MEAN WELL PWM-90 Series 90W Constant Voltage PWM Output LED Driver Owner's Manual

Contents

90W Constant Voltage PWM Output LED Driver

PWM-90 series

User's Manual

(for DA2-Type only) (for DA Type only)

AC Input: 100-240Vac
(for DA2-Type only)

IP67

(CCC optional)

IS 15885(Part 2/Sec13)
R-41027766
(for 12, 24, 48, Blank Type only)

E334687
Type HL
(for DA2 and Blank Type)

■ Features

- Constant Voltage PWM style output
- Emergency lighting application is available according to IEC61347-2-13
- Built-in active PFC function and class II design
- Class 2 power unit(except PWM-90-12)
- No load power consumption <0.5W
- Fully encapsulated with IP67 level
- Function: 3 in 1 dimming (dim-to-off); DALI/DALI-2
- Minimum dimming level 0.2% for DALI type
- Typical lifetime>50000 hours and 5 years warranty

■ Applications

- LED strip lighting
- Indoor LED lighting
- LED decorative lighting

- LED architecture lighting
- Industrial lighting

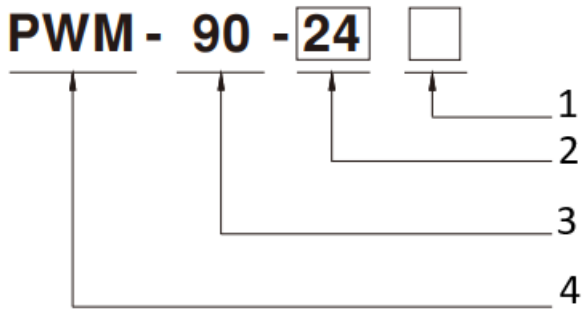
■ GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

■ Description

PWM-90 series is a 90W LED AC/DC LED driver featuring the constant voltage mode with PWM style output, which is able to maintain the brightness homogeneity when driving all kinds of LED strips.PWM-90 operates from 90~305VAC and offers models with different rated voltage ranging between 12V and 48V. Thanks to the high efficiency up to 90.5%, with the fanless design, the entire series is able to operate for -40°C ~ +85°C case temperature under free air convection. The entire series is rated with IP67 ingress protection level and is suitable to work for dry, damp or wet locations. PWM-90 is equipped with dimming function that varies the duty cycle of the output, providing great flexibility for LED strips applications.

■ Model Encoding



1. Function options
2. Rated output voltage (12/24/36/48V)
3. Rated wattage
4. Series name

Type	IP Level	Function	Note
Blank	IP67	3 in 1 dimming function (0~10Vdc, 10V PWM signal and resistance)	In Stock
DA	IP67	DALI control technology(for 12V/24V with DA type only)	In Stock
DA2	IP67	DALI-2 control technology(for 12V/24V/48V with DA2 type only)	In Stock

SPECIFICATION

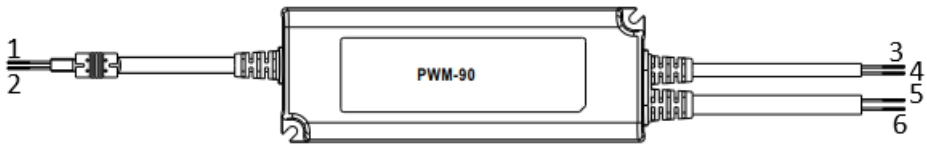
MODEL		**PWM-90-12 □**	**PWM-90-24 □**	**PWM-90-36 □**	**PWM-90-48 □**
	DC VOLTAGE	12V	24V	36V	48V
	RATED CURRENT	7.5A	3.75A	2.5A	1.88A

