MEAN WELL

320W Single Output Switching Power Supply

# HLG-320H series

■ Features :

- Universal AC input / Full range (up to 305VAC)
- Built-in active PFC function
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- OCP point adjustable through output cable or internal potential meter
- IP67 / IP65 design for indoor or outdoor installations
- Optional dimming function (1~10Vdc or PWM signal or resister)
- Suitable for LED lighting and moving sign applications
- Compliance to worldwide safety regulations for lighting
- Suitable for dry / damp / wet location and outdoor application
- 5 years warranty

SELV IP65 IP67

HLG-320H-12 [A] Blank : IP67 rated. Cable for I/O connection.
A : IP65 rated. Output voltage and constant current level can be adjusted through internal potential meter.
B : IP67 rated. Constant current level adjustable through output cable with 1~10Vdc or PWM signal or resister.
C : Terminal block for I/O connection. Output voltage and constant current level can be adjusted through internal potential meter.

## SPECIFICATION

| MODEL | | HLG-320H-12□ | HLG-320H-15□ | HLG-320H-20□ | HLG-320H-24□ | HLG-320H-30□ | HLG-320H-36□ | HLG-320H-42□ | HLG-320H-48□ | HLG-320H-54□ |
|---|---|---|---|---|---|---|---|---|---|---|
| OUTPUT | DC VOLTAGE | 12V | 15V | 20V | 24V | 30V | 36V | 42V | 48V | 54V |
| | CONSTANT CURRENT REGION Note.4 | 6 ~12V | 7.5 ~ 15V | 10 ~ 20V | 12 ~ 24V | 15 ~ 30V | 18 ~ 36V | 21 ~ 42V | 24 ~ 48V | 27 ~ 54V |
| | RATED CURRENT | 22A | 19A | 15A | 13.34A | 10.7A | 8.9A | 7.65A | 6.7A | 5.95A |
| | RATED POWER | 264W | 285W | 300W | 320.2W | 321W | 320.4W | 321.3W | 321.6W | 321.3W |
| | RIPPLE & NOISE (max.) Note.2 | 150mVp-p | 150mVp-p | 150mVp-p | 150mVp-p | 200mVp-p | 250mVp-p | 250mVp-p | 250mVp-p | 350mVp-p |
| | VOLTAGE ADJ. RANGE Note.6 | 10.8 ~ 13.5V | 13.5 ~ 17V | 17 ~ 22V | 22 ~ 27V | 27 ~ 33V | 33 ~ 40V | 38 ~ 46V | 43 ~ 53V | 49 ~ 58V |
| | CURRENT ADJ. RANGE | Can be adjusted by internal potential meter or through output cable | | | | | | | | |
| | | 11 ~ 22A | 9.5 ~ 19A | 7.5 ~ 15A | 6.67 ~ 13.34A | 5.35 ~ 10.7A | 4.45 ~ 8.9A | 3.8 ~ 7.65A | 3.35 ~ 6.7A | 2.97 ~ 5.95A |
| | VOLTAGE TOLERANCE Note.3 | ±2.5% | ±2.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% |
| | LINE REGULATION | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| | LOAD REGULATION | ±2.0% | ±1.5% | ±1.0% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| | SETUP, RISE TIME Note.8 | 2500ms, 80ms at full load 230VAC /115VAC | | | | | | | | |
| | HOLD UP TIME (Typ.) | 15ms at full load 230VAC /115VAC | | | | | | | | |
