

320HBL 320W AC/DC Constant Current Non Isolate LED Driver

Features

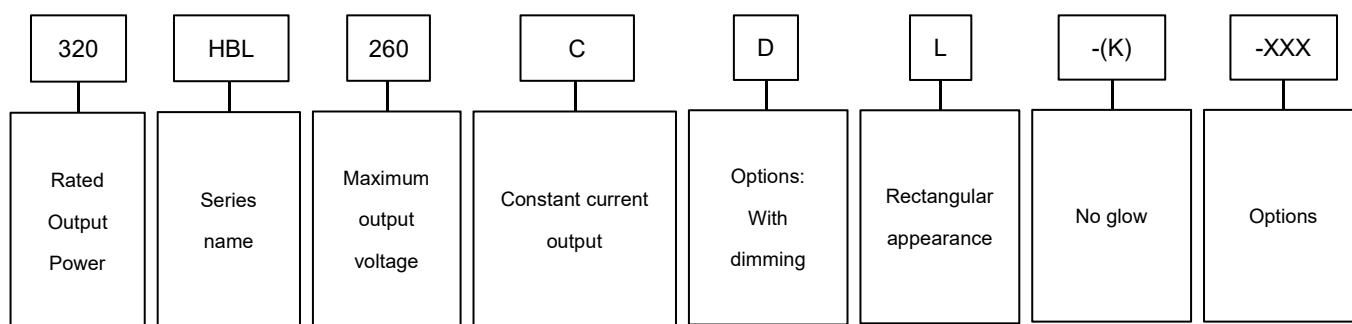
- Adjustable constant current output
- High efficiency: 96% typical @277 VAC, full load
- High power factor: 0.97 typical. @ 230 VAC, full load
- Isolated 0-10V/PWM/Rset Dimming optional
- With Lightning Protection & all-round protections (OVP,SCP,OTP)
- 12V/200mA AUX Output
- UL/CE/CB/ENEC



Description

This specification describes the performance characteristics of a 320W/1.6A versatile power supply for LED Driver. The output current of this series are adjustable, and designed for 0-10V/PWM/Rset dimming applications.

Model Name Definition



Specifications

Part Number	VIN_AC (VAC)	PO_MAX (W)	IO_RANGE @ CC (A)	VO_RANGE (V)	Typical η (%) @ 277 VAC	Dimming	AUX power
320HBL260CL	100-277	320	0.48-1.6	180-260	96	/	/
320HBL260CDL	100-277	320	0.48-1.6	180-260	96	0-10V	12V 200mA
320HBL260CDL-K	100-277	320	0.48-1.6	180-260	96	0-10V	12V 200mA
320HBL260CDL-K0	100-277	320	0.48-1.6	180-260	96	0-10V	12V 200mA

Note1:Efficiency value is typical value.

Note2:-K means no glow during dim-to-off.

Note3:-K0 means no glow during dim-to-off and default dim-to-off

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1. Input Specifications

	Parameter	Min.	Typ.	Max.	Unit	Notes
V _{IN_AC}	Rated Input AC Voltage	100	120/230 /277	277	VAC	
V _{IN_RANGE}	Input AC Voltage Range	90	-	305	VAC	
F _{LINE}	Input Frequency	47	50/60	63	Hz	
I _{LKG}	Leakage Current	-	-	0.75	mA	At 277 VAC/ 60 Hz input , grounding effectively
I _{IN_AC}	Input AC Current	-	-	3.16	A	Measured at full load and 120 VAC input.
		-	-	1.65	A	Measured at full load and 230 VAC input.
		-	-	1.37	A	Measured at full load and 277 VAC input.
I _{PK_INRUSH}	Inrush Peak Current	-	-	100	A	At 230 VAC input, 25°C cold start. See Inrush Current Waveform for the details.
PF	Power Factor	0.9	-	-		At 120-277 VAC , 70%-100% load, 25°C and 60Hz
THD	Total Harmonic	-	-	20	%	At 120-277 VAC , 60%-100% load, 25°C and 60Hz
η	Efficiency	93	94	-	%	Measured at 120 VAC input, 100% load and steady-state temperature in 25°C ambient
		95	96	-	%	Measured at 230 VAC input, 100% load and steady-state temperature in 25°C ambient
		95	96	-	%	Measured at 277 VAC input, 100% load and steady-state temperature in 25°C ambient

