LED Drivers / LED Control Gear

USCO-PRO Series

USCO-PRO

Highlights & Features

- Constant current design
- Universal AC input voltage from 99-305Vac
- High efficiency up to 95%
- Wide operating temperature range -40ºC ~ +60ºC
- With IP67 protection for most outdoor applications
- Built-in Active PFC and conforms to harmonic current IEC/EN 61000-3-2, Class C
- Adjustable constant current level through program tool
- Common mode 6kV and differential mode 6kV surge immunity
- Suitable for Dry / Damp / Wet location
- 5 years warranty

Safety Standards

E336604

CB Certified for worldwide use

General Description

Delta LED drivers come in different series to suit different application needs. The USCO-PRO series features program output current level. All the models come in full corrosion resistance aluminum casing and major international safety certifications. USCO-PRO series offers the capability to achieve different level of LED brightness via built-in 1-10V dimming function to meet various application and energy optimization needs. The products are designed and rigorously tested to work with various indoor and outdoor LED lighting conditions. Featuring high surge immunity (CM: 6kV, DM: 6kV) and complying to IP67 make Delta USCO-PRO series an essential part of an energy efficient LED lighting power solution for both indoor and outdoor applications.

Model Information

Model Number	Input Voltage Range	Output Voltage	Program Output Current Range	Constant Power Current Range
USCO-075140G□□□	110-277Vac Typical (99-305Vac) Range 110-277Vac (for North America) 220-240Vac (for European Union/Europe)	36-107Vdc	500 – 1400mA	700 – 1400mA
USCO-100140G□□□		47-143Vdc	600 – 1400mA	700 – 1400mA
USCO-150140G□□□		72-214Vdc	600 – 1400mA	700 – 1400mA
USCO-200140G□□□		75-190Vdc	600 – 1400mA	1050 – 1400mA
USCO-250140G□□□		90-238Vdc	600 – 1400mA	1050 – 1400mA
USCO-320210G□□□		90-225Vdc	700 – 2100mA	1400 – 2100mA

Model Numbering

USCO –	□□□	□□□	□	□	□□
LED Driver	Output Power 075: 75W 100: 100W 150: 150W 200: 200W 250: 250W 320: 320W	Maximum Output Current 140: 1400mA 210: 2100mA	Dimming Type G – Programmable	Variable A or C– 0-10V DIM & +12V/50mA	Variable

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Specifications

Model Number		USCO-075140GA	USCO-100140GA	USCO-150140GC	USCO-200140GA	USCO-250140GA	USCO-320210GA
Input Ratings / Characteristics							
Nominal Input Voltage		110-277Vac (99-305Vac)					
Nominal Input Frequency		50-60Hz (47-64Hz)					
Power Factor		Full Load: >0.98@110/120Vac, >0.95@230Vac, >0.92@277Vac; >70% Load: >0.90@110/120/230Vac; >50% Load: >0.90@277Vac;					
Total Harmonic Distortion		THD<20% with load≧50% at 110/120/230Vac input and load≧75% at 277Vac input					
Max. Input Current	110Vac	0.78A	1.04A	1.67A	2.1A	2.6A	3.23A
Efficiency at 100% Load (Typical), Tested after 30 minutes warm up.	120Vac	90%@0.7A	90.5%@0.7A	91.5%@0.7A	93%@1.05A	93.0%@1.05	93%@1.4A
	230Vac	92%@0.7A	92.5%@0.7A	93.0%@0.7A	94%@1.05A	94.5%@1.05	94.5%@1.4A
	277Vac	92%@0.7A	93.0%@0.7A	93.0%@0.7A	94%@1.05A	94.5%@1.05	94.5%@1.4A
Inrush Current (Apk / 50%-us) (Cold Start)	120Vac	40A/250uS	40A/250uS	60A/250uS	120A/200uS	140A/150uS	90A/250uS
	230Vac	65A/250uS	65A/250uS	110A/250uS	180A/200uS	280A/150uS	180A/250uS
	277Vac	80A/250uS	80A/250uS	130A/250uS	220A/200uS	320A/150uS	220A/250uS
Max. No.of drivers MCB at 230Vac	B16	8	8	5	4	2	3
	C16	14	12	8	6	4	5
Leakage Current		<0.7mA peak @ 277Vac					
Standby Power		<0.5W @ Dim to off, 230Vac & 277Vac					
Input Over-voltage		Can survive input over-voltage stress of 320VAC for 48 hours and 350VAC for 2 hours					
Output Ratings / Characteristics							
Output Power		75W	100W	150W	200W	250W	320W
Output Voltage		36-107Vdc	47-143Vdc	72-214Vdc	75-190Vdc	90-238Vdc	90-225Vdc
Max. No Load Output Voltage		120Vrms	150Vrms	250Vrms	230Vrms	250Vrms	250Vrms
Adjustable Output Current (AOC)		500-1400mA	600-1400mA	600-1400mA	600-1400mA	600-1400mA	700-2100mA
		With steps of 1 mA, configurable via software					
Minimum Output Current		100mA (Min dim level)					
Current Accuracy		± 5% (@ Typical output current range)					
Line / Load Regulation		± 1% (@ 110-277Vac input) / ± 3% (@ Min-Max output voltage)					
Output Current LF Ripple		5% (ripple = peak-average/average) at full load					
Start-up Time		500ms max. @ 110-277Vac (full load)					
Hold-up Time		16ms typ. @ 110-277Vac (full load)					

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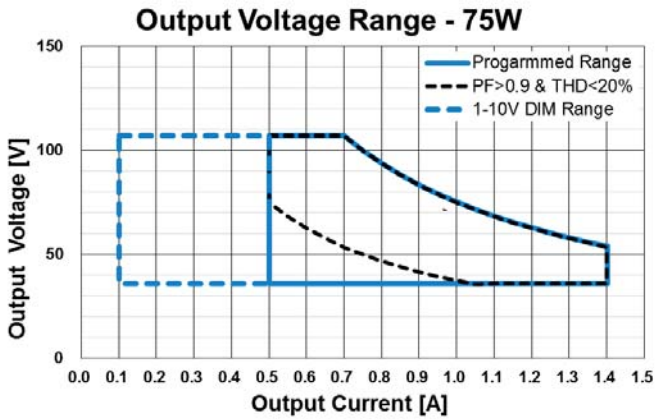
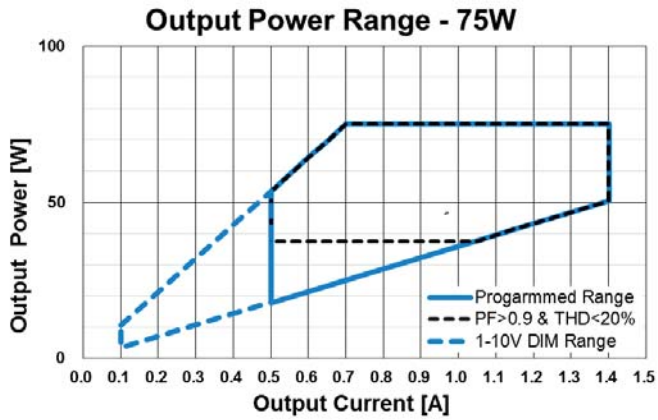
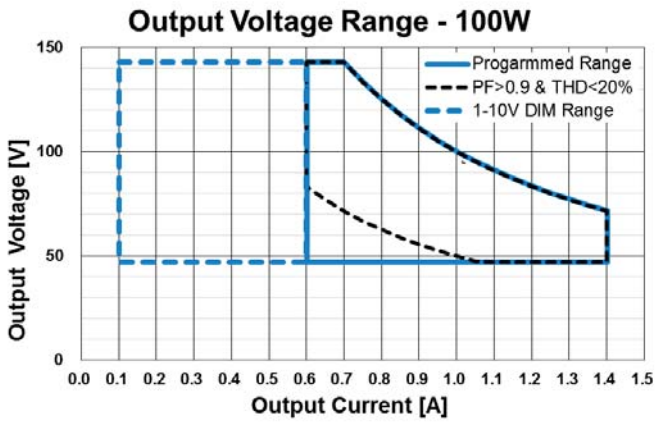
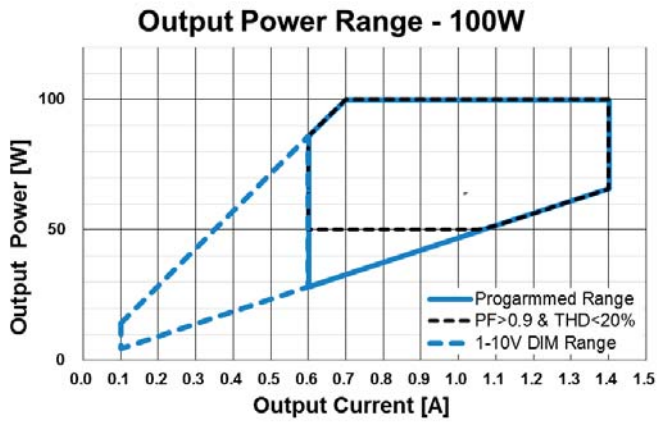
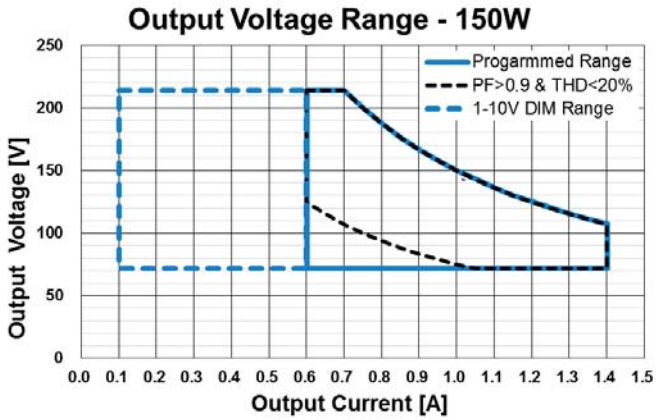
Operational Window