| INPUT | VOLTAGE RANGE Note.5 | 90 ~ 305VAC 127 ~ 431VDC | | | | | | | | |
| | FREQUENCY RANGE | 47 ~ 63Hz | | | | | | | | |
| | POWER FACTOR | PF≧0.95/230VAC PF≧0.98/115VAC at full load and rated output voltage PF≧0.9 at 50 ~ 100% load | | | | | | | | |
| | EFFICIENCY (Typ.) | 92% | 92% | 93% | 94% | 94% | 94% | 94.5% | 95% | 95% |
| | AC CURRENT | 4A / 115VAC 2A / 230VAC 1.8A / 277VAC | | | | | | | | |
| | INRUSH CURRENT(Typ.) | COLD START 75A/230VAC | | | | | | | | |
| | LEAKAGE CURRENT | <0.75mA / 277VAC | | | | | | | | |
| PROTECTION | OVER CURRENT Note.4 | 95 ~ 108% | | | | | | | | |
| | | Protection type : Constant current limiting, recovers automatically after fault condition is removed | | | | | | | | |
| | SHORT CIRCUIT | Hiccup mode, recovers automatically after fault condition is removed. | | | | | | | | |
| | OVER VOLTAGE | 14 ~ 17V | 18 ~ 21V | 23 ~ 27V | 28 ~ 34V | 34 ~ 38V | 41 ~ 46V | 47 ~ 53V | 54 ~ 60V | 59 ~ 65V |
| | | Protection type : Shut down and latch off o/p voltage, re-power on to recover | | | | | | | | |
| | OVER TEMPERATURE | 105℃ ±5℃ (TSW1) | | | | | | | | |
| | | Protection type : Shut down o/p voltage, recovers automatically after temperature goes down | | | | | | | | |
| ENVIRONMENT | WORKING TEMP. | -30 ~ +60℃ @ full load ; +70℃ @ 60% load (Refer to derating curve) ; -40℃ can power on | | | | | | | | |
| | WORKING HUMIDITY | 20 ~ 95% RH non-condensing | | | | | | | | |
| | STORAGE TEMP., HUMIDITY | -40 ~ +80℃, 10 ~ 95% RH | | | | | | | | |
| | TEMP. COEFFICIENT | ±0.03%/℃ (0 ~ 50℃) | | | | | | | | |
| | VIBRATION | 10 ~ 500Hz, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes | | | | | | | | |
| SAFETY & EMC | SAFETY STANDARDS Note.7 | UL8750, EN61347-1, EN61347-2-13 independent (except for HLG-320H C type) approved ; Design refer to UL60950-1, TUV EN60950-1 | | | | | | | | |
| | WITHSTAND VOLTAGE | I/P-O/P:3.75KVAC I/P-FG:1.88KVAC O/P-FG:0.5KVAC | | | | | | | | |
| | ISOLATION RESISTANCE | I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH | | | | | | | | |
| | EMI CONDUCTION & RADIATION | Compliance to EN55015, EN55022 (CISPR22) Class B | | | | | | | | |
| | HARMONIC CURRENT | Compliance to EN61000-3-2 Class C (≧50% load) ; EN61000-3-3 | | | | | | | | |
| | EMS IMMUNITY | Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN61547, EN55024, heavy industry level (surge 4KV), criteria A | | | | | | | | |
| OTHERS | MTBF | Khrs min. MIL-HDBK-217F (25℃) | | | | | | | | |
| | DIMENSION | 252*90*42mm (L*W*H)(HLG-320H-Blank/A/B) 256*90*42mm (L*W*H)(HLG-320H-C) | | | | | | | | |
| | PACKING | Kg | | | | | | | | |