2. Output Specifications

	Parameter	Min.	Typ.	Max.	Unit	Notes
I _{O_ACCU}	Output Current Accuracy relative to I _o set	-5	-	5	%	At 25°C and full load condition.
I _{O_RIPPLE}	Total Output Current Ripple (pk-pk) relative to I _o max	-	-	10	%	At 25°C and full load condition, 8 kHz BW
I _{O_OVERSHOOT}	Startup Overshoot Current relative to I _o max	-	-	20	%	At 25°C and full load condition, 8 kHz BW
V _{O_LINE}	Line Regulation	-	-	±4	%	Measured at 25°C and full load
V _{O_LOAD}	Load Regulation	-	-	±4	%	At 25°C condition
T _{ON_DELAY}	Turn-on Delay Time	-	-	1	s	Measured 120 VAC input to 90% output current, 25°C condition
I _{O_TC}	Temperature Coefficient of I _o set	-0.03	-	0.03	%/°C	Case temperature = 0°C ~T _c max
V _{O_AUX}	12V Auxiliary Output Voltage	11	12	16	V	For 320HBL260CDL/320HBL260CDL-K /320HBL260CDL-K0

I _{O_AUX}	12V Auxiliary Output Current	0	-	200	mA	For 320HBL260CDL/320HBL260CDL-K /320HBL260CDL-K0; Return terminal is "Dim-"
T _{OTP_TC}	Over Temperature Protection Threshold(Tc point)	90	95	100	°C	Output current will drop
SCP	Short Circuit Protection					Recovers automatically after fault condition is removed

3.General Specifications

	Parameter	Min.	Typ.	Max.	Unit	Notes
P _{STANDBY}	Standby power	-	-	0.5	W	Measured at 230 VAC/50 Hz; Dimming off
T _{MTBF}	Mean Time Between Failure	234,000	-	-	Hours	Measured at 230 VAC input, 80% load and 25°C ambient temperature (MIL-HDBK- 217F)
T _{LIFETIME}	Lifetime	60000	-	-	Hours	Measured at 230 VAC input, 80% load and 75°C case temperature; See lifetime vs Tc curve for the details
T _C	Operating Case Temperature T _c	-40	-	90	°C	T _c must be controlled between this range, add heat sink or other way to help heat dissipation if necessary.
T _A	Operating Ambient Temperature T _a	-40	-	50	°C	At 200-305 VAC input, other voltage T _a 40°C max. T _a range is just a reference, it will change depend on different installation.
T _{STG}	Storage Temperature	-40	-	85	°C	Humidity: 5%RH to 90%RH
	IP Grade	IP20				
	Dimensions	8.92×1.47×1.45			inch	
	L × W × H	226.5×37.4×36.8			mm	
	Net Weight	-	410	-	g	

Note4: There are three points could be maximum T_c point, depending on different VAC input and V_{dc} output. These three points(T_c, T_{c1}, T_{c2}) position are shown in below mechanical drawing.

4.0-10V and PWM Dimming Specifications

(320HBL260CDL/320HBL260CDL-K/320HBL260CDL-K0)

Parameter	Min.	Typ.	Max.	Unit	Notes
Absolute Maximum Voltage on the Vdim (+) Pin	-1	-	15	V	
Source Current on Vdim (+)Pin	90	100	110	uA	
Dimming Output Range	-	10 I _{o set}	I _{o set}	%	50%I _{o max} ≤ I _{o set} ≤ 100%I _{o max}
	-	5 I _{o max}	I _{o set}	%	I _{o set} < 50%I _{o max}
Recommended Dimming Input Range	0	-	10	V	Default 0-10V dimming mode.
Dim off Voltage	0.3	0.5	0.8	V	
Dim on Voltage	0.5	0.7	1	V	
Dim off Resistance	3	5	8	kΩ	
Dim on Resistance	4	7	10	kΩ	
Hysteresis	-	0.2	-	V	
PWM_in High Level	9.5	10	10.5	V	
PWM_in Low Level	-0.3	-	0.6	V	
PWM_in Frequency Range	0.5	-	3	KHz	
PWM_in Duty Cycle	1	-	100	%	
PWM Dimming off	3	5	8	%	
PWM Dimming on	4	7	10	%	