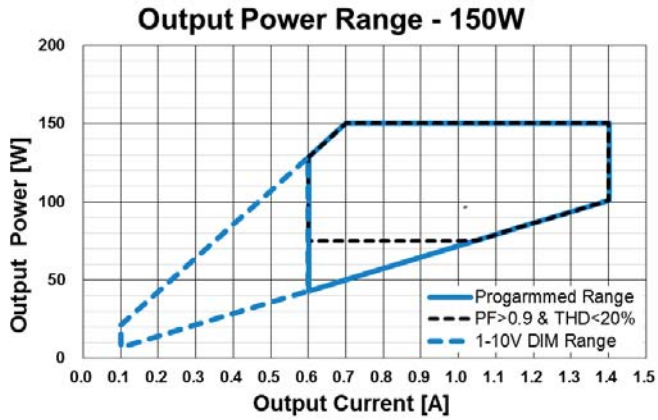












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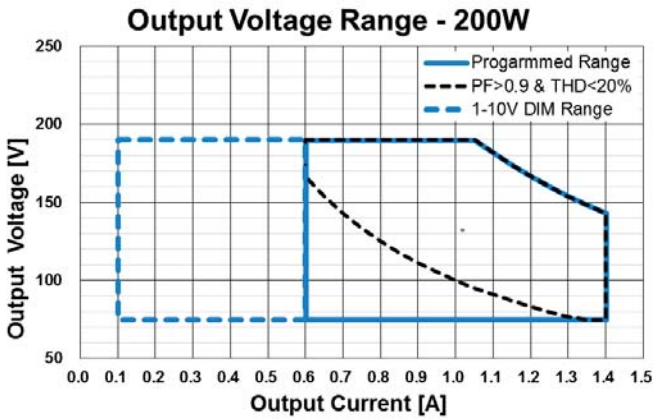
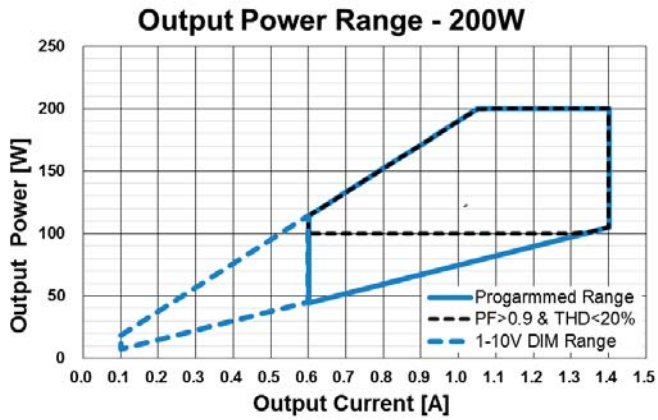
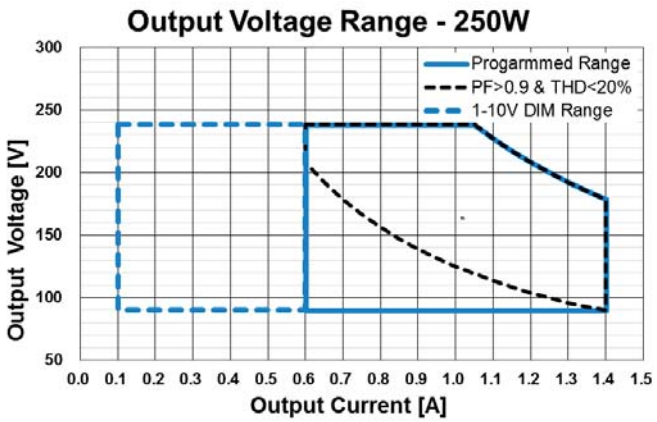
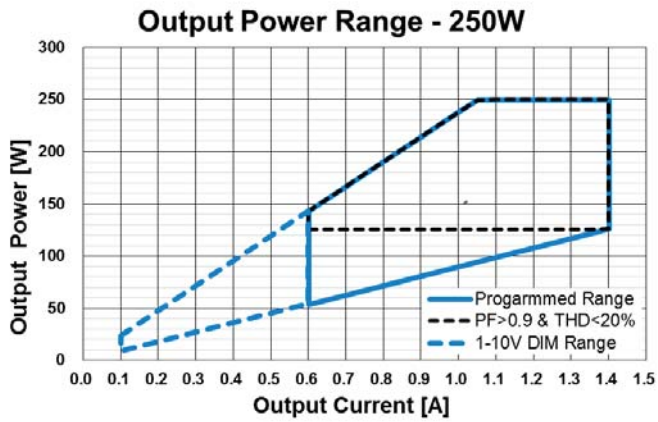
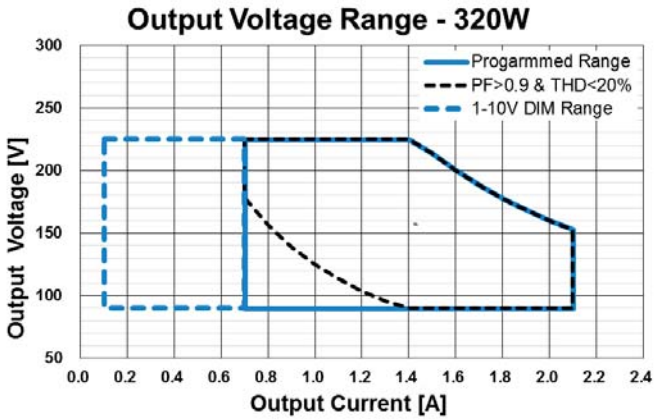
Operational Window

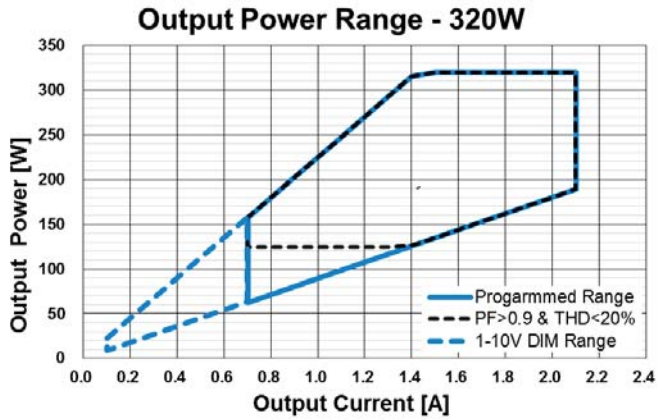












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Specifications

Model Number		USCO-075140GA	USCO-100140GA	USCO-150140GC	USCO-200140GA	USCO-250140GA	USCO-320210GA
Mechanical							
Casing		Aluminum, color : Natural					
Dimensions (L x W x D) mm		174*68*37	174*68*37	220*68*37	240*68*37	240*68*37	240*100*38
Unit Weight (gram)		900	900	1100	1200	1300	2000
Noise (30cm distance)		Sound Pressure Level (SPL) < 24dBA					
Wire	Input	Line: Brown, Neutral: Blue, PE: Yellow/Green, Cable Length 300mm					
	Output	Positive: Brown, Negative: Blue; NTC/PRG: Black; Cable Length 300mm					
	Dimming	Dim(+): Violet, Dim(-): Gray, +12V: Black/White, Cable Length 300mm					
Environment							
Ambient Temperature	Operating	-40˚C to +60˚C (+60˚C ~ +70˚C Load de-rating)				-40˚C~ +55˚C	-40˚C~ +50˚C
	Storage	-40˚C to +85˚C					
Maximum Case Temperature		+85˚C	+85˚C	+85˚C	+90˚C	+90˚C	+90˚C
Power De-rating		>60˚C(75/100/150/200W), >55˚C(250W), >50˚C(320W) de-rating power & <110Vac de-rating power “OUTPUT LOAD VS INPUT VOLTAGE” & “OUTPUT LOAD VS AMBIENT TEMPERATURE”					
Humidity	Operating	10 to 90% RH (Non-Condensing)					
	Storage	5 to 95% RH (Non-Condensing)					
Shock Test (Non-Operating)		IEC 60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions					
Vibration (Non-Operating)		IEC 60068-2-6, Random: 5Hz to 500Hz (2.09G); 20 min per axis for all X, Y, Z direction					
Protections							
Over Voltage		108-120Vdc	144-160Vdc	215-250Vdc	191-230Vdc	239-250Vdc	226-250Vdc
		Auto-Recovery when the fault is removed					
Over Load		Reduce output current. Auto-Recovery when the fault is removed					
Over Temperature		Reduce output current. Auto-Recovery when the fault is removed					
Output Short Circuit		Auto-Recovery when the fault is removed					
Suitable for Luminaires Class		Class I. Insulation Class according to IEC60598					
Reliability Data							
Lifetime		50,000 hours at case temp. tc= +80˚C & full load. Refer to “LIFETIME VS CASE TEMPERATURE”					
MTBF		500 khours at ta=+50˚C (75-250W), ta=+45˚C (320W), Telcordia SR-332.					
Warranty life		5 years at ta=+50˚C (75-250W), ta=+45˚C (320W)					

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Model Number	USCO-075140GA	USCO-100140GA	USCO-150140GC	USCO-200140GA	USCO-250140GA	USCO-320210GA

Certificates and standards

Safety	CB scheme to IEC 61347-1, IEC 61347-2-13 (independent) ENEC to EN 61347-1, EN 61347-2-13 UL/cUL (cRUus) to UL 8750, type"HL" & type"TL" Compliance to IEC/EN/UL 60950-1 SELV for 75W
CE	In conformance with EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC

Galvanic Isolation		Mains (Input)	Earth (Case)	Output/PROG	DIM +/- & +12V
	Mains (Input)	N/A	1875V	3750V	3750V
	Earth (Case)	1875V	N/A	1875V	1875V
	Output/PROG	3750V	1875V	N/A	1875V
	DIM +/- &+12V	3750V	1875V	1875V	N/A

EMC Compliance

EMC / Emissions	Compliance to EN 55015:2013 Class B; 47 CFR FCC Part 15, Subpart B, Class B	
Immunity to	Compliance to EN 61547:2009	
Electrostatic Discharge	IEC 61000-4-2:2008 ED.2.0	ESD, Criteria A[1] or B[2] Air Discharge: 8kV Contact Discharge: 4kV
Radiated Field	IEC 61000-4-3:2010 ED.3.2	RS, Criteria A[1] 80MHz-1GHz, 3V/m with 1kHz Sine Wave / 80% AM Modulation
Electrical Fast Transient / Burst	IEC 61000-4-4:2012 ED.3.0	EFT, Criteria A[1] or B[2] 1kV
Surge	IEC 61000-4-5:2014 ED.3.0	Criteria A[1] or B[2] Common Mode[3]: 6kV; Differential Mode[4]: 6kV 1.2/50μs, 8/20μs Combination Wave with 2ohms (L-N), 12ohms (L-PE & N-PE) source impedance
Conducted	IEC 61000-4-6:2013 ED.4.0	CS, Criteria A[1] 150kHz-80MHz, 3Vrms
Power Frequency Magnetic Fields	IEC 61000-4-8:2009 ED.2.0	PFMF, Criteria A[1] 3A/Meter
Voltage Dips	IEC 61000-4-11:2004 ED.2.0	Criteria A[1] or B[2] ; 100% dip; 0.5 cycle; Self Recoverable 30% dip; 10 cycle; Self Recoverable
Harmonic Current Emission	IEC 61000-3-2:2014	Class C (230Vac @ ≥ 50% load)
Voltage Fluctuation & Flicker	IEC 61000-3-3:2013	

1. Criteria A: Normal performance within the specification limits
2. Criteria B: Temporary degradation or loss of function which is self-recoverable
3. Asymmetrical: Common mode (Line to earth)
4. Symmetrical: Differential mode (Line to line)

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Model Number	USCO-075140GA	USCO-100140GA	USCO-150140GC	USCO-200140GA	USCO-250140GA	USCO-320210GA
1-10V Dimming Specification						
Absolute Maximum Voltage	+/- 20V					
Source Current	200uA +/- 50uA					
Dimming Input Range	1) 0-10V, 1.2V (+/-0.1V) is 10% of Io_set or 100mA minimum,≥8.5V is 100% of Io_set. 2) Lower than 1.1V (+/-0.1V) → Dim to off is programmable. 0.1V Hysteresis. 3) Short is 0% (dim to off) 4) Open is 100% 5) See 0-10V Dimming Curve					
Dimming Current Tolerance	+/- 10% of maximum setting output current. Ex. Io_set=1000mA, tolerance is +/-100mA.					
Default settings of the driver (can be changed with programmer tools)						
Adjustable Output Current (AOC)	700mA	700mA	700mA	1050mA	1050mA	1400mA
0-10V DIM	Enabled (DIM to OFF). Selectable for Min. Dim Level and Min. & Max. Dim Voltage though Tools					
Smart Time DIM	Disabled (Only one function will be enabled between 0-10V & Smart Time Dim)					
Module Temperature Protection (MTP)	Disabled. Settable though programmable tools					
Constant Lumen Output (CLO)	Disabled. Settable though programmable tools.					
End of Life indication (EOL)	Disabled. Settable though programmable tools					
DALI	Not ready (Plan for GB version), According IEC 62386 -101/102/207					
Auxiliary Output Voltage						
+12V Output Range	+12Vdc (10.8 – 13.2Vdc)					
+12V Output Current	50mA					
Maximum Output Power	0.6W					