OUTPUT	**RATED POWER**	90W	90W	90W	90.24W
	DIMMING RANGE	0 ~ 100%			
	PWM FREQUENCY (Typ.)	1.47kHz for Blank/DA-Type, 2.5kHz for DA2-Type			
	SETUP, RISE TIME Note.2 Note.9	500ms, 80ms/ 115VAC or 230VAC			
	HOLD UP TIME (Typ.)	16ms/115VAC or 230VAC			
INPUT	**VOLTAGE RANGE Note.3**	90 ~ 305VAC 127 ~ 431VDC (Please refer to “STATIC CHARACTERISTIC” section)			
	FREQUENCY RANGE	47 ~ 63Hz			
	POWER FACTOR (Typ.)	PF>0.98/115VAC, PF>0.96/230VAC, PF>0.92/277VAC @ full load (Please refer to “POWER FACTOR (PF) CHARACTERISTIC” section)			
	TOTAL HARMONIC DISTORTION	THD< 20%(@load≧60%/115VAC, 230VAC; @load≧75%/277VAC) (Please refer to “TOTAL HARMONIC DISTORTION” section)			
	EFFICIENCY (Typ.)	88%	90.5%	90.5%	90.5%
	AC CURRENT (Typ.)	0.95A / 115VAC 0.5A / 230VAC 0.4A / 277VAC			
	INRUSH CURRENT (Typ.)	COLD START 60A(twidth=550 μs measured at 50% Ipeak) at 230VAC; Per NEMA 410			
	MAX. NO. of PSUs on 16A CIRCUIT BREAKER	3 units (circuit breaker of type B) / 6 units (circuit breaker of type C) at 230VAC			
	LEAKAGE CURRENT	<0.25mA / 277VAC			

	NO LOAD POWER CONSUMPTION	<0.5W			
PROTECTION	**OVERLOAD**	108 ~ 130% rated output power			
		Hiccup mode, recovers automatically after fault condition is removed			
	SHORT CIRCUIT	Shut down o/p voltage, re-power on to recover(except for DA2-type) Hiccup mode,recovers automatically after fault condition is removed (only for DA2-type)			
	OVER VOLTAGE	15 ~ 17V	28 ~ 34V	41 ~ 46V	54 ~ 60V
		Shut down o/p voltage, re-power on to recover			
	OVER TEMPERATURE	Shut down o/p voltage, re-power on to recover			
ENVIRONMENT	**WORKING TEMP.**	Tcase=-40 ~ +85℃ (Please refer to " OUTPUT LOAD vs TEMPERATURE" section)			
	MAX. CASE TEMP.	Tcase=+85℃			
	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.5**	UL8750(except for DA-Type), CSA C22.2 No. 250.13-12; ENEC BS EN/EN61347-1, BS EN/EN 61347-2-13 independent, BS EN/EN62384, IP67,BIS IS15885(for 12,24,48 Blank Type only), EAC TP TC 004,GB19510.1, GB19510.14 approved; Design refer to BS EN/EN60335-1;According to BS EN/EN61347-2-13 appendix J suitable for emergency installations(EL)(AC Input: 100-240Vac)(for DA2-Type only)			
	DALI STANDARDS	IEC62386-101, 102, 207,251 for DA/DA2-Type only,Device type 6(DT6)			
	WITHSTAND VOLTAGE	I/P-O/P:3.75KVAC; I/P-DA:1.5KVAC; O/P-DA:1.5KVAC			
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25℃/ 70% RH			

	EMC EMISSION Note.6	Compliance to BS EN/EN55015, 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, light industry level (surge immunity Line-Line 2KV), EAC TP TC 020
OTHERS	**MTBF**	2394.5K hrs min. Telcordia SR-332 (Bellcore) ; 224.2K hrs min. MIL-HDBK-217F (25℃)
	DIMENSION	171*63*37.5mm (L*W*H)
	PACKING	0.77Kg; 18pcs/14.9Kg/0.97CUFT
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated current and 25°C of ambient temperature. 2. De-rating may be needed under low input voltages. Please refer to “STATIC CHARACTERISTIC” sections for details. 3. 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. 4. 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. 5. This series meets the typical life expectancy of >50,000 hours of operation when Tcase, particularly (TC) point (or TMP, per DLC), is about 75°C or less. 6. Please refer to the warranty statement on MEAN WELL’s website at **http://www.meanwell.com** 7. The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft). 8. For any application note and IP water proof function installation caution, please refer our user manual before using. **https://www.meanwell.com/Upload/PDF/LED_EN.pdf** 9. Based on IEC 62386-101/102 DALI power on timing and interruption regulations, the set up time needs to test with a DALI controller which can support for DALI power on function, otherwise the set up time will be higher than 0.5 second for DA type. ※ Product Liability Disclaimer : For detailed information, please refer to **https://www.meanwell.com/serviceDisclaimer.aspx**	

