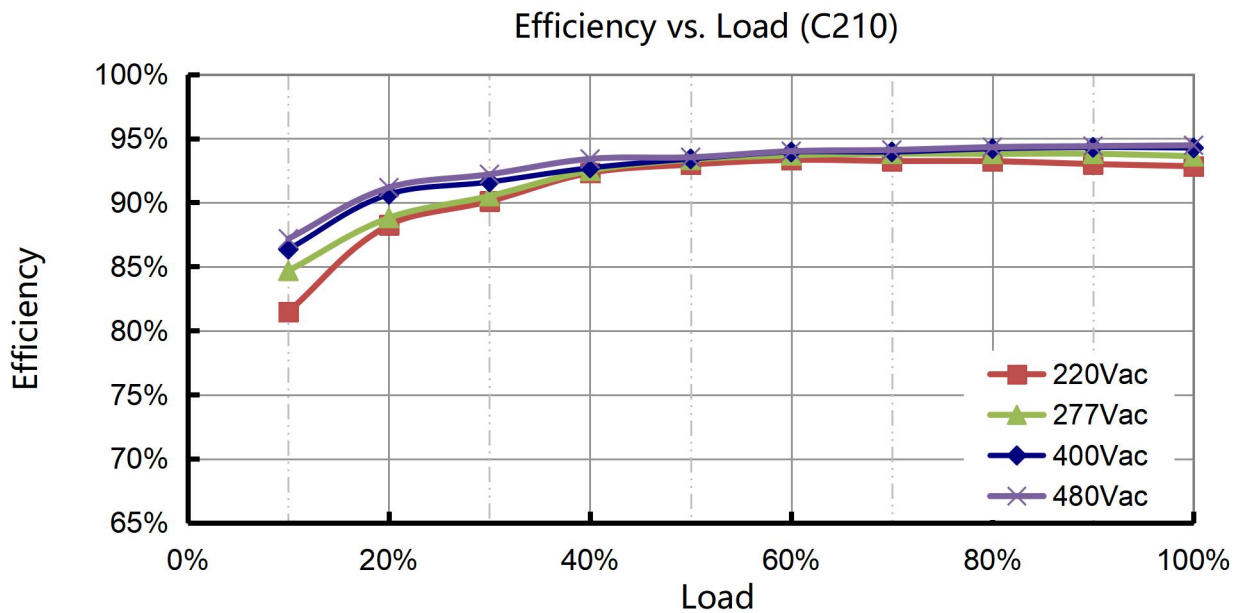
■ Power Factor vs. Load



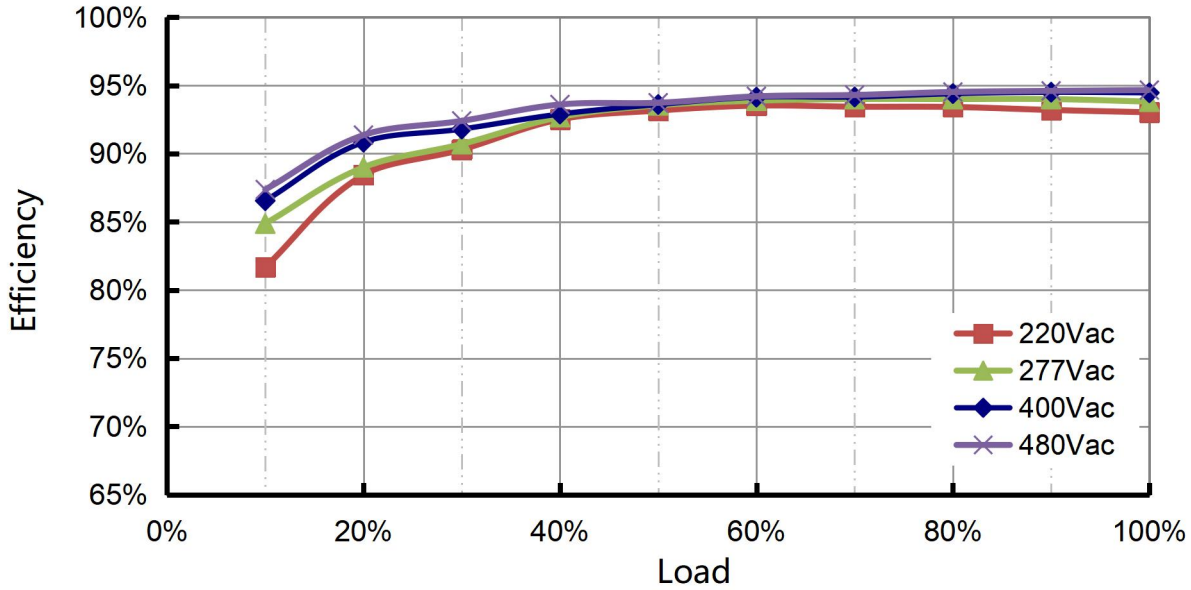
THD vs. Load



