(except for D-type) (except for B/AB/D-type) (except for AB-type) Type HL

SELV IP65 IP67

## ■ Features

- Constant Voltage + Constant Current mode output
- Metal housing with class Ⅰ design
- Built-in active PFC function
- Class 2 power unit
- IP67 / IP65 rating for indoor or outdoor installations
- Function options: output adjustable via potentiometer; 3 in 1 dimming; Timer dimming
- Typical lifetime > 62000 hours
- 7 years warranty

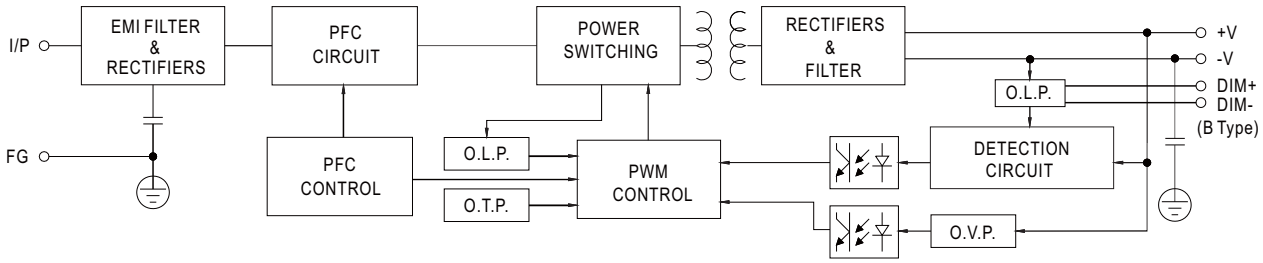
## ■ Applications

- LED street lighting
- LED high-bay lighting
- Parking space lighting
- LED fishing lamp
- LED greenhouse lighting
- Type “HL” for use in Class Ⅰ , Division 2 hazardous (Classified) location.

| Type | IP Level | Function |
|---|---|---|
| B | IP67 | 3 in 1 dimming function (1~10VDC, 10V PWM signal and resistance) |

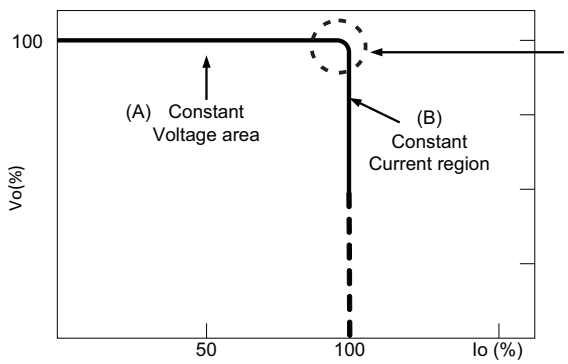
## ■ BLOCK DIAGRAM

Fosc : 100KHz




## ■ DRIVING METHODS OF LED MODULE

※ This series is able to work in either Constant Current mode (a direct drive way) or Constant Voltage mode (usually through additional DC/DC driver) to drive the LEDs.




In the constant current region, the highest voltage at the output of the driver depends on the configuration of the end systems.

Typical output current normalized by rated current (%)