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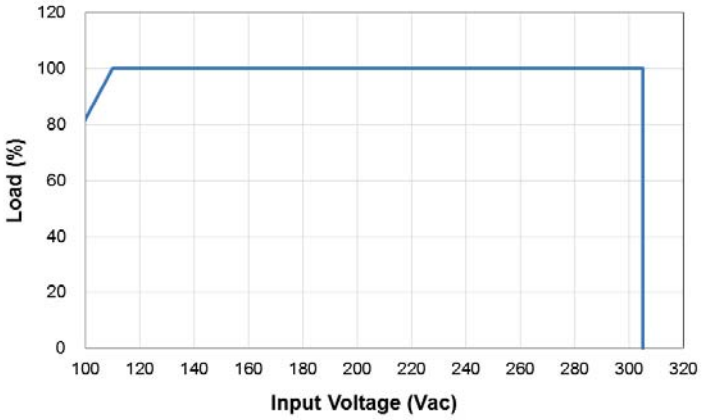
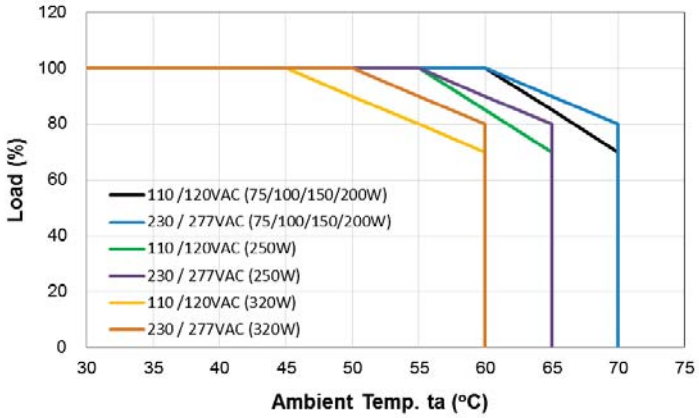
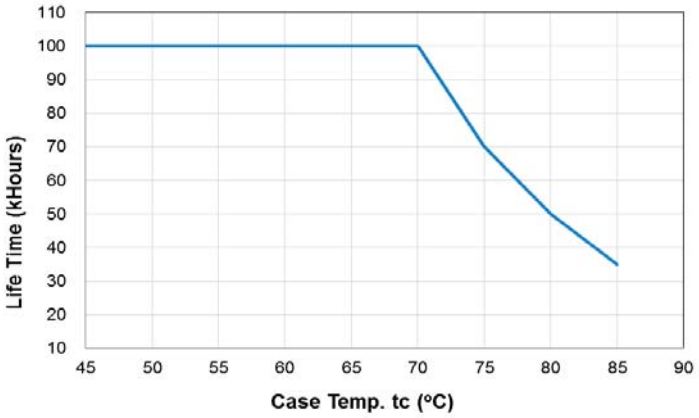
- OUTPUT LOAD VS INPUT VOLTAGE



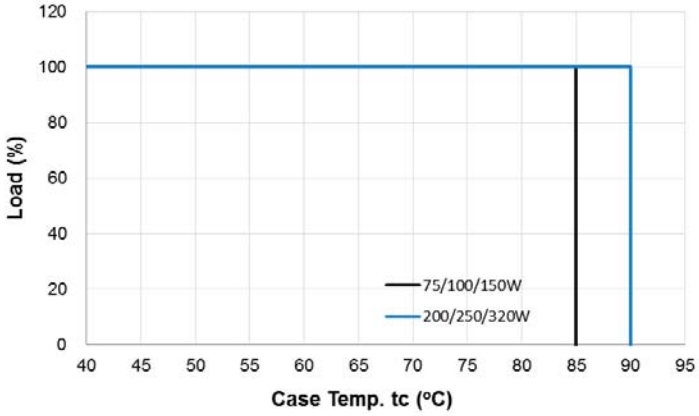
- OUTPUT LOAD VS AMBIENT TEMPERATURE



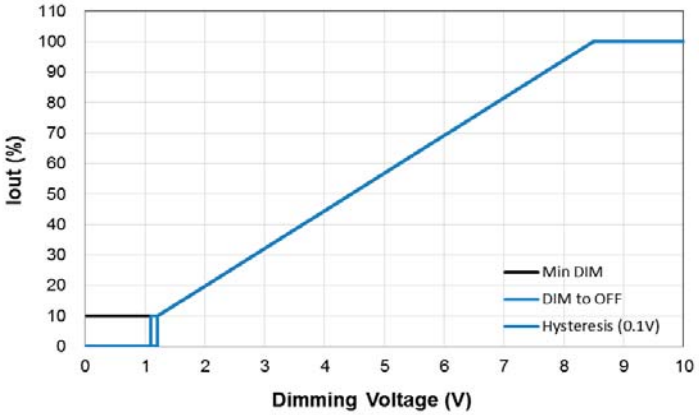
- LIFETIME VS CASE TEMPERATURE



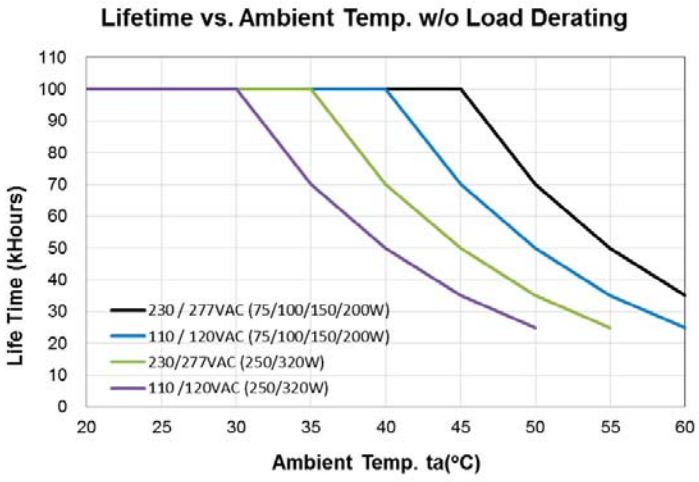
- OUTPUT LOAD VS CASE TEMPERATURE



- DIMMING CURVE



- LIFETIME VS AMBIENT TEMPERATURE



All information and specifications are subject to change without prior notice.
All parameters are specified at 25°C ambient unless otherwise indicated.

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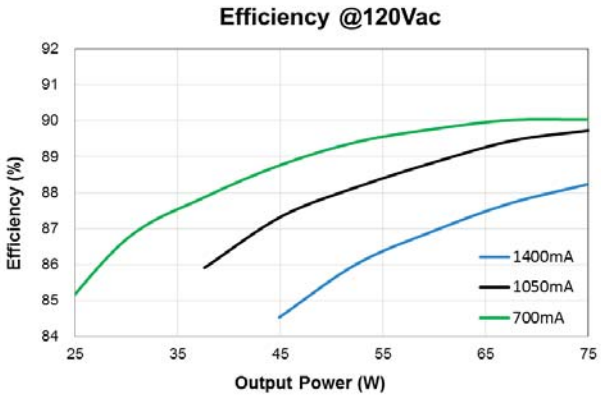
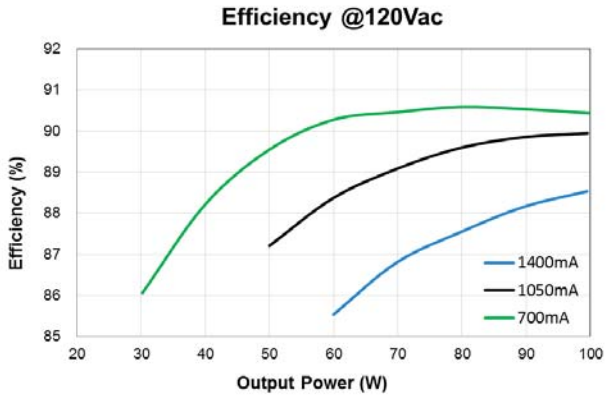
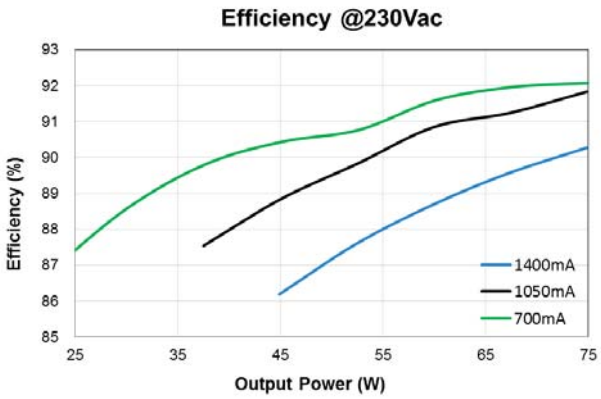
- EFFICIENCY versus OUTPUT POWER