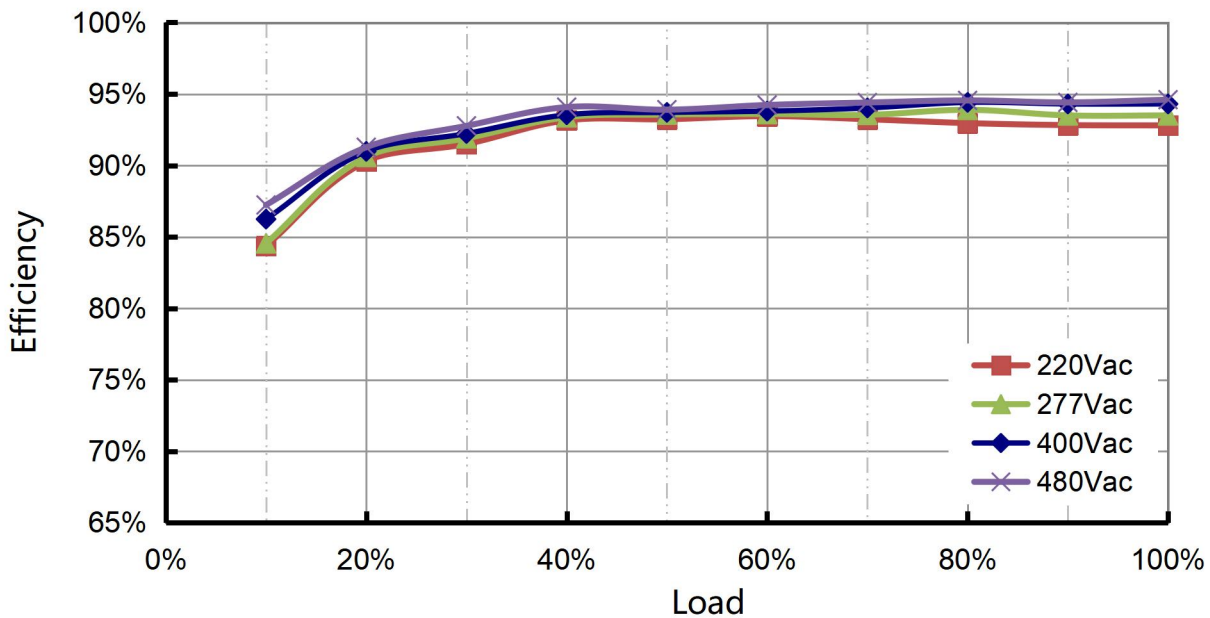
Efficiency vs. Load



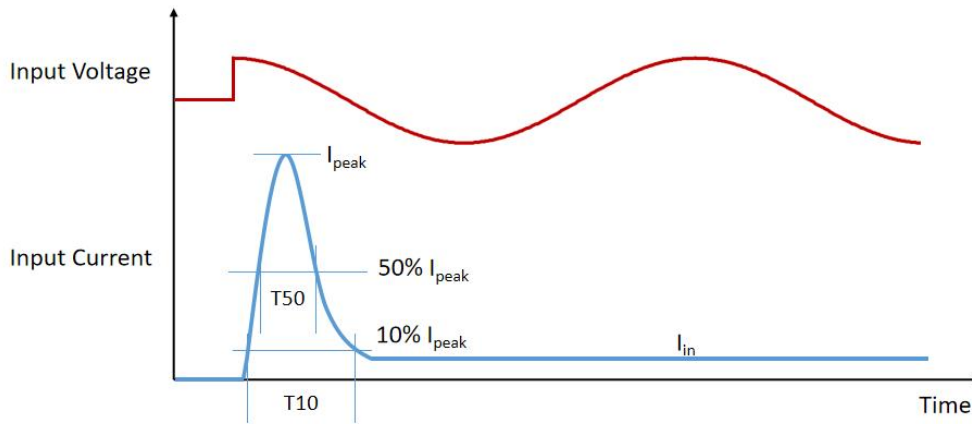
Efficiency vs. Load (C420)



Efficiency vs. Load (C990)