■ DIMMING OPERATION



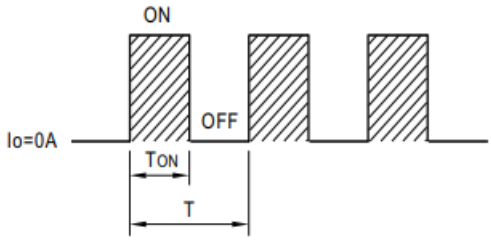
1. AC/L(Brown)
2. AC/N(Blue)
3. DIM+(Purple)*
4. DIM-(Pink)**
5. Vo+(Red)
6. Vo-(Black)

* DIM+ for Blank-Type
DA+ for DA/DA2-type
* *DIM- for Blank-Type
DA- for DA/DA2-type

※ Dimming principle for PWM style output

• Dimming is achieved by varying the duty cycle of the output current.

Output DC current



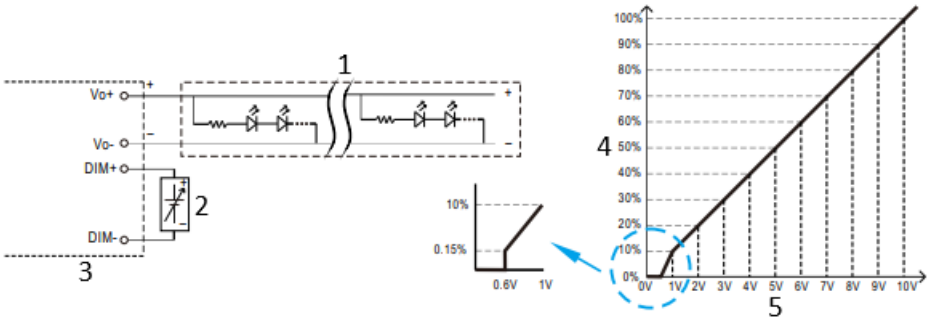
Duty cycle(%) = T ON/T ×100%

Output PWM frequency : 1.47kHz for Blank/DA-Type, 2.5kHz for DA2-Type

❉ 3 in 1 dimming function (for Blank-Type)

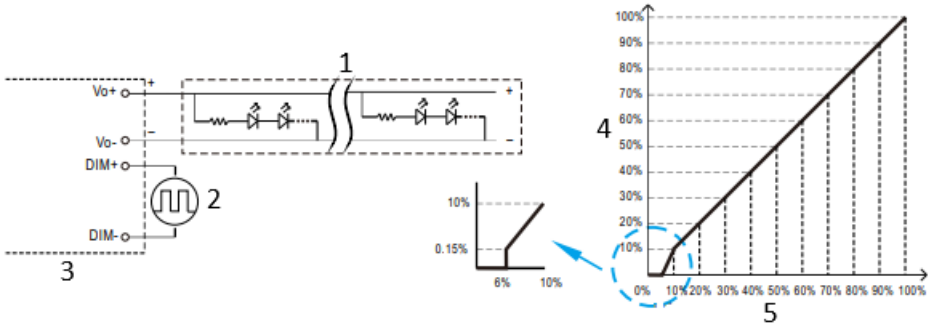
- Apply one of the three methodologies between DIM+ and DIM-: 0 ~ 10VDC, or 10V PWM signal or resistance.
- Dimming source current from power supply: 100μA (typ.)

◎ Applying additive 0 ~ 10VDC



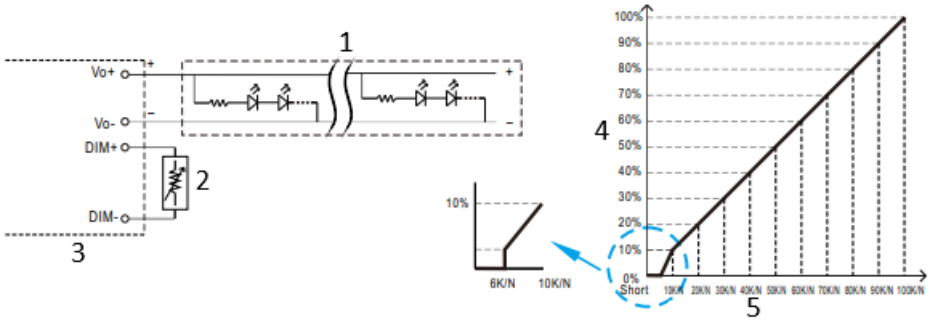
1. LED Strips
2. Additive Voltage
3. “DO NOT connect “DIM- to Vo-“
4. Duty cycle of output current (%)
5. Dimming input: Additive voltage