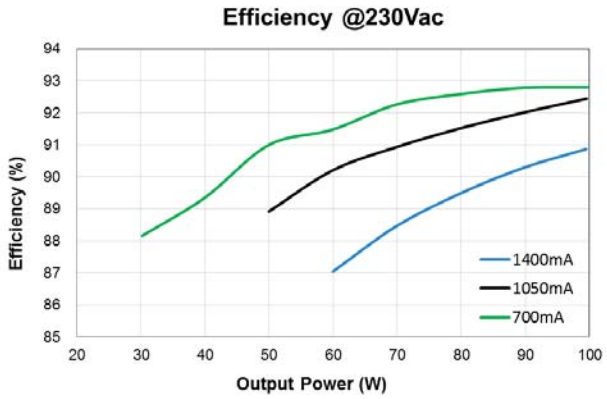
USCO-075140GA – 75W

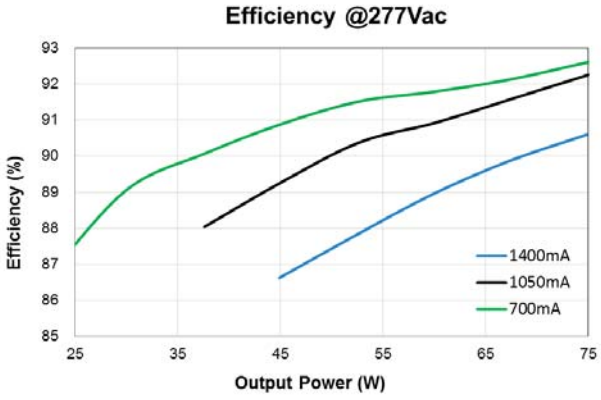


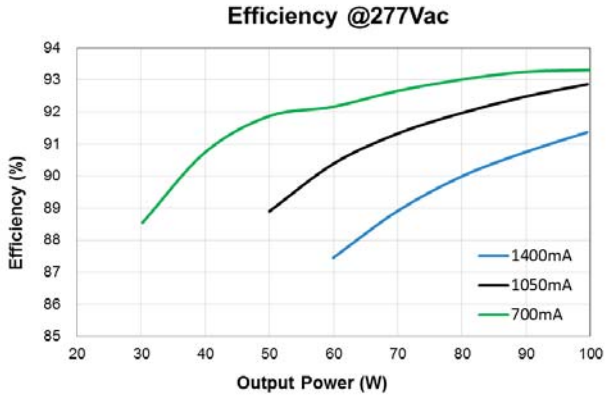
USCO-100140GA – 100W











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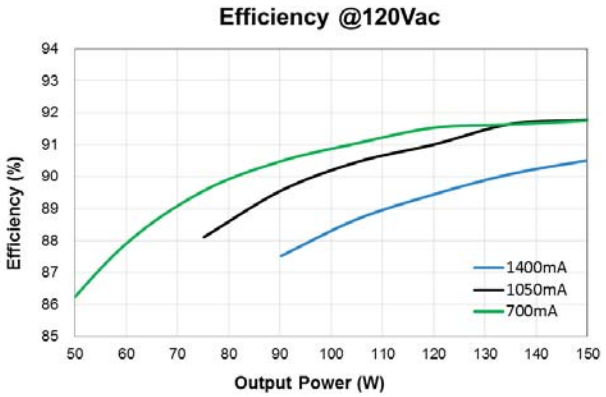
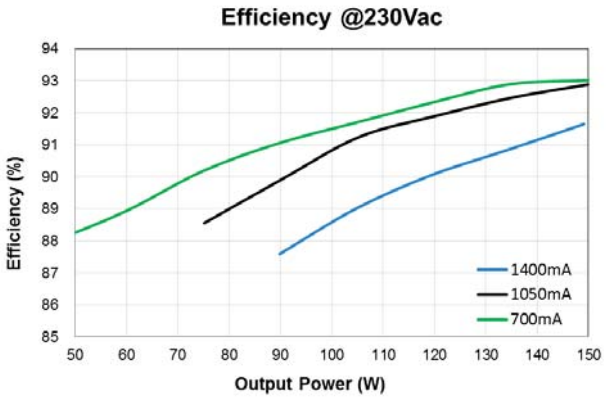
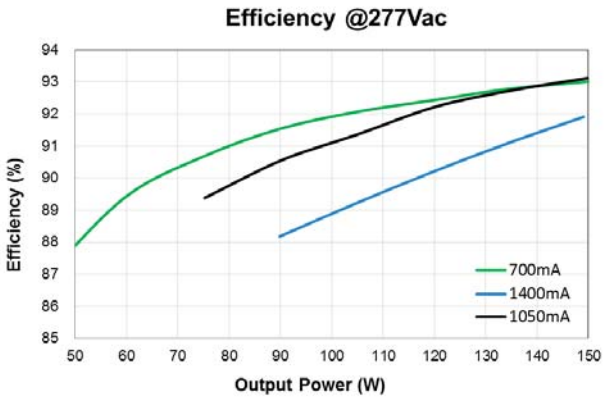
- EFFICIENCY versus OUTPUT POWER

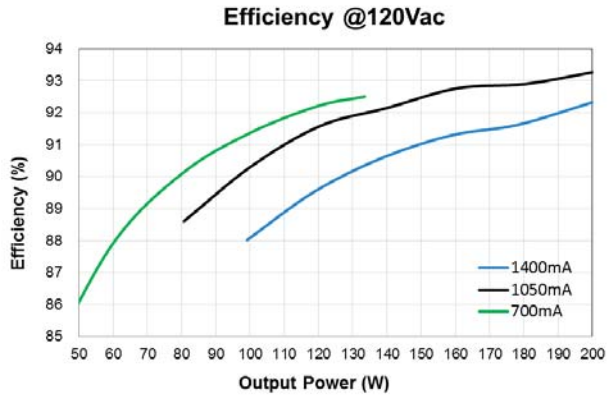
USCO-150140GC – 150W

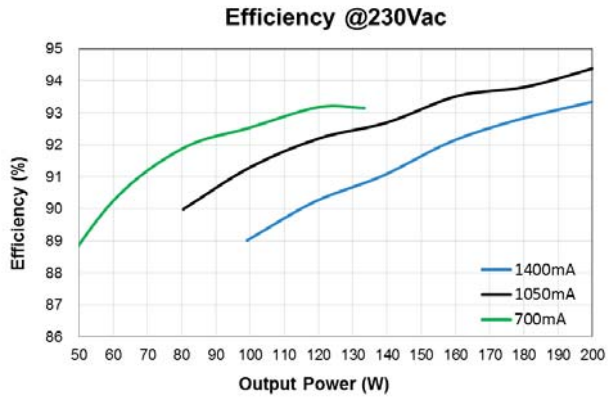


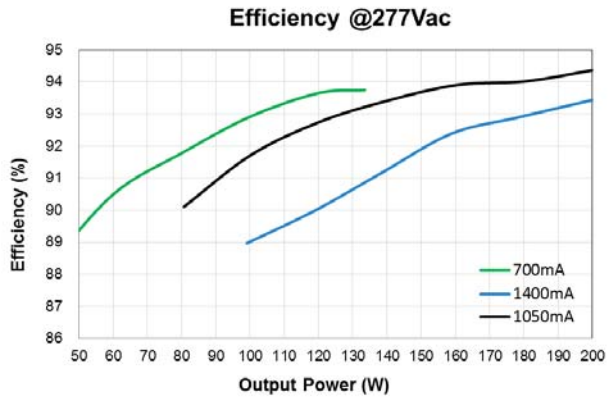




USCO-200140GA – 200W



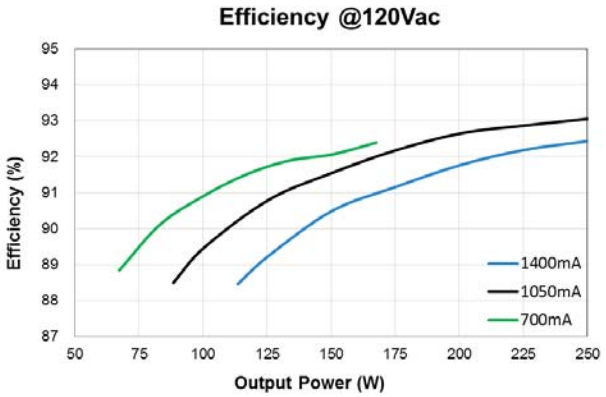




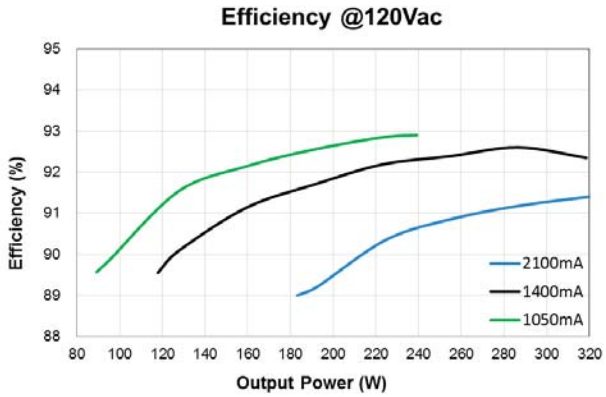
LED Drivers / LED Control Gear
USCO-PRO Series