Inrush Current

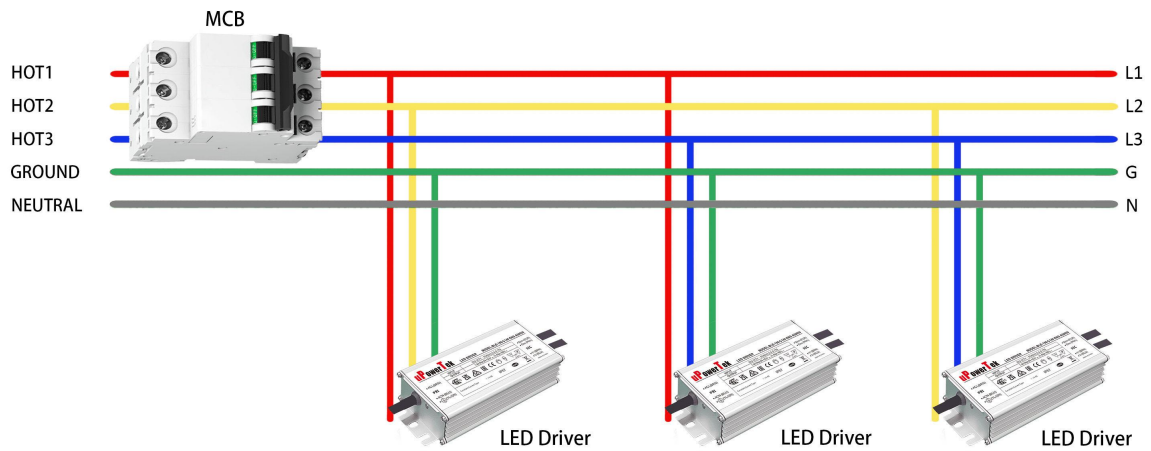


Input Voltage	I_{peak}	10% -10% T10 Duration	50% -50% T50 Duration
220Vac	64A	824 μ s	400 μ s
277Vac	87.6A	804 μ s	390 μ s
400Vac	101.2A	680 μ s	320 μ s
480Vac	121.2A	660 μ s	300 μ s

- MCB Suggestion

Type	B10	B16	B25	B32	C10	C16	C25	C32	D10	D16	D25	D32
220Vac	3	4	7	9	3	5	8	11	4	6	10	12
277Vac	2	3	5	7	3	6	9	12	5	8	12	16
400Vac	3(x3)	4(x3)	7(x3)	9(x3)	3(x3)	5(x3)	8(x3)	11(x3)	4(x3)	6(x3)	10(x3)	12(x3)
480Vac	2(x3)	3(x3)	5(x3)	7(x3)	3(x3)	6(x3)	9(x3)	12(x3)	5(x3)	8(x3)	12(x3)	16(x3)

Three phase wiring suggestion.

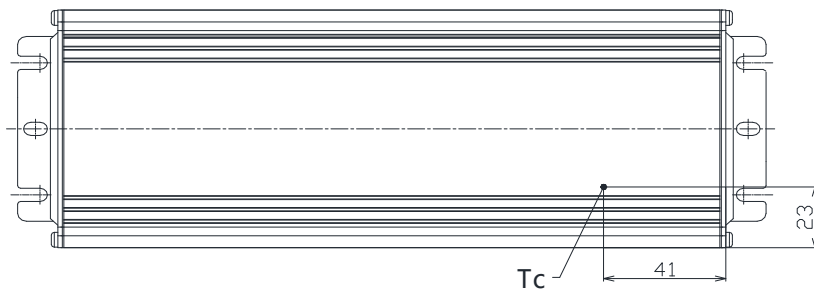


■ Dielectric Strength

Unit: Vac	Input	Output	Dimming	Case
Input	-	3920	3920	1960
Output	3920	-	1960	1960
Dimming	3920	1960	-	1960
Case	1960	1960	1960	-