5.Isolation

Isolation	AC Input	DC Output	Dimming (Class 2)	Housing
AC Input	/	No isolation	Double isolation	Basic
DC Output	No isolation	/	Double isolation	Basic
Dimming (Class 2)	Double isolation	Double isolation	/	Basic
Housing	Basic	Basic	Basic	/

6.Safety & EMC Compliance

Safety Category	Standard
UL/CUL	UL8750,CAN/CSA-C22.2 No. 250.13-12
ENEC&CE	EN61347-1, EN 61347-2-13
CE	IEC 61347-1
Dielectric Strength(Hi-pot)	Input to Earth: 1554 VAC/60 seconds 10mA max or 1864VAC / at least 1second10mA max.
	Output to Earth: 1900 VAC/60 seconds 10mA max.
	Input to Dimming: 3108 VAC/60 seconds 10mA max.
	Output to Dimming: 3800 VAC/60 seconds 10mA max.
	Dimming to Earth: 500 VAC/60 seconds 10mA max.
Insulation Resistance	50Mohm min.@ primary to secondary add 500VDC test voltage
Grounded Resistance	0.1Ωmax. @ 25A, 1 minute
EMI Standards	Notes

EN55015	Class B
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired Operation.
EMS Standards	Notes
EN 61000-4-2	Electrostatic Discharge (ESD): 8 kV air discharge, 4 kV contact discharge, criteria B
EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-RS, criteria A
EN 61000-4-4	Electrical Fast Transient / Burst-EFT: level 3, criteria B
EN 61000-4-5	Surge Immunity Test: AC Power Line: line to line 6kV, line to earth 10kV, criteria B
EN 61000-4-6	Conducted Radio Frequency Disturbances Test-CS, criteria A
EN 61000-4-11	Voltage Dips, criteria B
EN IEC 61547	Electromagnetic Immunity Requirements Applies To Lighting Equipment

Note5: This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.

7. Performance Curve

7.1. Inrush Current Curve



Figure 1. Inrush Current @ full load and cold start

V _{in} (VAC)	F _{LINE} (Hz)	Spec(A)	I _{PK_INRUSH} (A)	T _{DURATION} (ms)	I _{2T} (A ² S)
230	50	100	89.6	0.724	2.91

Note6: Test equipment: Regenerative Grid Simulator IT7803-350-30U.