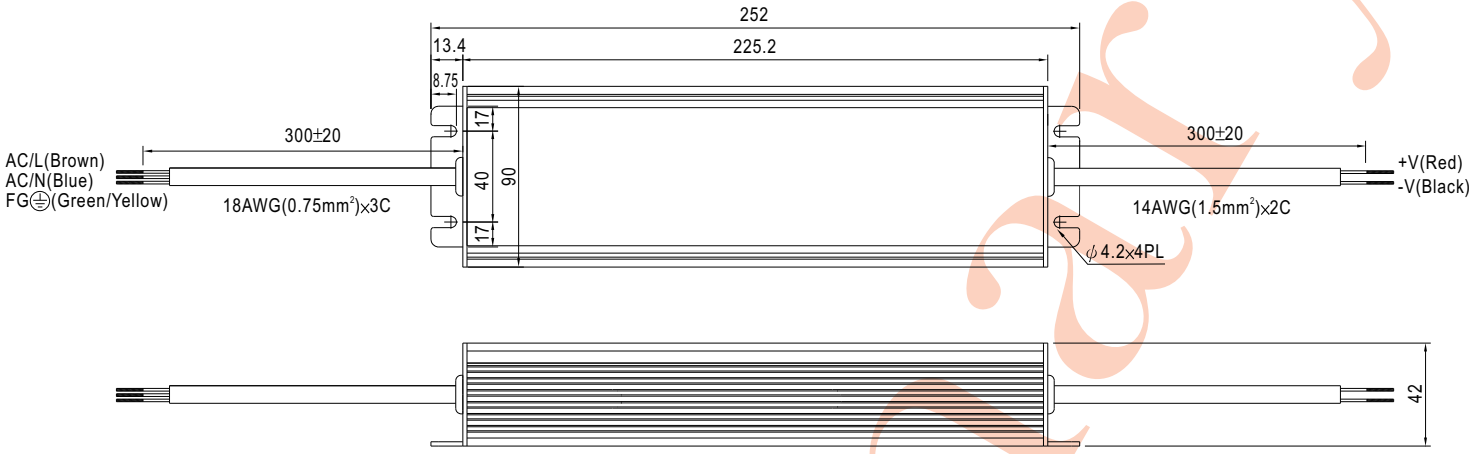
NOTE

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Constant current operation region is within 50% ~100% rated output voltage. This is the suitable operation region for LED related applications, but please reconfirm special electrical requirements for some specific system design.
5. Derating may be needed under low input voltages. Please check the static characteristics for more details.
6. Type A and type C only.
7. Safety and EMC design refer to EN60598-1, subject CNS15233, GB7000.1, FCC part18.
8. Length of set up time is measured at cold first start. Turning ON/OFF the power supply may lead to increase of the set up time.
9. The power supply is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC Directive on the complete installation again.