■ Tc Point

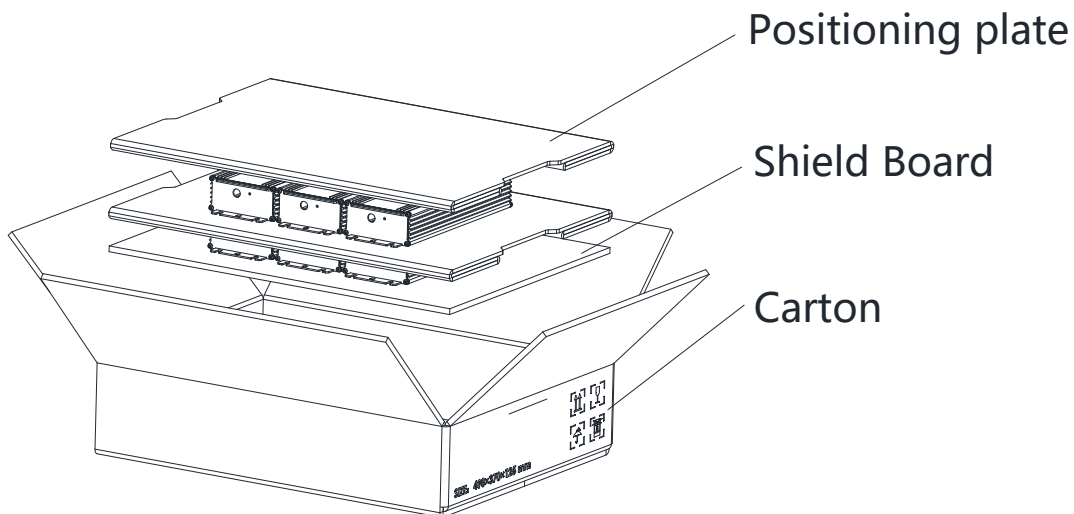
AC INPUT



DC OUTPUT

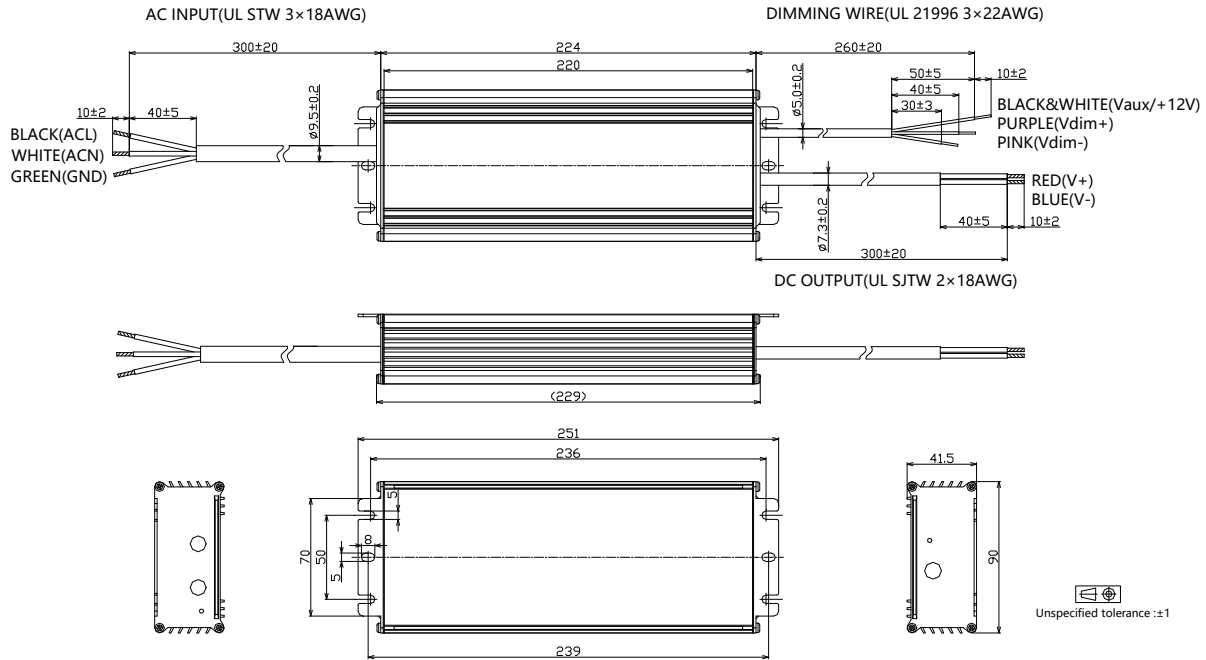
■ Packaging Information

Typical Carton Dimension(L×W×H)	490×370×125 mm
Positioning plate	2pcs/carton
Shield Board	1pcs/carton
LED Drivers/LED	6pcs/carton
Net Weight	10.1 kg/carton
Gross Weight	11.1 kg/carton