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



1. LED Strips
2. Additive PWM signal
3. “DO NOT connect “DIM- to Vo-“
4. Duty cycle of output current (%)
5. Duty cycle of additive 10V PWM signal dimming input

◎ Applying additive resistance:



1. LED Strips
2. Additive Resistance
3. “DO NOT connect “DIM- to Vo-“
4. Duty cycle of output current (%)
5. (N=driver quantity for synchronized dimming operation) Dimming input: Additive resistance

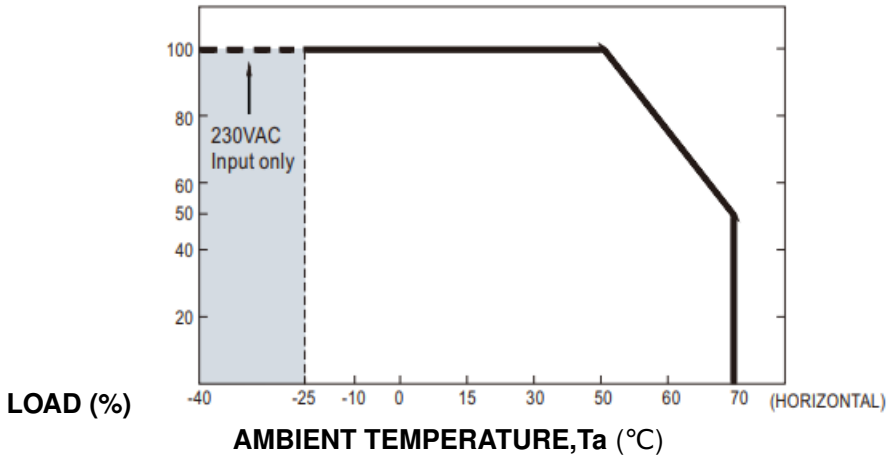
Note :

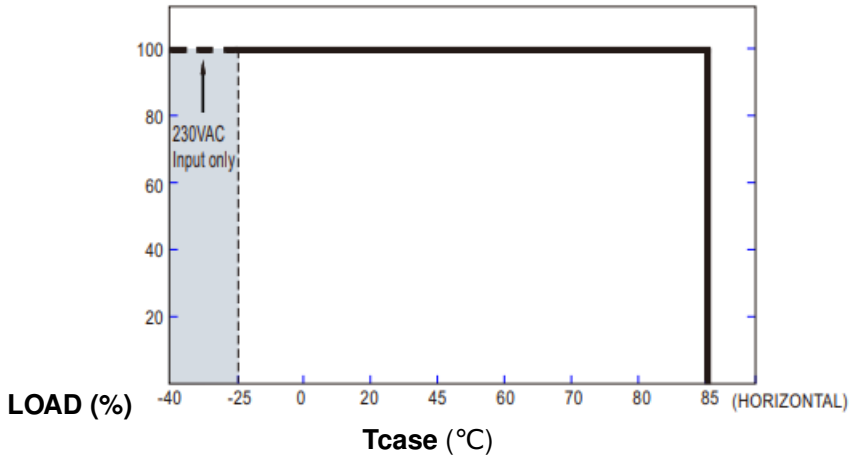
1. Min. duty cycle of output current is about 0.15%, and the dimming input is about 6KΩ or 0.6VDC, or 10V PWM signal with 6% duty cycle.
2. The duty cycle of output current could drop down to 0% when dimming input is less than 6KΩ or less than 0.6VDC, or 10V PWM signal with duty cycle less than 6%.