7.2. Derating Curve

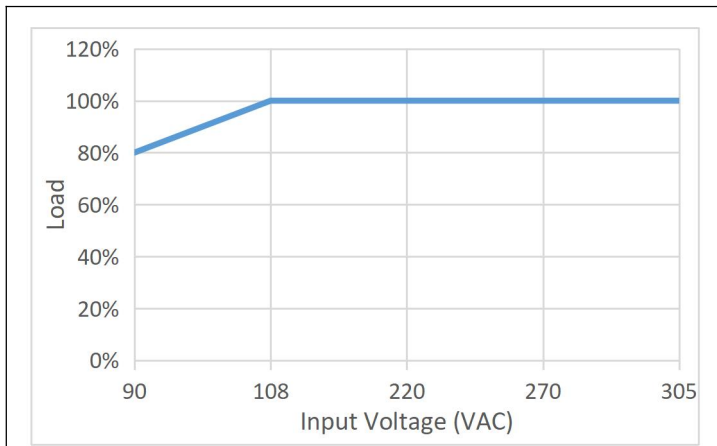


Figure 2. Input Voltage Derating Curve

7.3. Lifetime Curve

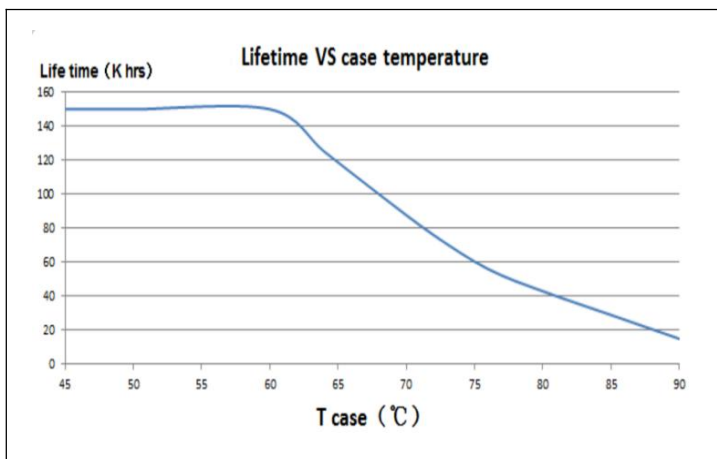


Figure 3. Life vs Case Temperature

7.4. Operation Range Curve

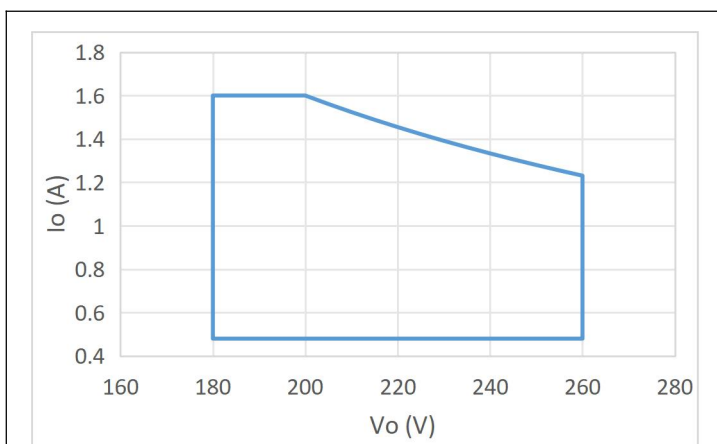


Figure 4. I/V Operating Area

7.5.General Performance Curve

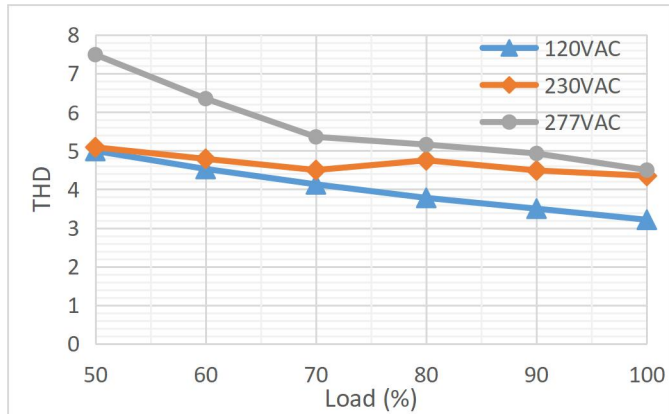


Figure 5.Total Harmonics vs Different Loads

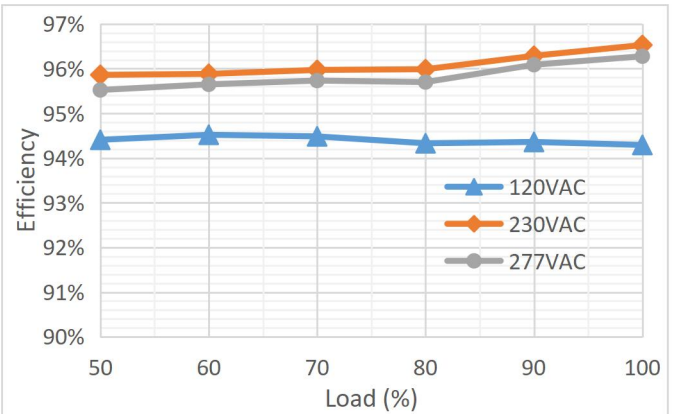


Figure 6.Efficiency vs Different Loads