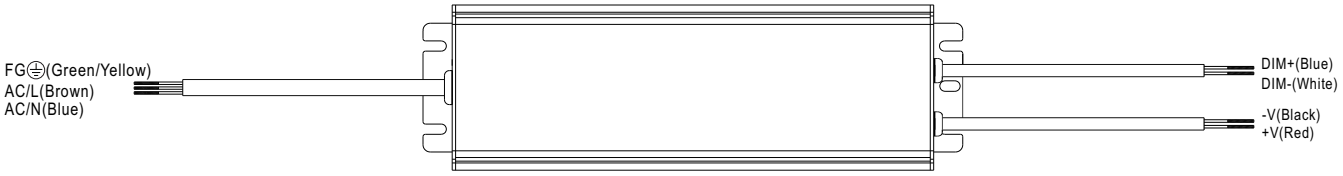
## SPECIFICATION

| | | |
|---|---|---|
| OUTPUT | DC VOLTAGE | 24V |
| | CONSTANT CURRENT REGION Note.4 | 12 ~ 24V |
| | RATED CURRENT | 4A |
| | RATED POWER | 96W |
| | RIPPLE & NOISE (max.) Note.2 | 150mVp-p |
| | VOLTAGE ADJ. RANGE | 22 ~ 27V |
| | CURRENT ADJ. RANGE | 2.5 ~ 4A |
| | VOLTAGE TOLERANCE Note.3 | ±1.0% |
| | LINE REGULATION | ±0.5% |
| | LOAD REGULATION | ±0.5% |
| | SETUP, RISE TIME Note.6 | 1200ms,50ms/115VAC 500ms,50ms/230VAC |
| | HOLD UP TIME (Typ.) | 16ms / 115VAC, 230VAC |
| INPUT | VOLTAGE RANGE Note.5 | 90 ~ 305VAC 127 ~ 431VDC<br>(Please refer to "STATIC CHARACTERISTIC" section) |
| | FREQUENCY RANGE | 47 ~ 63Hz |
| | POWER FACTOR (Typ.) | PF≧0.98/115VAC, PF≧0.95/230VAC, PF≧0.93/277VAC @ full load<br>(Please refer to "POWER FACTOR (PF) CHARACTERISTIC" section) |
| | TOTAL HARMONIC DISTORTION | THD< 20% (@ load≧60% / 115VAC,230VAC; @ load≧75% / 277VAC)<br>(Please refer to "TOTAL HARMONIC DISTORTION (THD)" section) |
| | EFFICIENCY (Typ.) | 93% |
| | AC CURRENT (Typ.) | 1.2A / 115VAC 0.55A / 230VAC 0.5A / 277VAC |
| | INRUSH CURRENT (Typ.) | COLD START 60A($t_{width}$=415$\mu$s measured at 50% $I_{peak}$) at 230VAC; Per NEMA 410 |
| | MAX. No. of PSUs on 16A CIRCUIT BREAKER | 4 units (circuit breaker of type B) |
| | LEAKAGE CURRENT | <0.75mA / 277VAC |
| PROTECTION | OVER CURRENT | 95 ~ 106%<br>Constant current limiting, recovers automatically after fault condition is removed |
| | SHORT CIRCUIT | Constant current limiting, recovers automatically after fault condition is removed |
| | OVER VOLTAGE | 28 ~ 34V<br>Shut down o/p voltage with auto-recovery or re-power on to recovery |
| | OVER TEMPERATURE | Shut down o/p voltage, recovers automatically after temperature goes down |
| ENVIRONMENT | | |
| | MAX. CASE TEMP. | Tcase= +80℃ |
| | WORKING HUMIDITY | 20 ~ 95% RH non-condensing |
| | STORAGE TEMP., HUMIDITY | -40 ~ +80℃, 10 ~ 95% RH |
| | TEMP. COEFFICIENT | ±0.03%/℃ (0 ~ 60℃) |
| | VIBRATION | 10 ~ 500Hz, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes |
| SAFETY & EMC | SAFETY STANDARDS Note.8 | UL8750(type"HL"), CSA C22.2 No. 250.0-08; BS EN/EN 61347-1, BS EN/EN 61347-2-13, AS/NZS 61347-1, AS/NZS 61347-2-13 independent; GB19510.1,GB19510.14,IP65 or IP67, J61347-1, J61347-2-13(except for B), KC61347-1,KC61347-2-13 ,EAC TP TC 004 approved |
| | WITHSTAND VOLTAGE | I/P-O/P:3.75KVAC I/P-FG:2KVAC O/P-FG:1.5KVAC |
| | ISOLATION RESISTANCE | I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH |
| | EMC EMISSION Note.8 | Compliance to BS EN/EN55015, BS EN/EN55032 Class B, BS EN/EN61000-3-2 Class C (@ load≧60%) ; BS EN/EN61000-3-3, GB17743 and GB17625.1, EAC TP TC 020 |
| | EMC IMMUNITY | Compliance to BS EN/EN61000-4-2,3,4,5,6,8,11, BS EN/EN61547, BS EN/EN55024, light industry level (surge immunity Line-Earth 4KV, Line-Line 2KV), EAC TP TC 020 |
| OTHERS | MTBF | 192.2K hrs min. MIL-HDBK-217F (25℃) |
| | DIMENSION | 220*68*38.8mm (L*W*H) |
| | | |