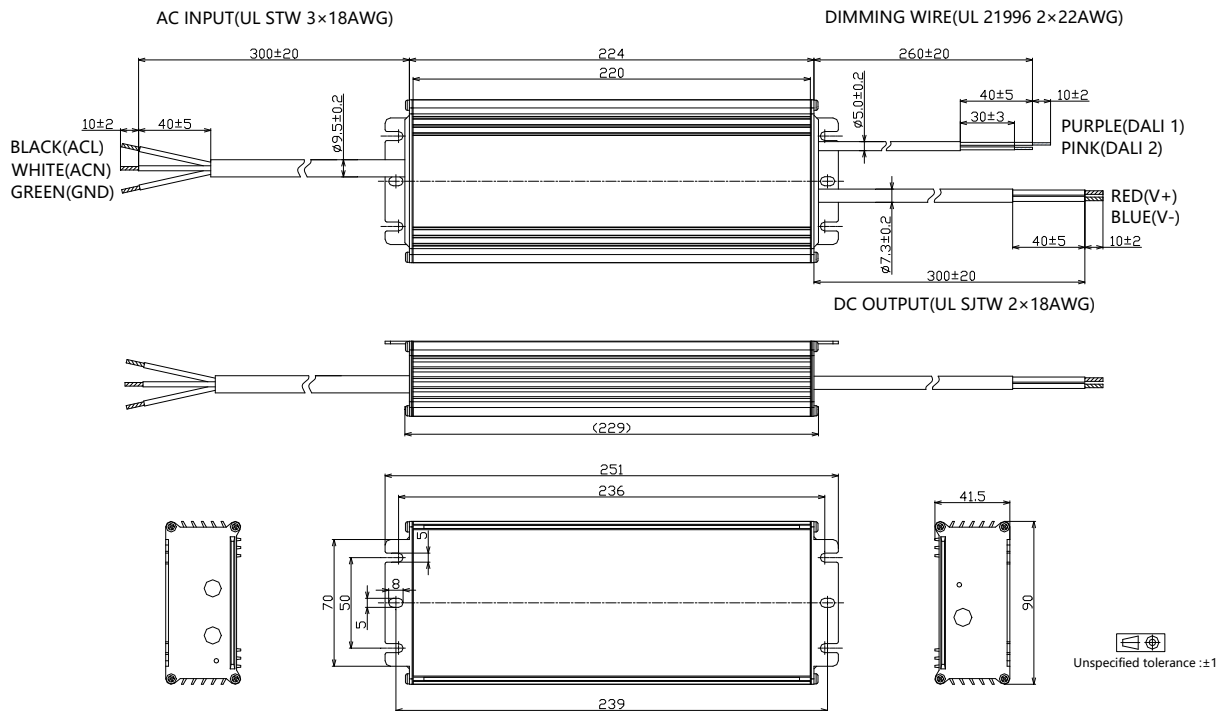


400W, 200-480Vac Input, Isolated Dimming LED Driver

- TLD-400-Cxxx-ERU (UL Cable)

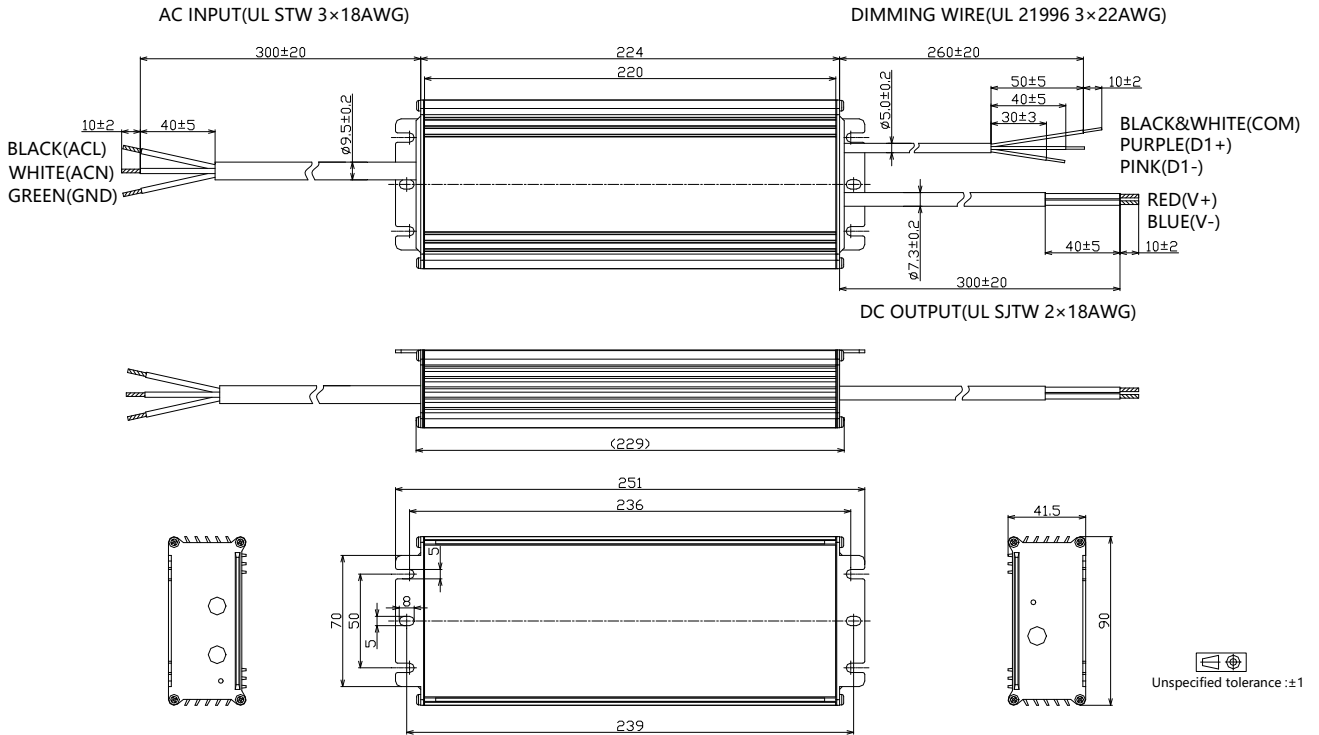


- TLD-400-Cxxx-ARU (UL Cable)