## ■ Mechanical Specification

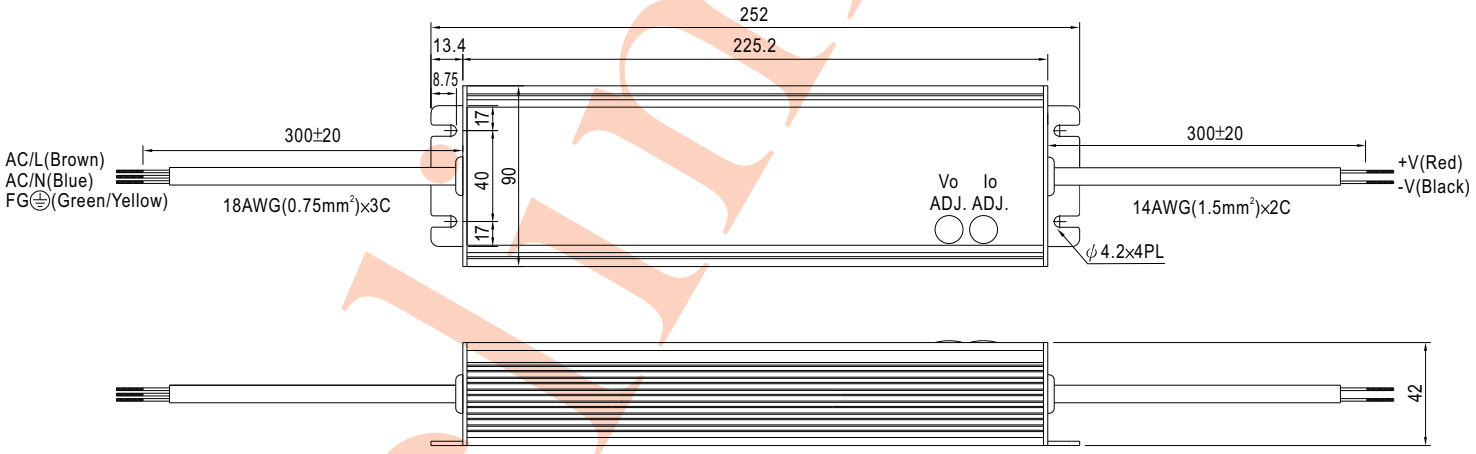
Case No.994C Unit:mm

**Blank:(HLG-320H)**



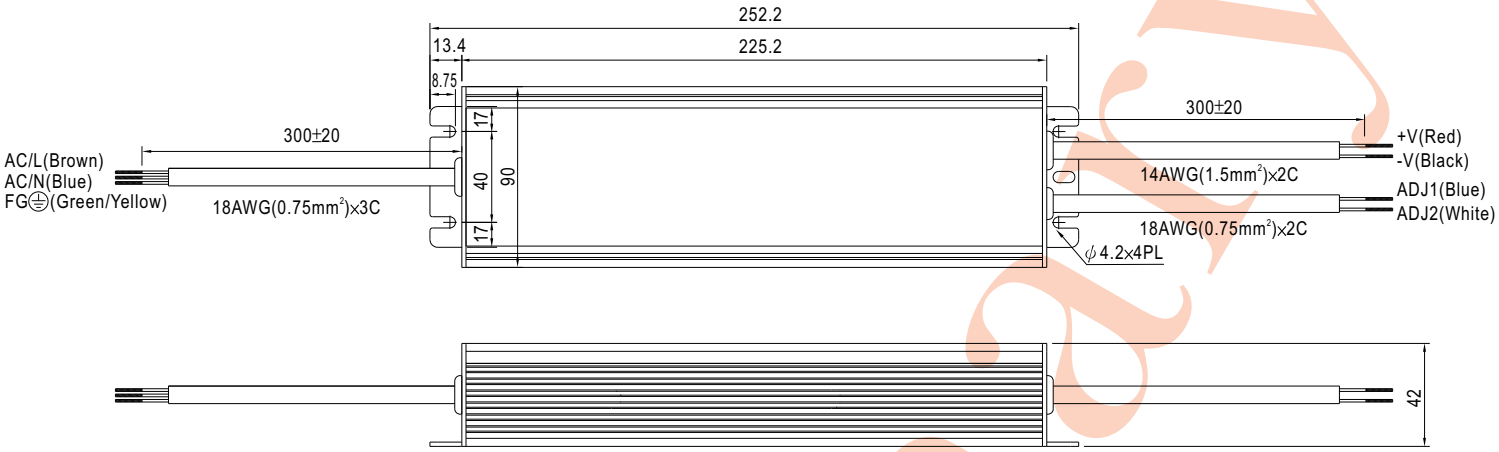

※IP67 rated. Cable for I/O connection.

**A Type:(HLG-320H-_A)**




※ IP65 rated. Output voltage and constant current level can be adjusted through internal potential meter.
(Can access by removing the rubber stopper on the case.)

**B Type:(HLG-320H-_B)**

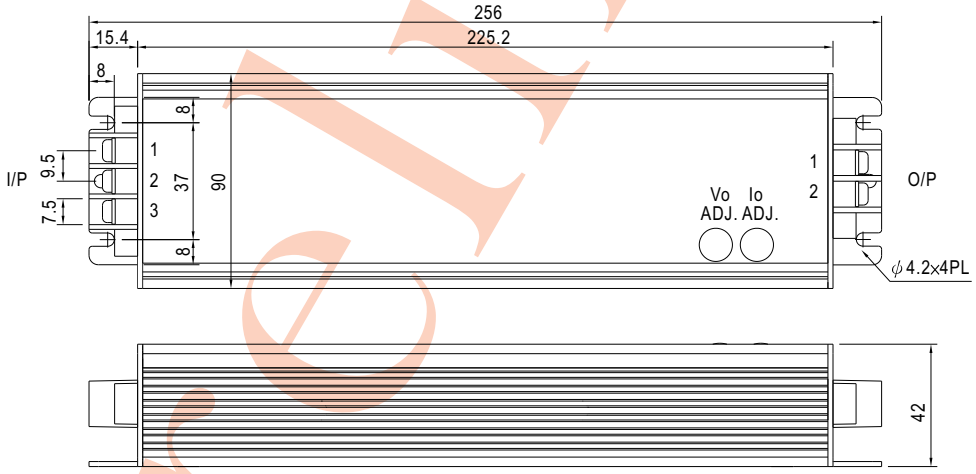



※ IP67 rated. Output constant current level can be adjusted through output cable by 1~10Vdc, PWM signal, or connecting a resistor between ADJ1 and ADJ2.