**NOTE**

1. All parameters NOT specially mentioned are measured at 230VAC input, rated current 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. Please refer to "DRIVING METHODS OF LED MODULE".
5. De-rating may be needed under low input voltages.
6. Length of set up time is measured at first cold start. Turning ON/OFF the driver may lead to increase of the set up time.
7. The driver 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.
8. To fulfill requirements of the latest ErP regulation for lighting fixtures, this LED driver can only be used behind a switch without permanently connected to the mains.
9. This series meets the typical life expectancy of >62,000 hours of operation when Tcase, particularly (tc) point (or TMP, per DLC), is about 80℃ or less.
10. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

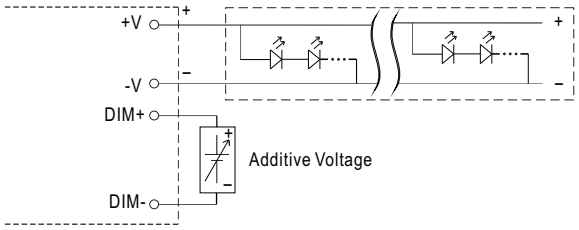
## ■ DIMMING OPERATION



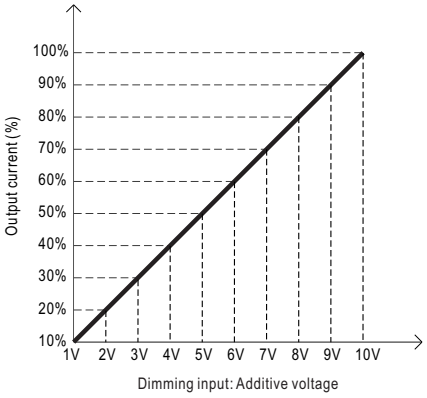

※ **3 in 1 dimming function (for B Type)**

- Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 1 ~ 10VDC, or 10V PWM signal or resistance.
- Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.
- Dimming source current from power supply: 100μA (typ.)

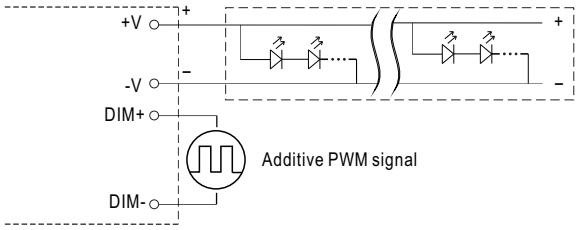
◎ Applying additive 1 ~ 10VDC



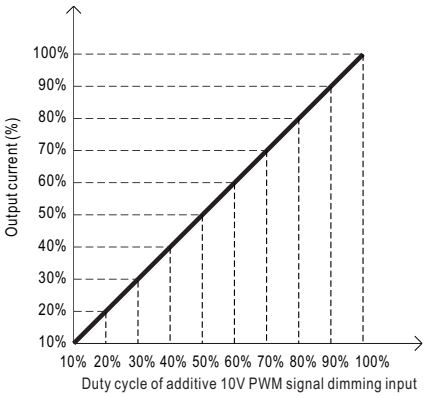

"DO NOT connect "DIM- to -V"