※ DALI Interface (primary side; for DA/DA2-Type)

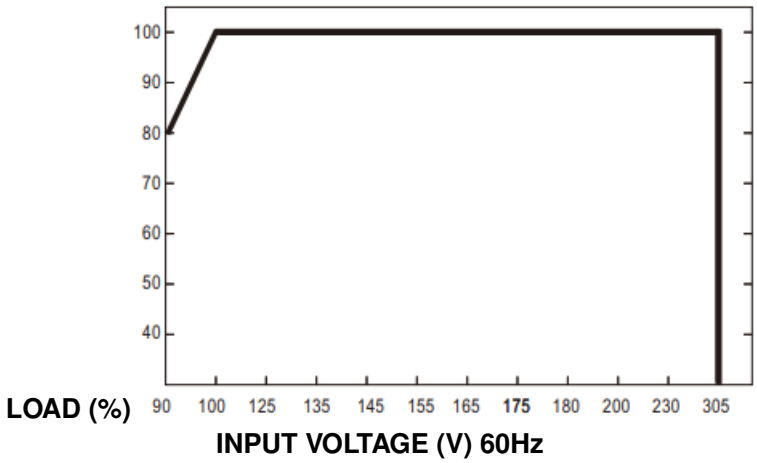
- Apply DALI signal between DA+ and DA-.
- DALI protocol comprises 16 groups and 64 addresses.
- First step is fixed at 0.2% of output

■ OUTPUT LOAD vs TEMPERATURE



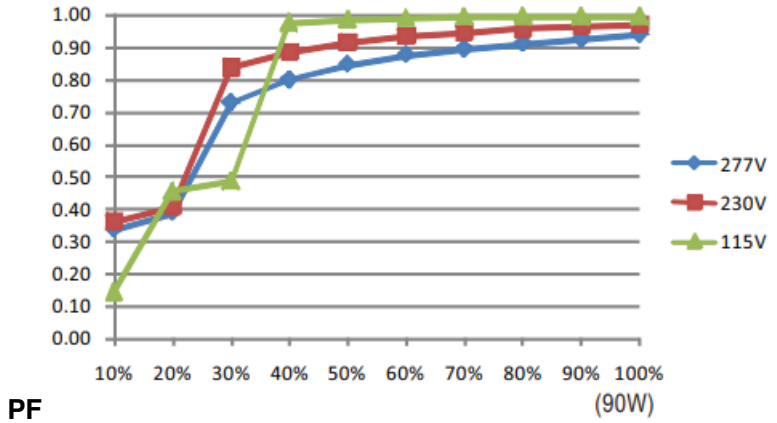


■ STATIC CHARACTERISTIC



■ POWER FACTOR (PF) CHARACTERISTIC

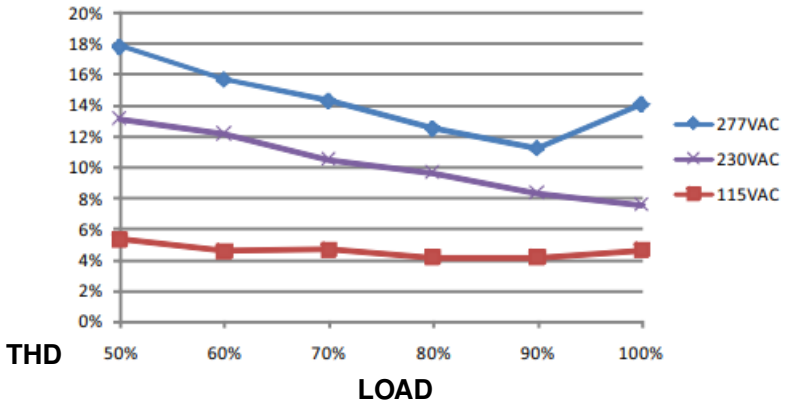
※ Tcase at 75℃



※De-rating is needed under low input voltage.

■ TOTAL HARMONIC DISTORTION (THD)