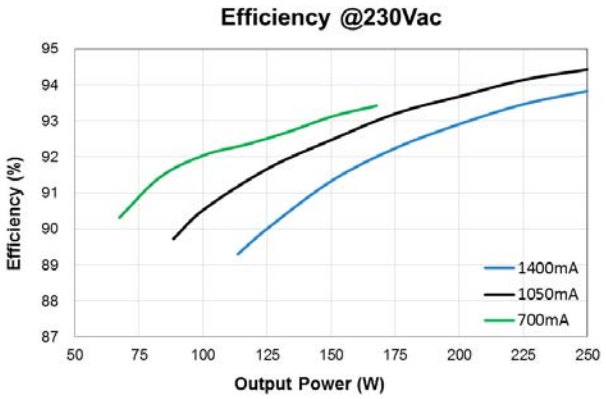
- EFFICIENCY versus OUTPUT POWER

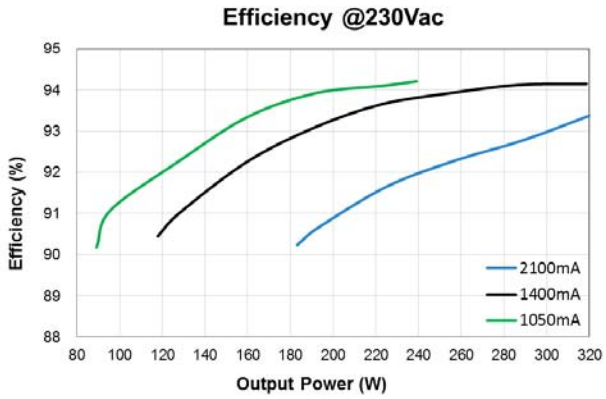
USCO-250140GA – 250W

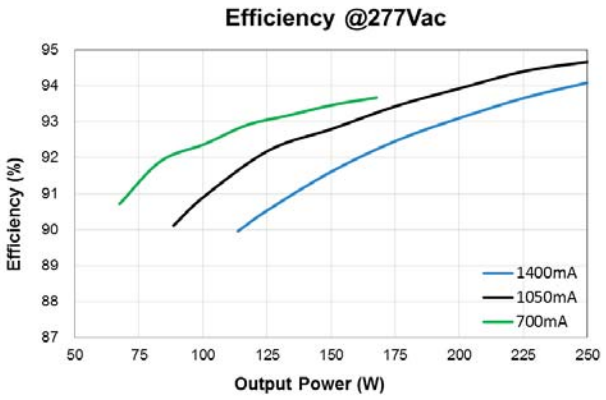


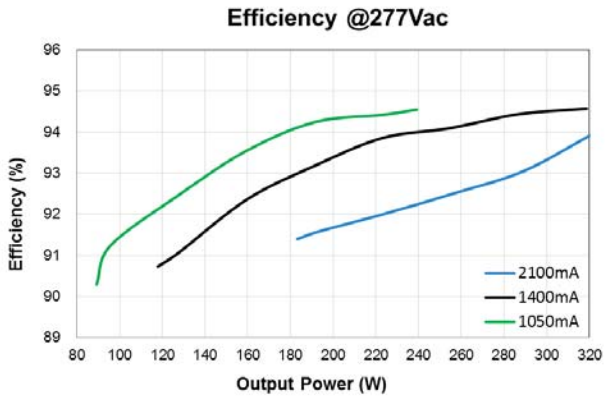
USCO-320210GA – 320W







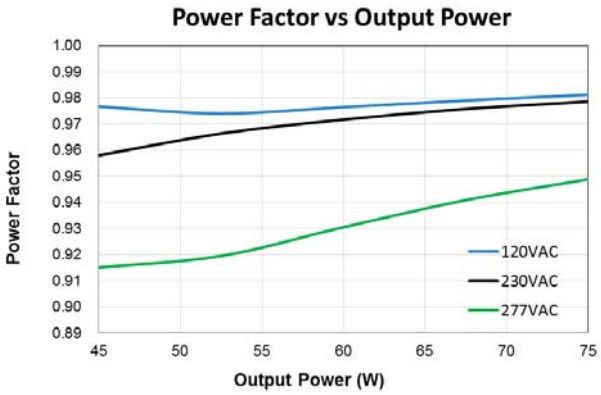


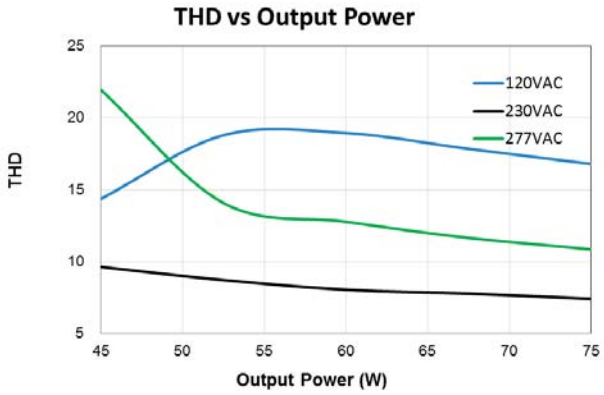


LED Drivers / LED Control Gear
USCO-PRO Series

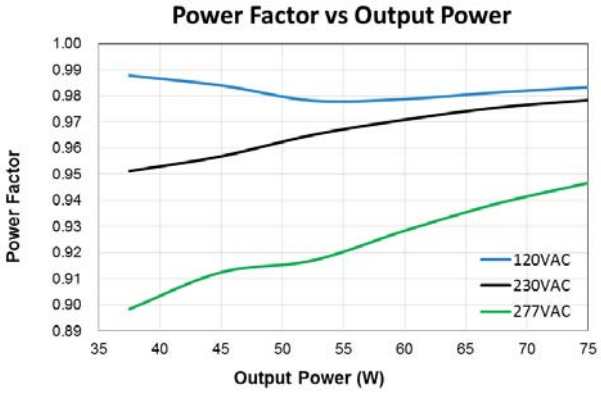
- POWER FACTOR versus OUTPUT POWER
- TOTAL HARMONIC DISTORTION versus OUTPUT POWER

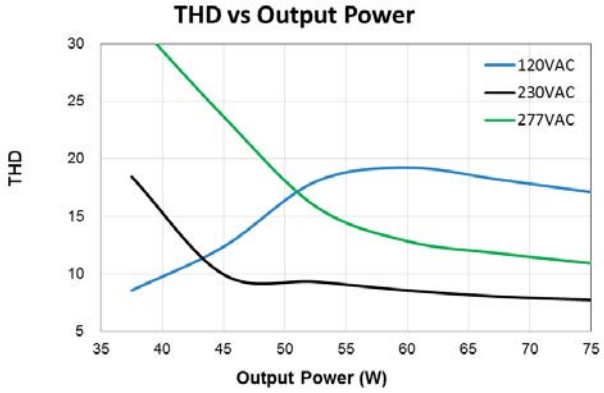
- USCO-075140GA – 1400mA



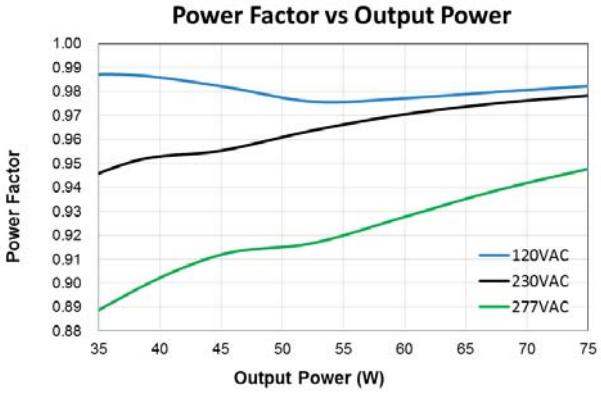


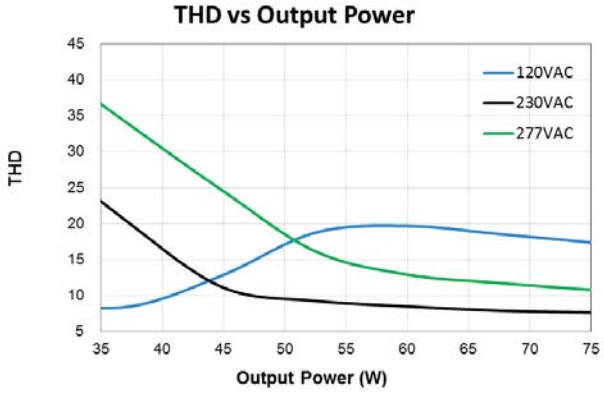
- USCO-075140GA – 1050mA





- USCO-075140GA – 700mA

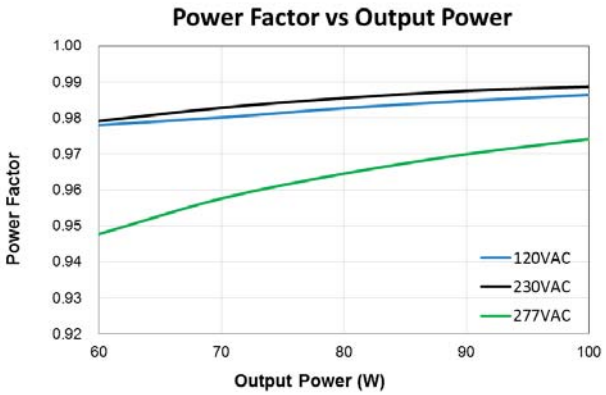


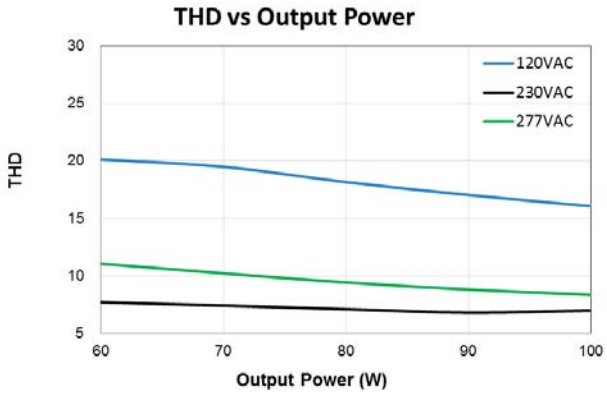


LED Drivers / LED Control Gear
USCO-PRO Series

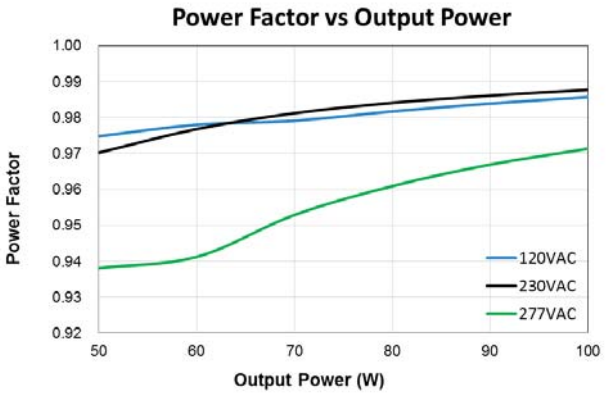
- POWER FACTOR versus OUTPUT POWER
- TOTAL HARMONIC DISTORTION versus OUTPUT POWER

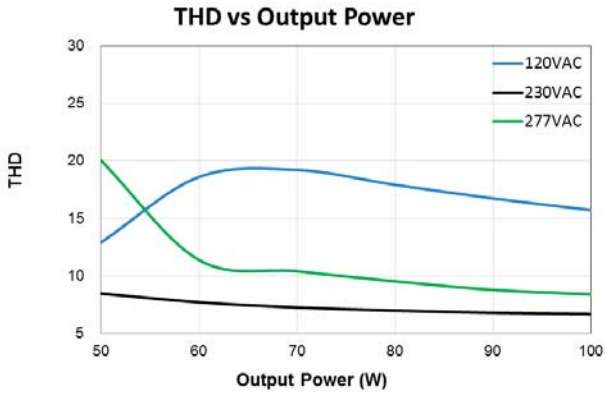
- USCO-100140GA – 1400mA



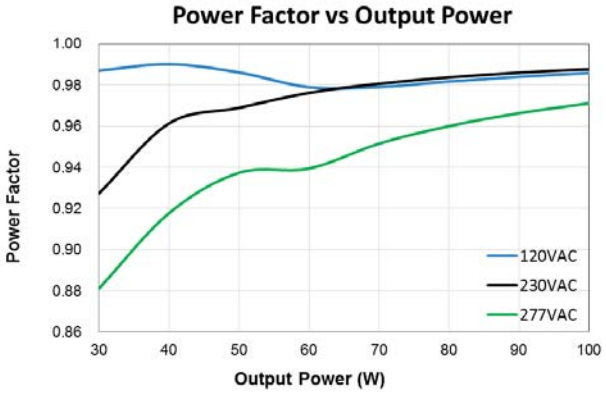


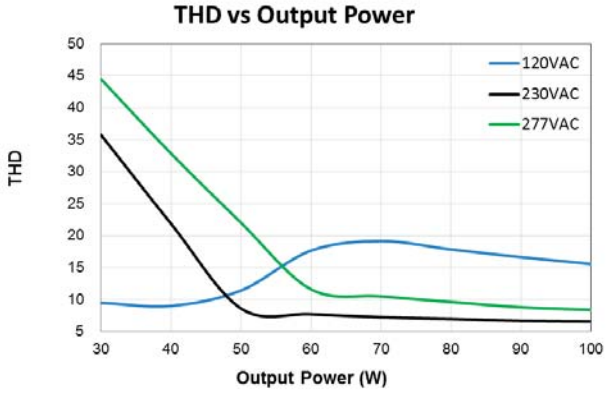
- USCO-100140GA – 1050mA





- USCO-100140GA – 700mA

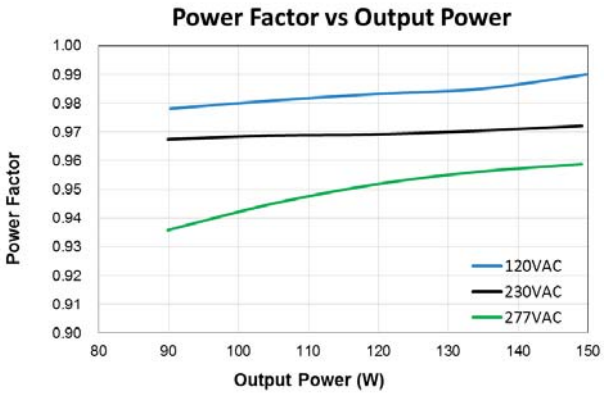


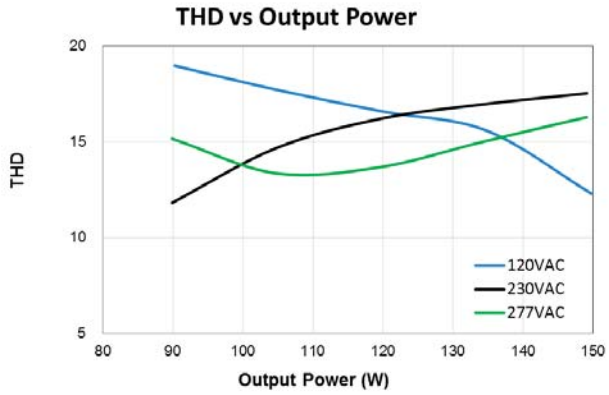


LED Drivers / LED Control Gear
USCO-PRO Series

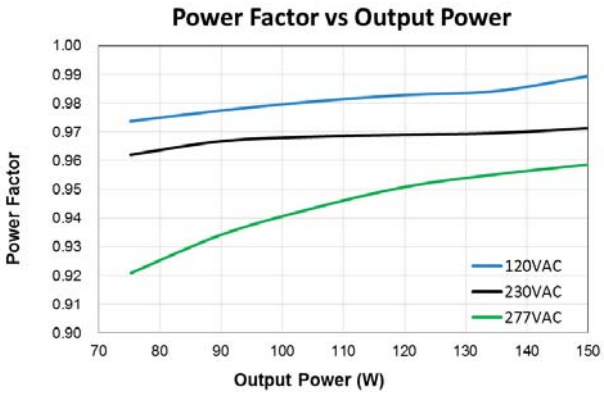
- POWER FACTOR versus OUTPUT POWER
- TOTAL HARMONIC DISTORTION versus OUTPUT POWER