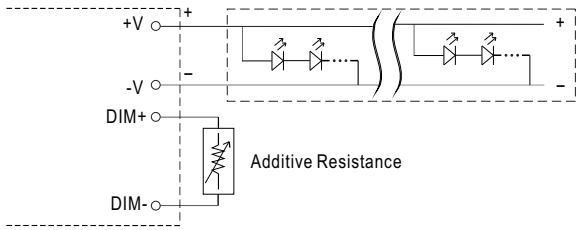

◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



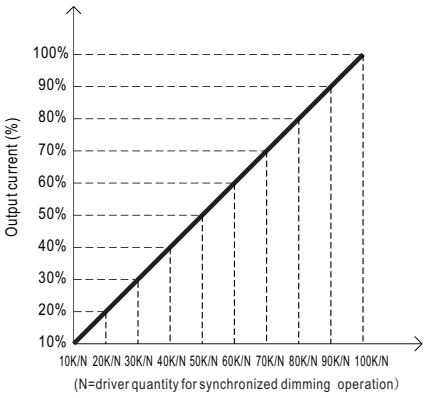

"DO NOT connect "DIM- to -V"



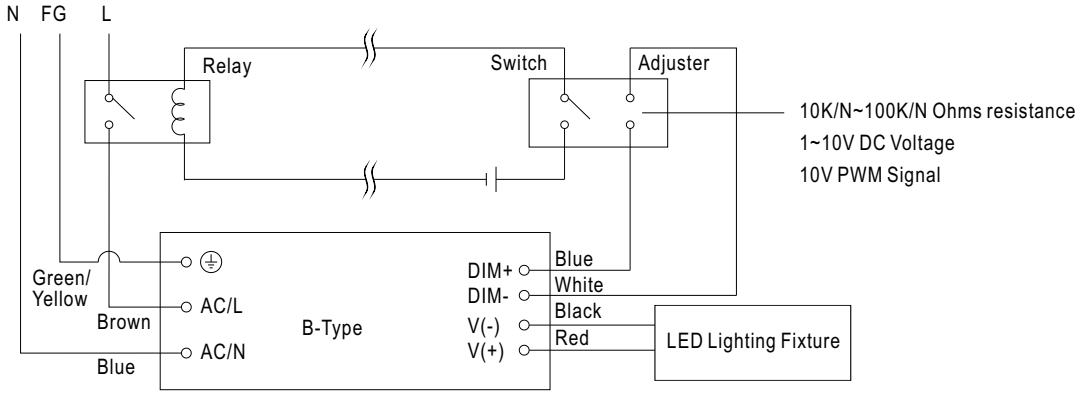

◎ Applying additive resistance:




"DO NOT connect "DIM- to -V"

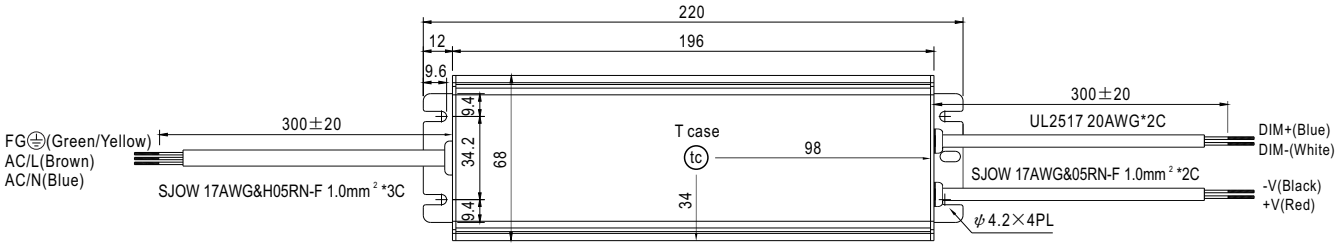


Note: In the case of turning the lighting fixture down to 0% brightness, please refer to the configuration as follow




Using a switch and relay can turn ON/OFF the lighting fixture.

**※B-Type**




• ⓣc : Max. Case Temperature