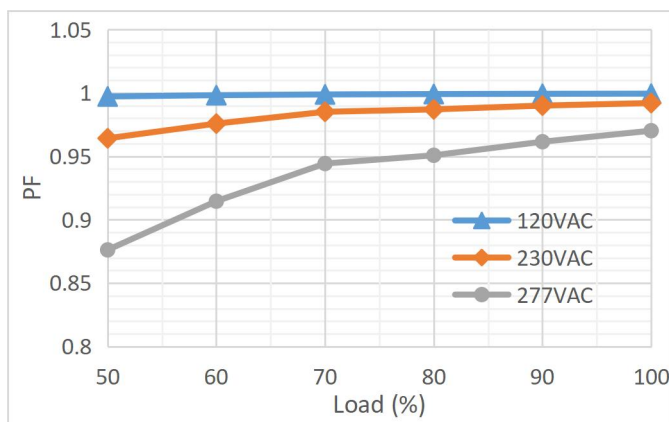


Figure 7.Power Factor vs Different Loads

7.6.0-10V Analog Dimming &PWM Dimming

(320HBL260CDL/320HBL260CDL-K/320HBL260CDL-K0)

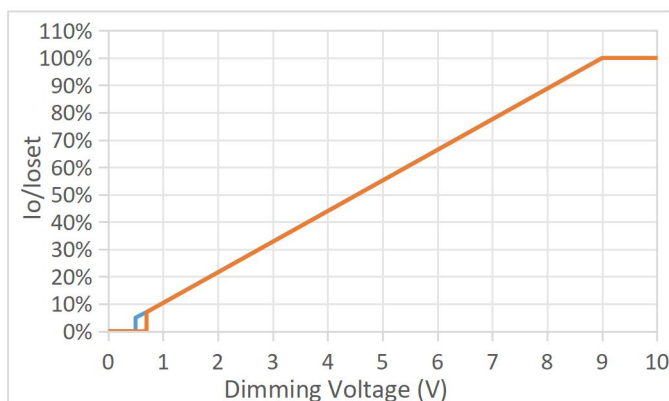


Figure 8.Io/IoSet vs Dimming Voltage

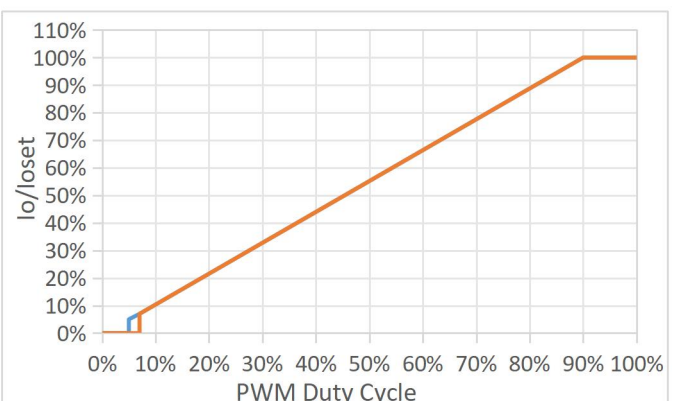


Figure 9.Io/IoSet vs PWM Duty Cycle

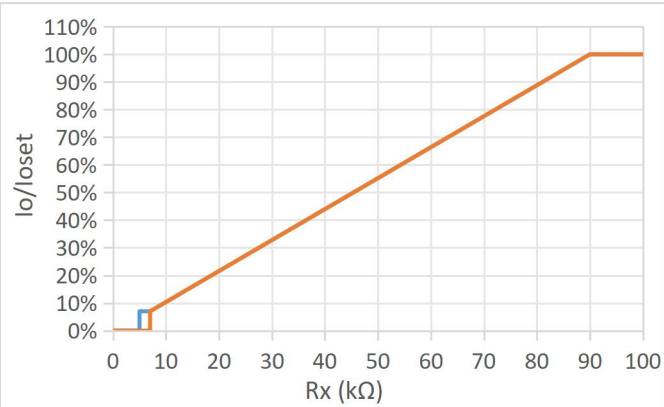


Figure 10. Io/Ioset vs Rx

7.7. Potentiometer Or Dip-switch Program Output Current

When DSW is connected to the voltage:

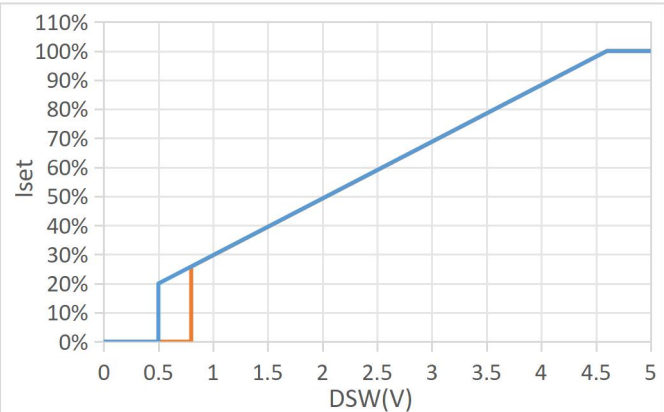
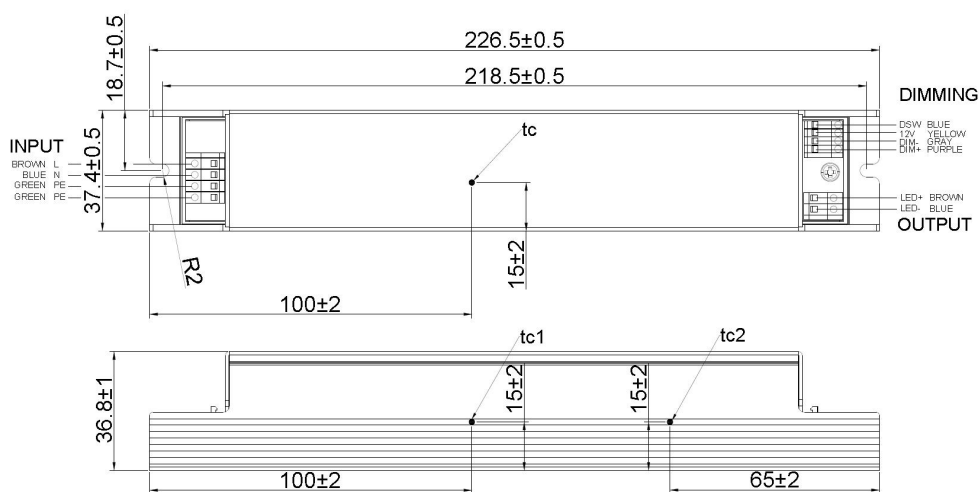


Figure 11. Iset vs DSW

8. Mechanical Specification



Unit:mm

Figure 12. Mechanical Drawing

9.Revision History

Change Date	Rev.	Description of Change		
		Item	From	To
2024/5/9	V1.0			
2024/6/28	V1.1	Update Mechanical Drawing		
2024/12/4	V1.2	Add Potentiometer Or Dip-switch Program Output Current/Inrush Current		
		PF	At 120-277Vac, 60%-100% load	At 120-277Vac, 70%-100% load
		Line Regulation	Max: 3%	Max: 4%
		Load Regulation	Max: 3%	Max: 4%
		Dimming Output Range	Min: 10%Io set; Typ: - Min: 8%Io max; Typ: -	Min: -, Typ: 10%Io set; Note: 50%Io max ≤ Io set ≤ 100%Io max Min: -, Typ: 5%Io max Note: Io set < 50%Io max
		Operating Case Temperature Tc	Note:Recommended bottom side installation	Note:Tc must be controlled between this range, add heat sink or other way to help heat dissipation if necessary.
		Operating Ambient Temperature Ta	Note:At 200-305Vac input, other voltage Ta 40°C max.	Note:At 200-305Vac input, other voltage Ta 40°C max. Ta range is just a reference, it will change depend on different installation.
		PWM Dimming on	Min:5%	Min:4%
		Add THD/PF/EFF curve		
		Add Dielectric Strength(Hi-pot)/Grounded Resistance		
		Output Current Range	0.48-1.6A	0.16-1.6A
		Temperature Coefficient of Io set	±0.03%/°C	±0.05%/°C
		Update Mechanical Drawing		Add DSW
2024/12/9	V1.3	Output Current Range	0.16-1.6A	0.48-1.6A
		Update Potentiometer Or Dip-switch Program Output Current		
		Dielectric Strength(Hi-pot)	Primary to Earth: 1600Vac/60 seconds 10mA max.	Primary to Earth: 1900Vac/60 seconds 10mA max.
		Turn-on Delay Time		Add 25°C condition
		Add Net Weight		
		Delete Built-in potentiometer to adjust the output current		
		Add I2T		
		Line Regulation/Load Regulation		Add 25°C condition