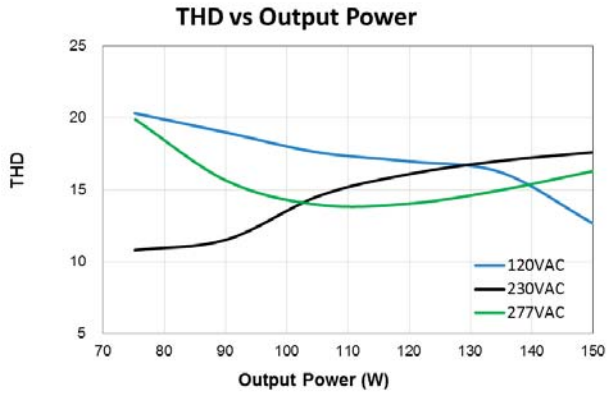
- USCO-150140GC – 1400mA



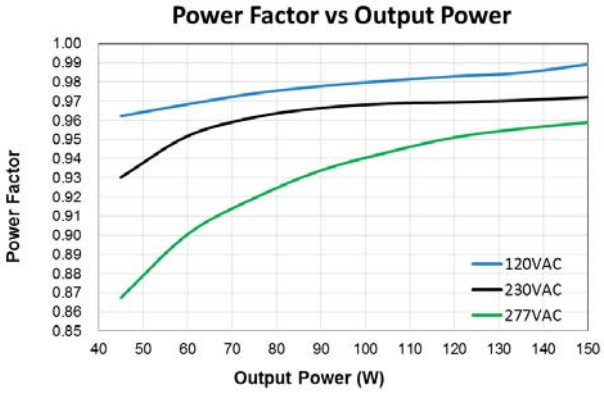


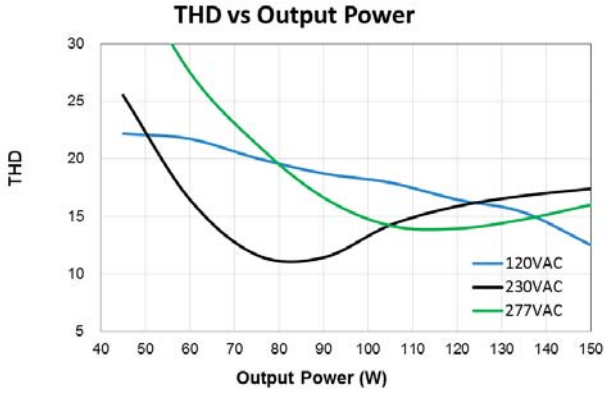
- USCO-150140GC – 1050mA





- USCO-150140GC – 700mA

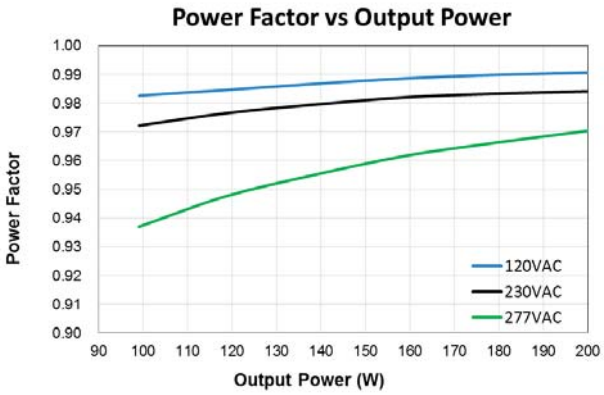


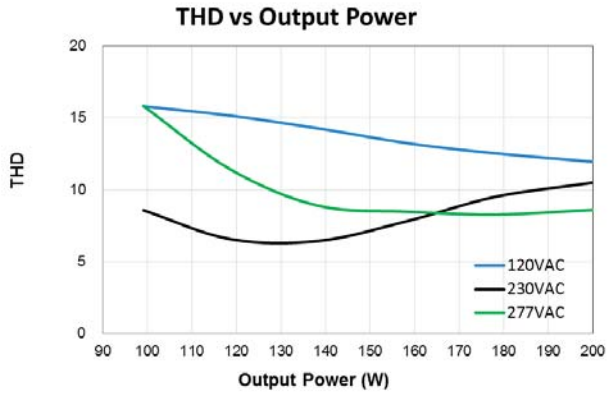


LED Drivers / LED Control Gear
USCO-PRO Series

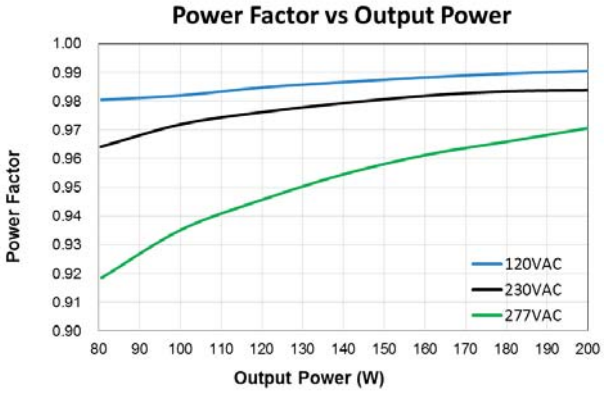
- POWER FACTOR versus OUTPUT POWER
- TOTAL HARMONIC DISTORTION versus OUTPUT POWER

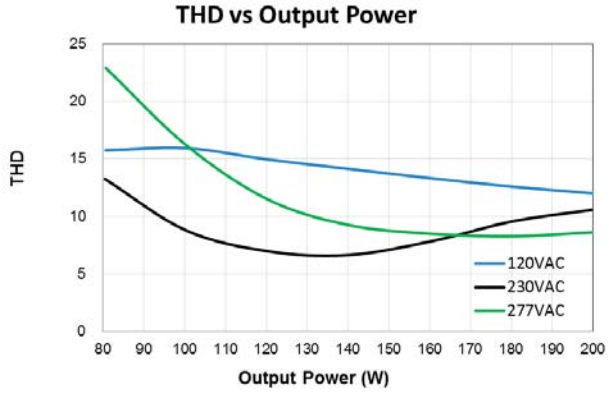
- USCO-200140GA – 1400mA



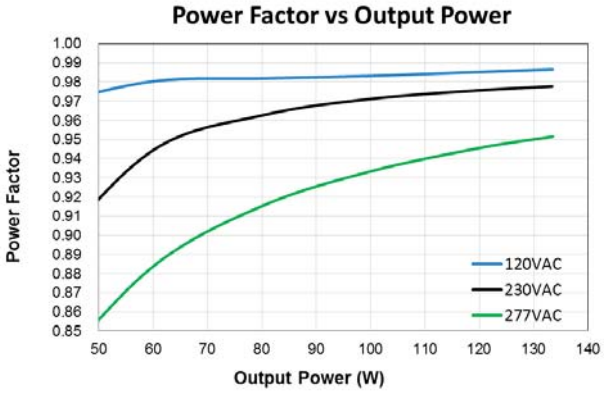


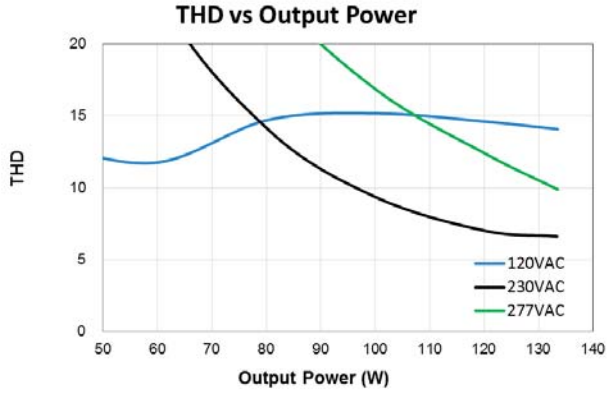
- USCO-200140GA – 1050mA





- USCO-200140GA – 700mA



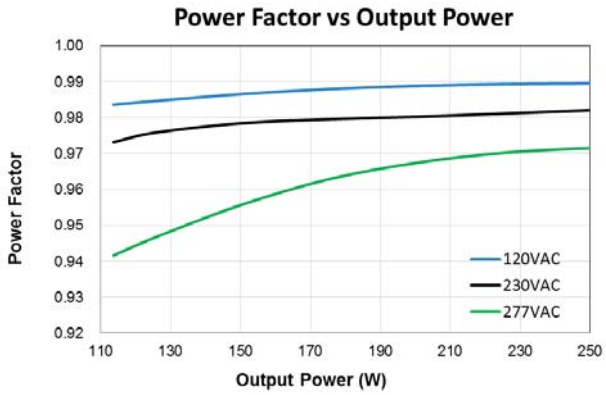


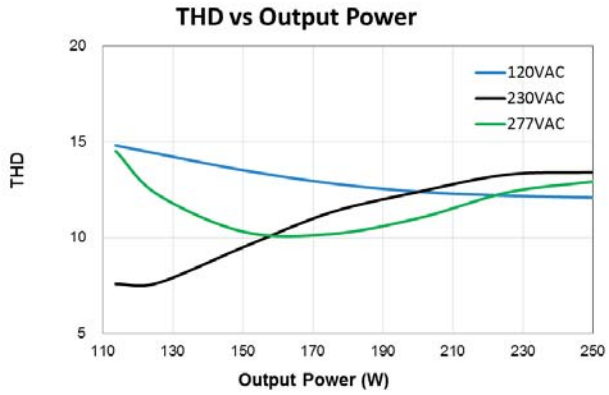
All information and specifications are subject to change without prior notice.
All parameters are specified at 25°C ambient unless otherwise indicated.