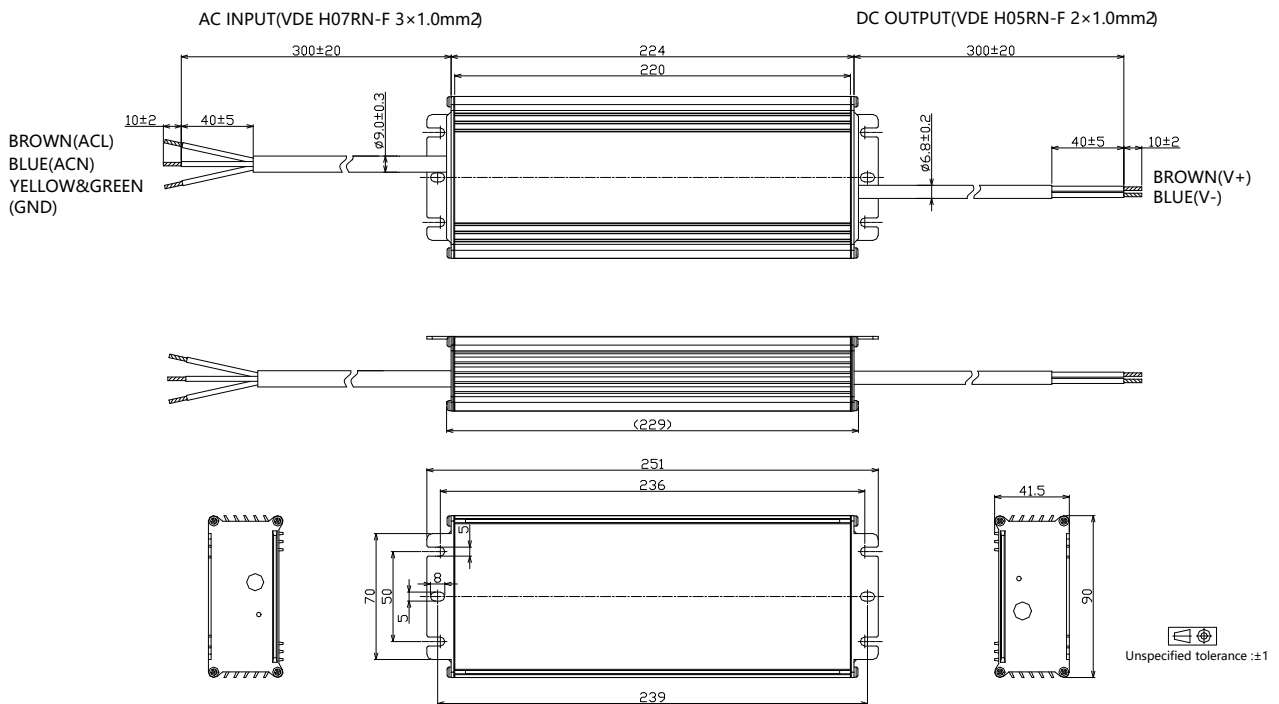


400W, 200-480Vac Input, Isolated Dimming LED Driver

- TLD-400-Cxxx-MRU (UL Cable)