2025/1/10	V1.4		Inrush Current	Inrush Peak Current
		Inrush Peak Current	Typ: 70A(Note: At 230Vac input, 25°C cold start.)	Max: 90A(At 230Vac input, 25°C cold start. See Inrush Current Waveform for the details.)
		Update Inrush Current (@Full load and cold start)		
		Delete OCP		
		Dielectric Strength(Hi-pot)	Primary to Earth: 1900Vac/60 seconds 10mA max.	Input to Earth: 1554Vac/60 seconds 10mA max. Output to Earth: 1900Vac/60 seconds 10mA max.
			Primary to Dimming: 3800Vac/60 seconds 10mA max.	Input to Dimming: 3108Vac/60 seconds 10mA max. Output to Dimming: 3800Vac/60 seconds 10mA max.
		Delete Note 7 : If $I_{o\text{set}} < 0.2A$, the minimum I_o will be limited to 0.02A.		
		Add Insulation Resistance/ $I_o/I_{o\text{max}}$ vs Rx/IP Grade		
		OTP T_c	Note: Output current will drop to 50% lowest	Note: Output current will drop
		Input Specifications		Add efficiency
		PF	Note: At 120-277Vac, 70%-100% load	Note: At 120-277Vac, 70%-100% load, 25°C and 60Hz
		THD	Note: At 120-277Vac, 60%-100% load	Note: At 120-277Vac, 60%-100% load, 25°C and 60Hz
		Total Output Current Ripple (pk-pk)	Note: At 25°C and full load condition, 200Hz BW	Note: At 25°C and full load condition, 8kHz BW
		Startup Overshoot Current	Max: 10% I_o max(Note: At 25°C and full load condition)	Max: 20% I_o max(Note: At 25°C and full load condition, 8kHz BW)
		Update input current	Typ: 2.8A(120Vac); Typ: 1.5A(230Vac); Typ: 1.22A(277Vac)	Max: 2.85(120Vac); Max: 1.55(230Vac); Max: 1.25(277Vac);
2025/1/13	V1.5	Add Resistance dimming/Dim off Resistance/Dim on Resistance		
2025/3/12	V1.6	Delete Programmable output current range by potentiometer.		
		Input AC Current		Max:3.16A(Measured at full load and 120 Vac input.) Max:1.65A(Measured at full load and 230 Vac input.)

				Max:1.37A(Measured at full load and 277 Vac input.)
		Inrush Peak Current	Max: 90A	Max: 100A
		Net Weight/pcs	Typ: 400g	Typ: 410g
		Update THD/PF/efficiency Curve		
		SCP	Shut down, recovers automatically after fault condition is removed	Recovers automatically after fault condition is removed
		12V Auxiliary Output Voltage	Max: 15V	Max: 16V
		Update Potentiometer Or Dip-switch Program Output Current		
		Update Mechanical Drawing		
2025/3/13	V1.7	Update 0-10V Analog Dimming &PWM Dimming		
2026/8/7	V1.8	Modify:format		
		Isolation	Dimming (SELV)	Dimming (Class 2)
		EMS Standards	EN 61547	EN IEC 61547
2026/8/20		Dielectric Strength(Hi-pot)	Input to Earth: 1554 VAC/60 seconds 10mA max.	Input to Earth: 1554 VAC/60 seconds 10mA max or 1864VAC / at least 1second10mA max.