LED Drivers / LED Control Gear
USCO-PRO Series

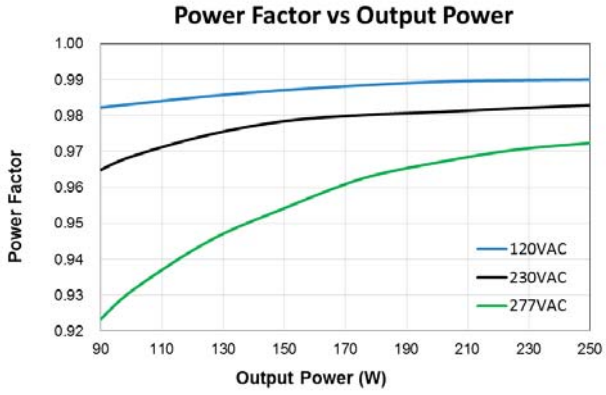
- POWER FACTOR versus OUTPUT POWER
- TOTAL HARMONIC DISTORTION versus OUTPUT POWER

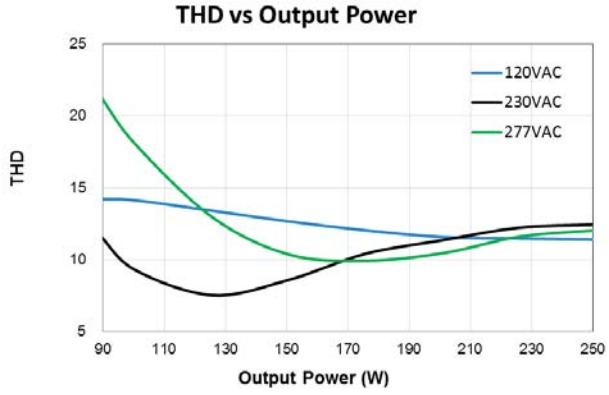
- USCO-250140GA – 1400mA



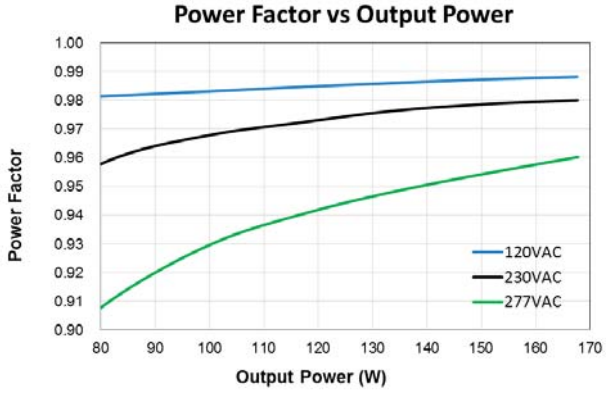


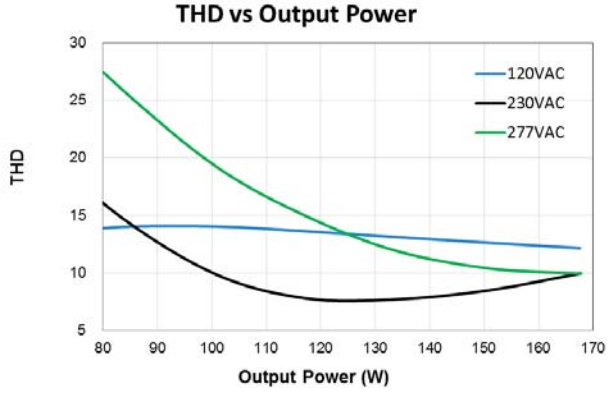
- USCO-250140GA – 1050mA





- USCO-250140GA – 700mA

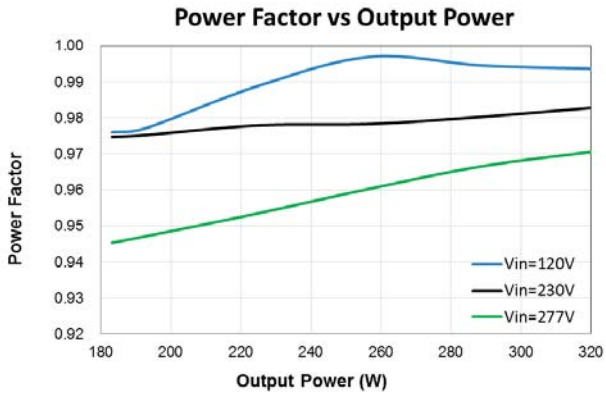


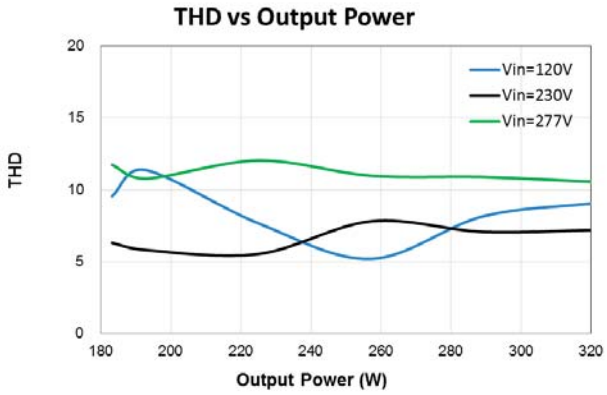


LED Drivers / LED Control Gear
USCO-PRO Series

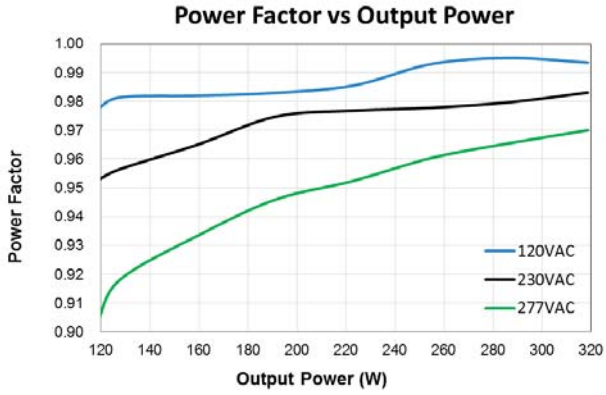
- POWER FACTOR versus OUTPUT POWER
- TOTAL HARMONIC DISTORTION versus OUTPUT POWER

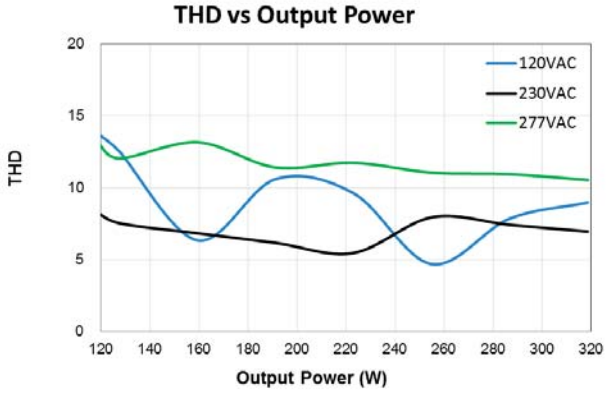
- USCO-320210GA – 2100mA



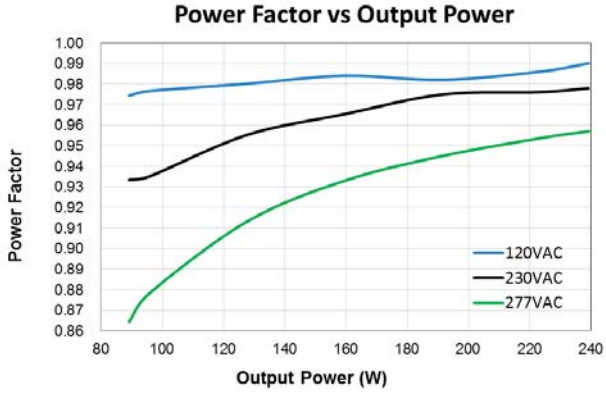


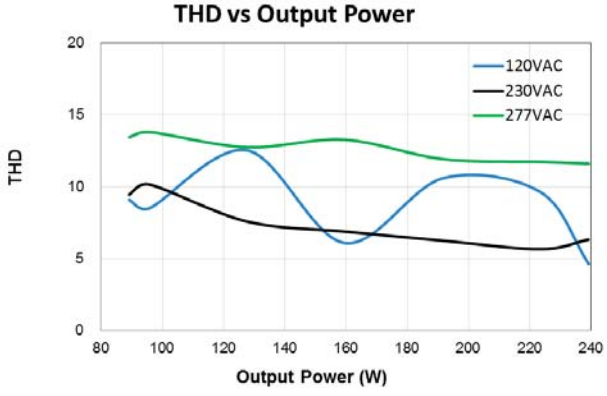
- USCO-320210GA – 1400mA





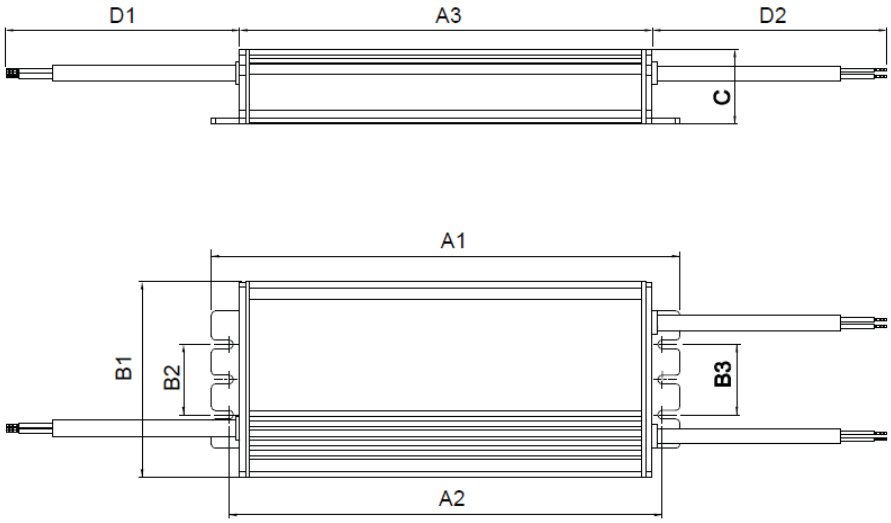
- USCO-320210GA – 1050mA





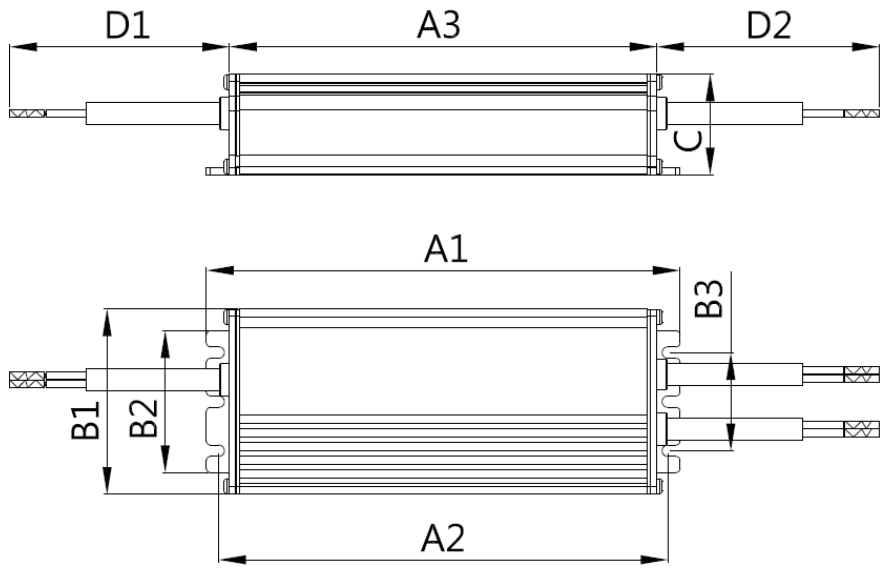
LED Drivers / LED Control Gear
USCO-PRO Series