※ Reference resistance value for output current adjustment (Typical)

| Percentage of rated current / Model | 12V | 15V | 20V | 24V | 30V | 36V | 42V | 48V | 54V |
|---|---|---|---|---|---|---|---|---|---|
| Slightly > 100% | Open | Open | Open | Open | Open | Open | Open | Open | Open |
| 75% | 680Ω | 560Ω | 680Ω | 510Ω | 820Ω | 1.8KΩ | 680Ω | 620Ω | 820Ω |
| 50% | 120Ω | 47Ω | 91Ω | 51Ω | 120Ω | 500Ω | 82Ω | 68Ω | 150Ω |
| Slightly < 50% | Short | Short | Short | Short | Short | Short | Short | Short | Short |

**C Type:(HLG-320H-_C)**




※ Output voltage and constant current level can be adjusted through internal potential meter. (Can access by removing the rubber stopper on the case.)

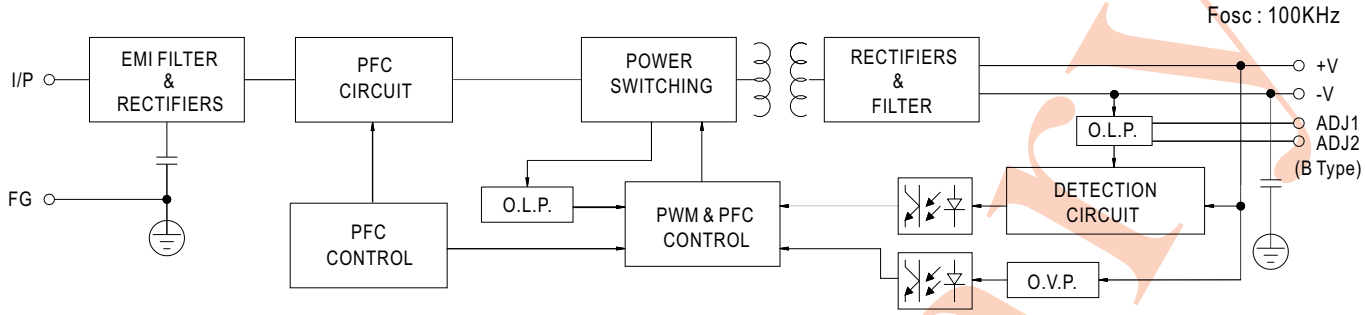