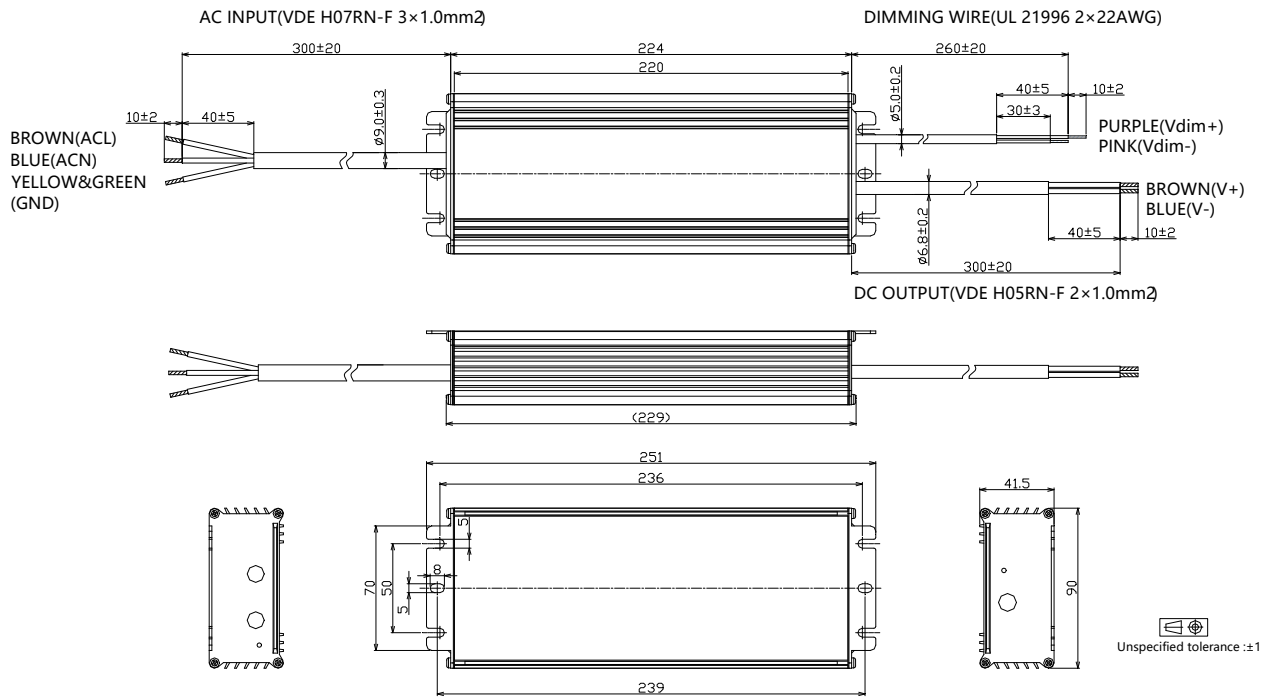


- TLD-400-Cxxx-NN/TRS (VDE Cable)

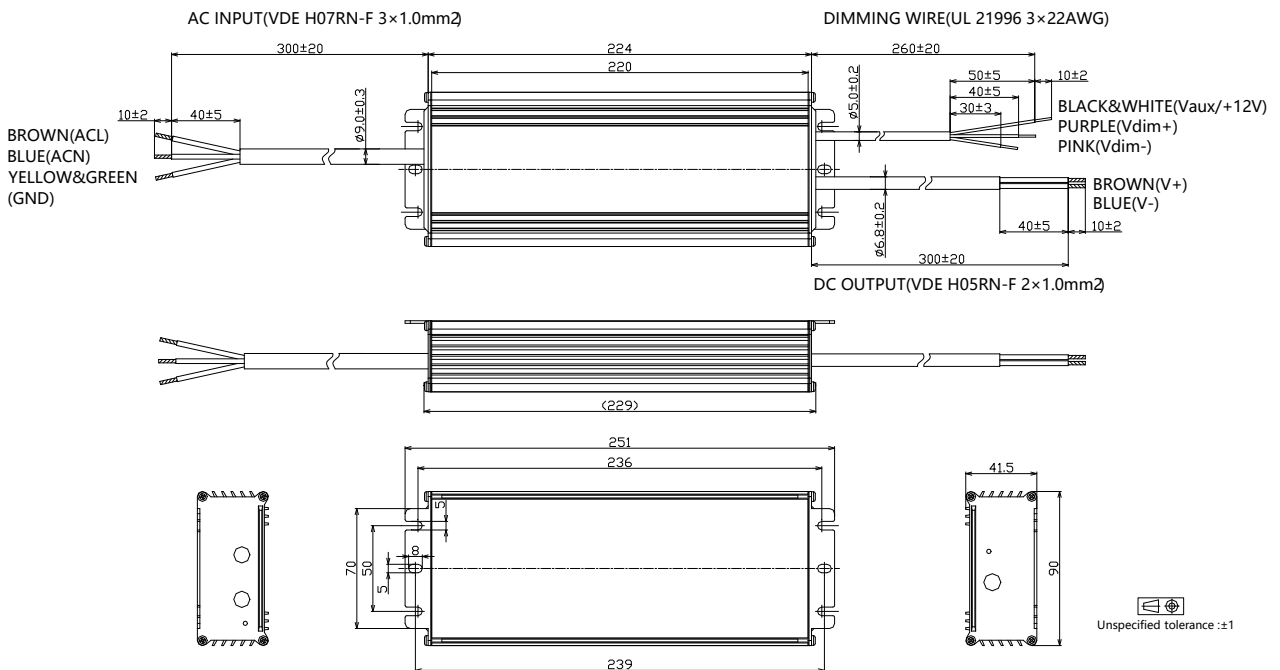


400W, 200-480Vac Input, Isolated Dimming LED Driver

- TLD-400-Cxxx-DN/DRS (VDE Cable)

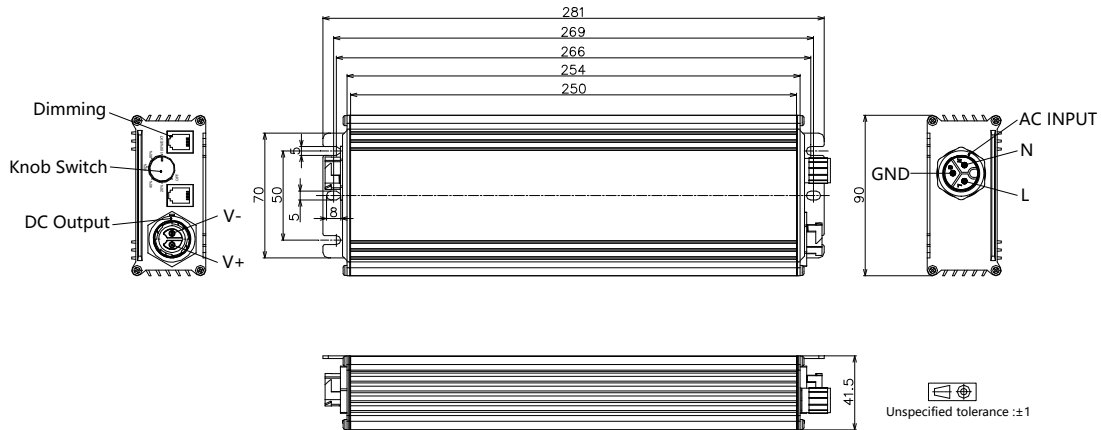


- TLD-400-Cxxx-EN/ERS (VDE Cable)