- Dimensions
- 320W



Length (A1): 240mm
Width (B1): 100mm
Height (C): 38mm
Fixing hole distance (A2): 222mm
Fixing hole distance (B2): 70mm
Fixing hole distance (B3): 36mm
Body length (A3): 211mm
Input cable (D1): 300mm
Output cable (D2): 300mm
Dimming cable (D2): 300mm

- 250W / 200W / 150W / 100W / 75W



Length (A1):
240mm (250W/200W);
220mm (150W);
174mm (100W/75W)

Width (B1): 68mm
Height (C): 37mm

Fixing hole distance (A2):
231mm (250W/200W);
211mm (150W);
165mm (100W/75W)

Fixing hole distance (B2): 52mm
Fixing hole distance (B3): 36mm

Body length (A3):
223mm (250W/200W);
203mm (150W);
157mm (100W/75W)

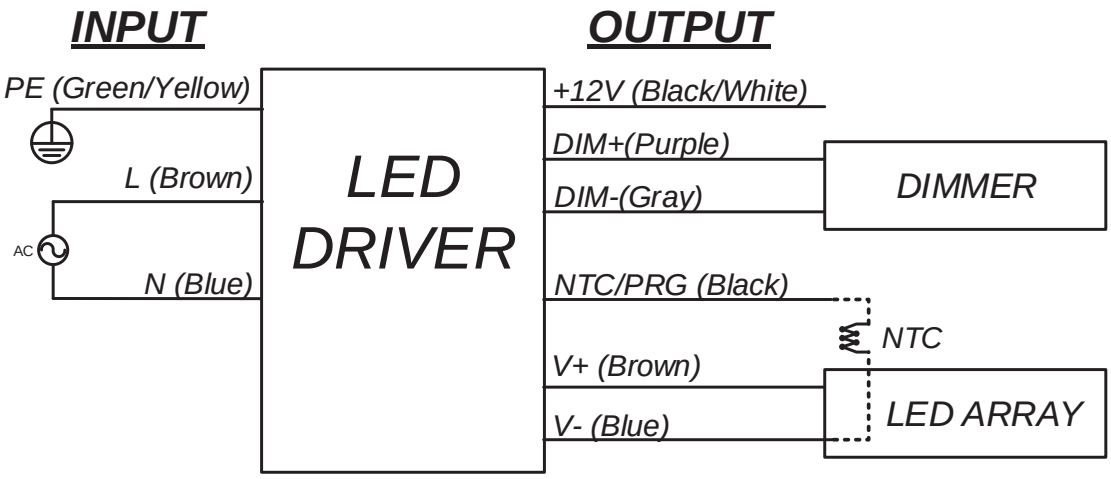
Input cable (D1): 300mm
Output cable (D2): 300mm
Dimming cable (D2): 300mm

LED Drivers / LED Control Gear
USCO-PRO Series

Wiring Connection

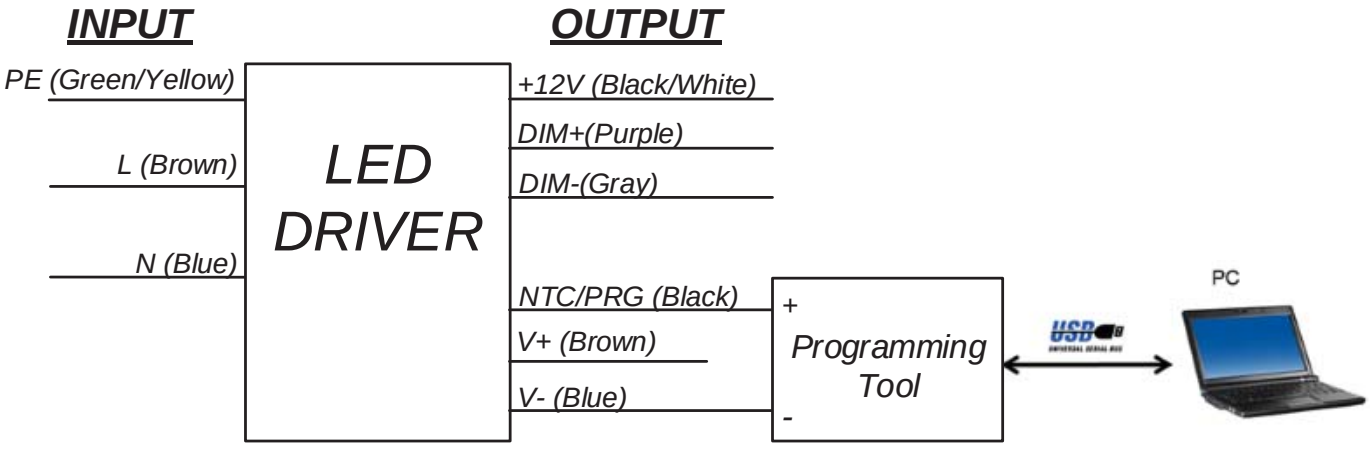
- Module Temperature Protection (MTP)

  The LEDs are thermally protected by the driver's NTC (Negative Temperature Coefficient resistor) interface, which ensures the output current will be reduced when a critical temperature is reached. Connect an NTC on the LED module to the LED driver associated wires as shown in the wiring diagram below.



- Programming Setup

  Programming doesn't require powering up input voltage or connecting the LED Module to the driver



Assembly & Installation

The device is not recommended to be placed on low thermal conductive surfaces. For example, plastics.

Base Mounting (Horizontal)

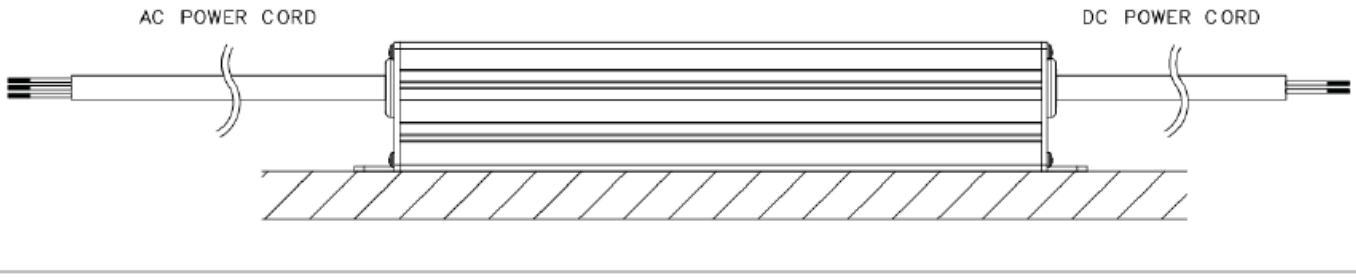


Fig. 2 Recommended Mounting Orientation

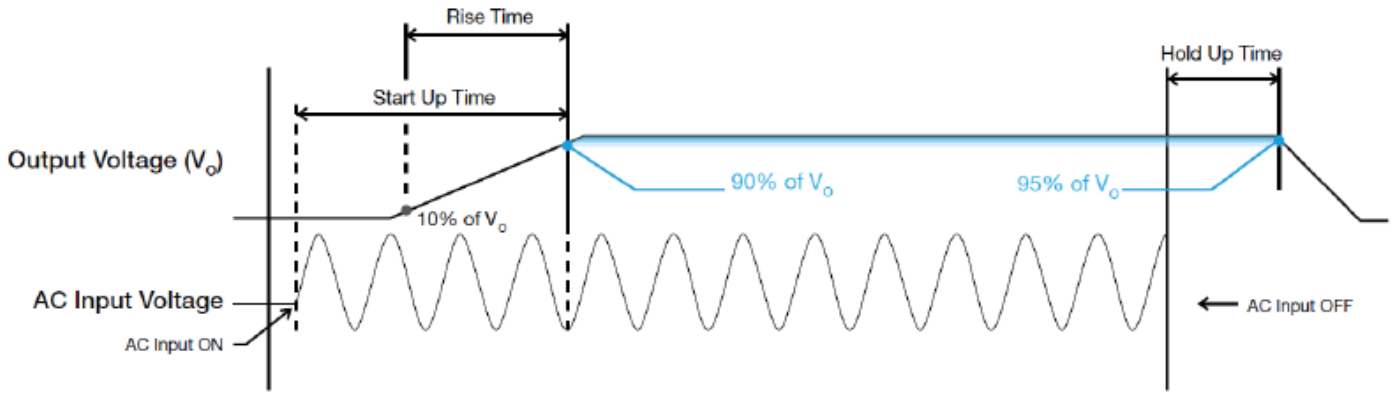
Safety Instructions

- ALWAYS switch mains of input power OFF before connecting and disconnecting the input voltage to the device. If mains are not turned OFF, there is risk of explosion / severe damage.
- To guarantee sufficient convection cooling, keep a distance of 50mm above and lateral distance to other units.
- DO NOT insert any objects into the device.
- When the PE terminal is not connected, the device must be installed on a metal plate with PE connection.
- The current rating for the output cable must be rated higher than or equal to the output current of the power supply. Please refer to the product specifications.
- For device with dimming function, always ensure the dimming control is working properly. “Dimming 0-10V” shall be insulated from AC mains by reinforced insulation.

Functions

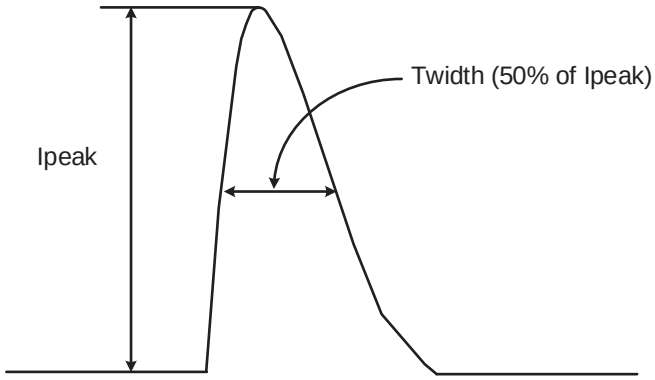
- Start-up Time
  The time required for the output voltage to reach 90% of its set value, after the input voltage is applied.
- Rise Time
  The time required for the output voltage to change from 10% to 90% of its set value.
- Hold-up Time
  Hold up time is the time when the AC input collapses and output voltage retains regulation for a certain period of time. The time required for the output to reach 95% of its set value, after the input voltage is removed.

■ Graph illustrating the Start-up Time, Rise Time, and Hold-up Time



Inrush Current

Inrush current is the peak, instantaneous, input current measured and, occurs when the input voltage is first applied. For AC input voltages, the maximum peak value of inrush current will occur during the first half cycle of the applied AC voltage. This peak value decreases exponentially during subsequent cycles of AC voltage.



LED Drivers / LED Control Gear

USCO-PRO Series

Revision History

Change Date	Rev.	Contents	Page
2/16/2017	S00	• Initial release	/
5/18/2017	S01	• Update 75/100W performance curve • Updated 320W inrush current value • Update 320W “OUTPUT LOAD VS AMBIENT TEMPERATURE” curve • Add 320W Efficiency, PF, THD data	2,9 2 8 11/17
9/01/2017	S02	• Change HI-pot voltage from 3750V to 1875V	6
9/22/2017	S03	• Updated Operating Ambient Temperature & MTBF & Warranty life conditions • Correct “LIFETIME VS AMBIENT TEMPERATURE”	5 8