AC Input Terminal Pin No. Assignment

| Pin No. | Assignment |
|---|---|
| 1 | FG ⏚ |
| 2 | AC/L |
| 3 | AC/N |

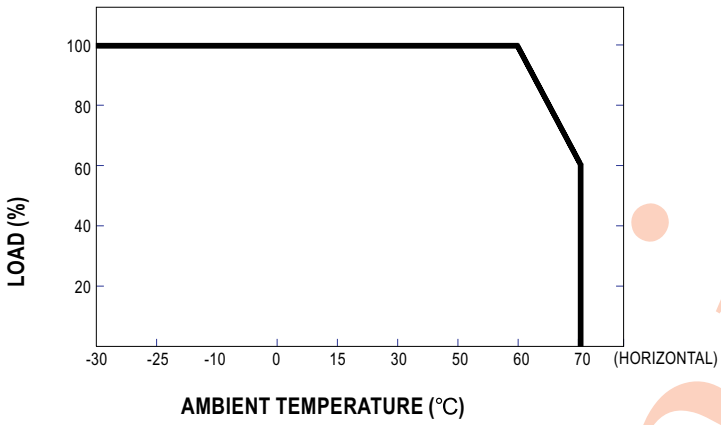
DC Output Terminal Pin No. Assignment

| Pin No. | Assignment |
|---|---|
| 1 | -V |
| 2 | +V |

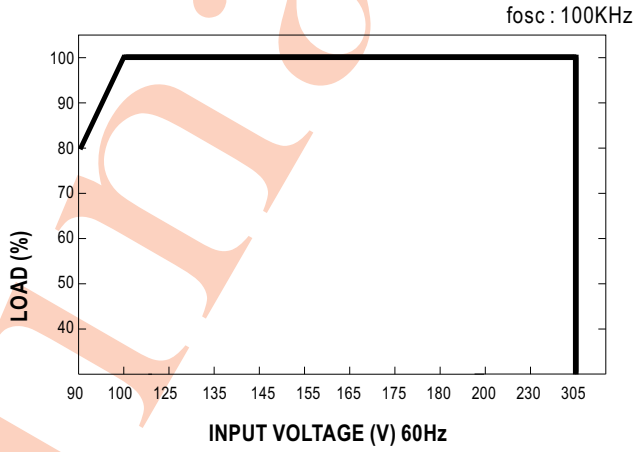
## Block Diagram




## Derating Curve

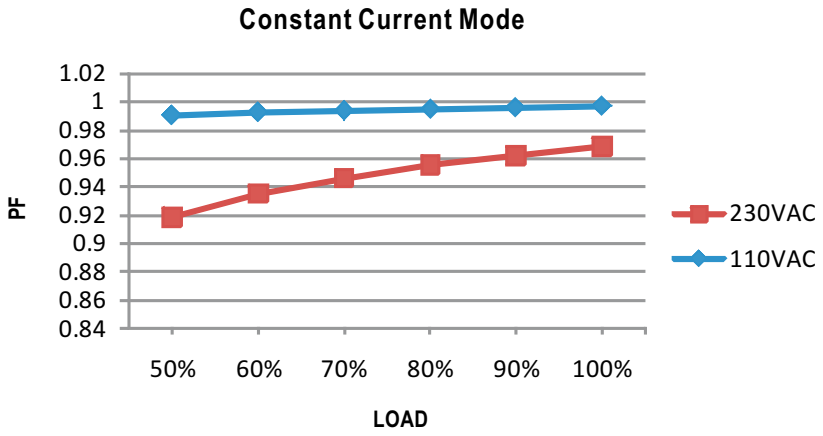



## Static Characteristics



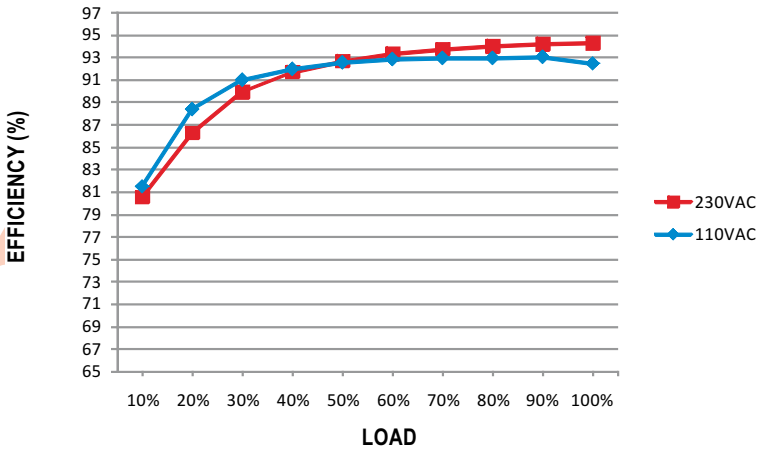

## Power Factor Characteristic

Power factor will be higher than 0.9 when output loading is 50% or higher.



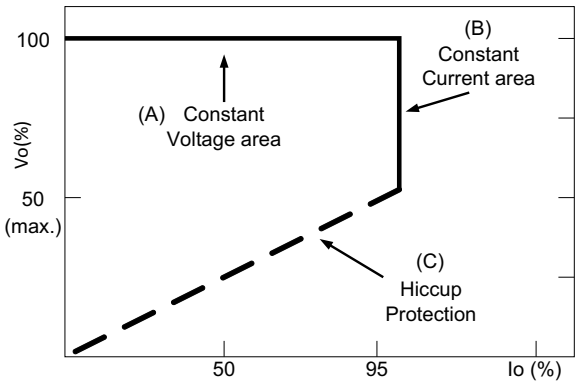

## EFFICIENCY vs LOAD (48V Model)

HLG-320H series possess superior working efficiency that up to 95% can be reached in field applications.