400W, 200-480Vac Input, Isolated Dimming LED Driver

- Customized Functional End Cap Version

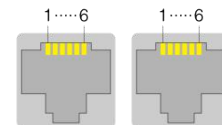


- Add suffix #abcd00 to the end of part number to indicate different configuration. Please refer to product application note AN06 or contact with us for more like **active daisy chain, master mode and button dimming** etc.

Item	Value Definition	Description
Input	a	F: M19 waterproof connector P: C14 plug N: Same cable as standard version
Output	b	F: M19 waterproof connector, 2 pin N: Same cable as standard version
Dimming	c	F: M12 waterproof connector R: RJxx (xx=25,14,12,11) connector x 2 S: 3.5mm multi-media plug N: Same cable as standard version
Knob	d	K: Knob with steps B: Knob without steps N: No knob

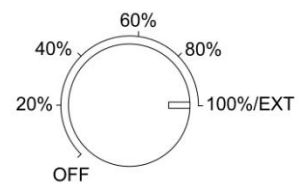
- RJ25 Pin Description (can be customized according to control system)

Pin	Description
1,6	12V Aux-power
2,5	Dim+
3,4	Dim-/RTN



- Knob Description

Position	Description
100%/EXT	If there is no external control, 100% output. If there is external control, output is controlled by external signal.
Off,20%,40%,60%,80%	External signal invalid.



■ Output Operation Range

Model	Typical Set Output Current (mA)	Max Output Power (W)	Output Voltage Min (V)	Output Voltage Max(V)	Minimum Dimming Current (mA)
-C210	2100	400	114	190	210
	2000	400	120	200	200
	1900	400	126	211	190
	1800	400	133	222	180
	1700	400	141	235	170
	1600	400	150	250	160
	1500	400	160	267	150
	1400	400	171	286	140
	1300	371	171	286	140
	1200	343	171	286	140
	1100	314	171	286	140
	1000	286	171	286	140
	171	286	...
	140	40	171	286	140

Model	Typical Set Output Current (mA)	Max Output Power (W)	Output Voltage Min (V)	Output Voltage Max(V)	Minimum Dimming Current (mA)
-C420	4200	400	57	95	420
	4100	400	59	98	410
	4000	400	60	100	400
	3900	400	62	103	390
	3800	400	63	105	380
	3700	400	65	108	370
	3600	400	67	111	360
	3500	400	69	114	350
	3400	400	71	118	340
	3300	400	73	121	330
	3200	400	75	125	320
	3100	400	77	129	310
	3000	400	80	133	300
	2900	400	83	138	290
	2800	400	86	143	280
	2700	386	86	143	280
	2600	371	86	143	280
	86	143	...
	280	40	86	143	280

400W, 200-480Vac Input, Isolated Dimming LED Driver

Model	Typical Set Output Current (mA)	Max Output Power (W)	Output Voltage Min (V)	Output Voltage Max(V)	Minimum Dimming Current (mA)
-C990	9900	400	24	40	990
	9600	400	25	42	960
	9300	400	26	43	930
	9000	400	27	44	900
	8700	400	28	46	870
	8400	400	29	48	840
	8100	400	30	49	810
	7800	400	31	51	780
	7500	400	32	53	750
	7200	400	33	56	720
	6900	400	35	58	690
	6600	400	35	58	690
	6300	383	35	58	690
	6000	365	35	58	690
	5700	348	35	58	690
	5400	331	35	58	690
	5100	313	35	58	690

	690	40	35	58	690

■ Revision History

Revision	Date	Contents
C	2022-03-22	<ol style="list-style-type: none">1. Index page added2. Reduced dimming interface sourcing current3. DALI 2.0 compatibility added4. Programming instruction added5. Inrush current data added6. Tc point position indication added7. Dielectric strength level added8. Packaging information added9. Mechanical design change with dimming cable color10. Revision history added
D	2022-12-14	<ol style="list-style-type: none">1. DMX dimmable models mechanical design updated
E	2023-07-14	<ol style="list-style-type: none">1. Update cable selection table in Model List Section
F	2023-09-15	<ol style="list-style-type: none">1. Update model selection table with -DN,-EN,DR models
G	2024-07-25	<ol style="list-style-type: none">1. Fast dimming description added2. Power factor, THD, efficiency curves updated by 10-100% load range3. MCB usage and driver quantity section added4. Inrush current data updated