## ■ DRIVING METHODS OF LED MODULE

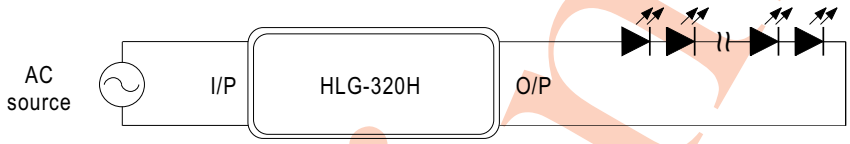
There are two major kinds of LED drive method "direct drive" and "with LED driver".
A typical LED power supply may either work in "constant voltage mode (CV) or constant current mode (CC)" to drive the LEDs.
Mean Well's LED power supply with CV+ CC characteristic can be operated at both CV mode (with LED driver, at area (A) and CC mode (direct drive, at area (B).




Typical LED power supply I-V curve

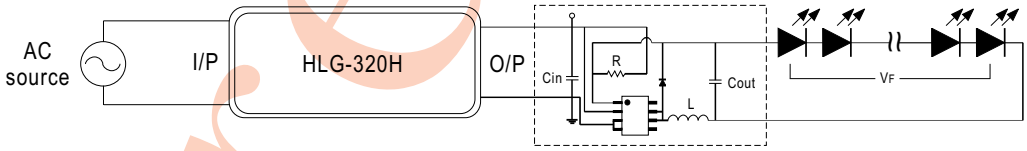
◎ **Direct driving :**

Under direct driving, the power supply will work in "constant current mode (CC)" and output voltage of the power supply will be clamped by sum of forward voltage ($V_F$) of the LED strip.
The total forward voltage of series connecting LEDs is suggested for 75%~95% of power supply rated output voltage due to concern of the best PF value and efficiency.



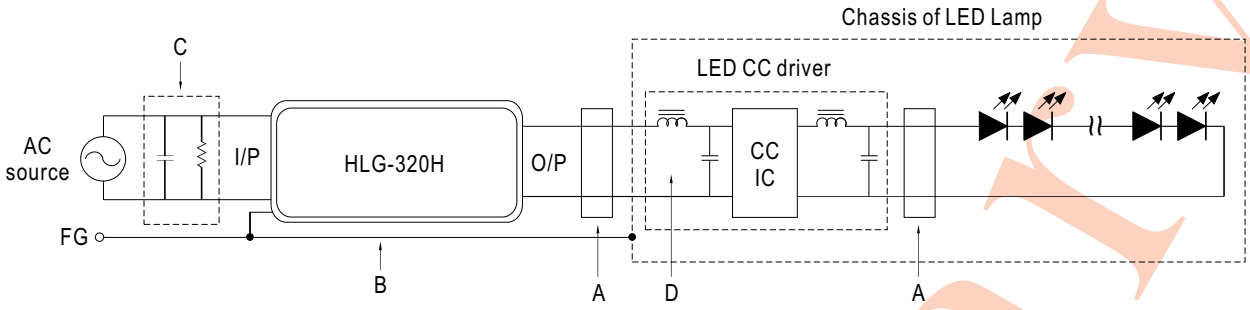

◎ **With LED driver** :

Using additional driver, the power supply will work in "constant voltage mode (CV)" and output voltage of the power supply will be kept in rated value.
In this drive mode, several design issues need to be considered:
1.Output voltage of PSU must be higher than total forward voltage of series connecting LEDs by 3V minimum.
2.Input capacitor (Cin) of LED driver circuit should use 2.2uF ~ 22uF(typ.) of rating depends on the operating frequency of the LED driver.
The higher the operating frequency is used, the smaller value of Cin should be chosen, and vice versa.




IC Circuit

## ■ EMI DEBUG SUGGESTION




A. Add a common mode ferrite choke on output wires to reduce the common emission between 10M ~ 300MHz per lighting EMI regulation.

B. Chassis of LED lamp and chassis of HLG-320H or the FG wire should be connected to the safety ground to reduce the EMI noise, including the conduction and radiation emission.

C. The additional X-Cap and discharge resistor can reduce the low frequency conduction noise between 9K ~ 1MHz per lighting EMI regulation.

D. L-C filter should be added at the DC input of LED constant current driver to avoid the differential emission and high frequency noise generated by the CC driver.