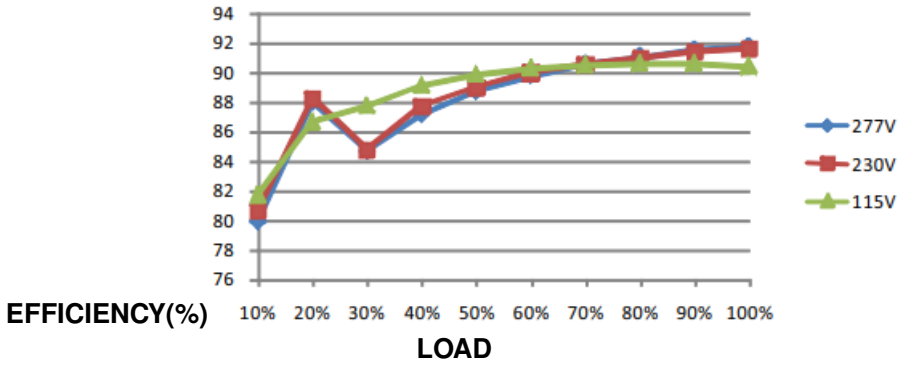
※ 48V Model, Tcase at 75℃



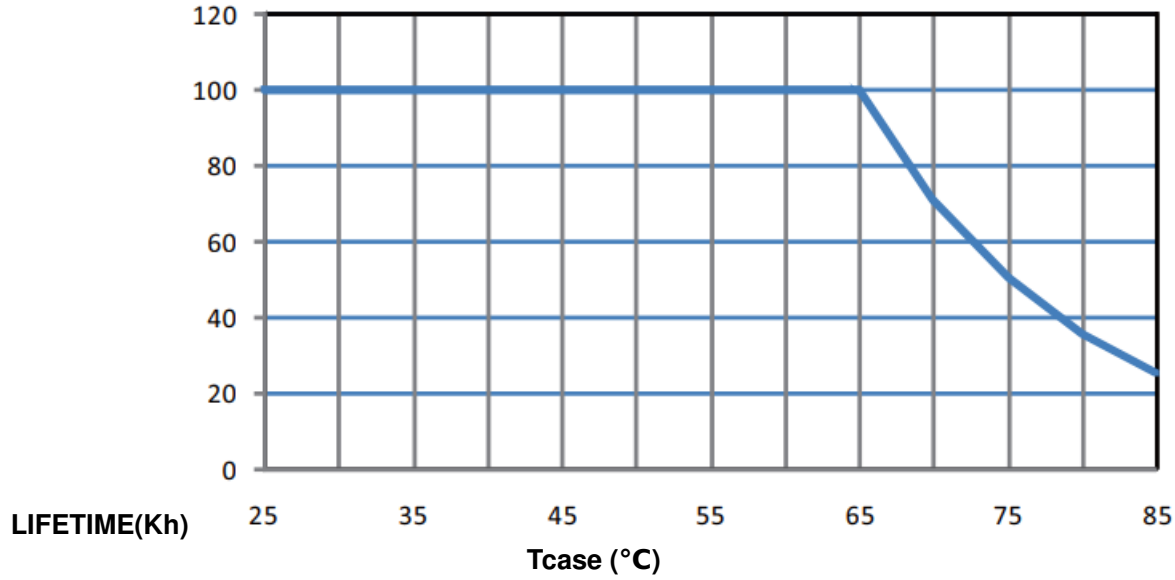
■ EFFICIENCY vs LOAD

PWM-90 series possess superior working efficiency that up to 90.5% can be reached in field applications.

※ 48V Model, Tcase at 75℃

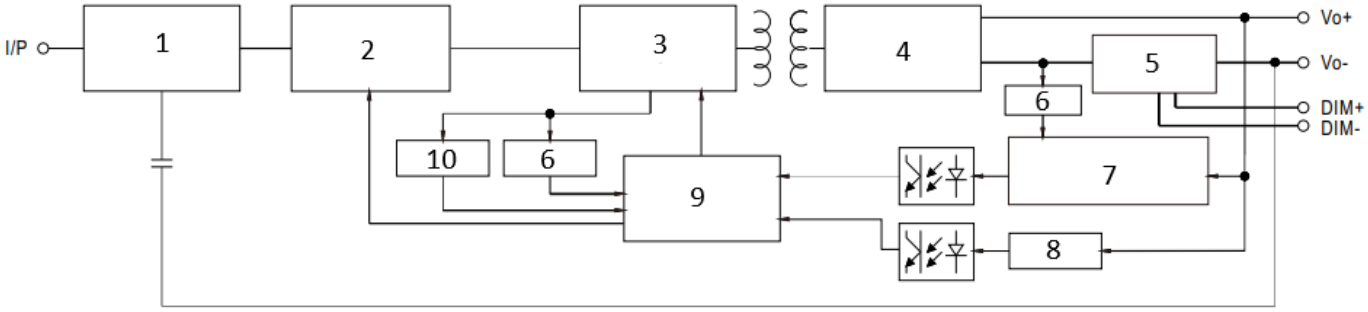


■ LIFE TIME



■ Block Diagram

PFC fosc : 50~120KHz
PWM fosc : 60~130KHz

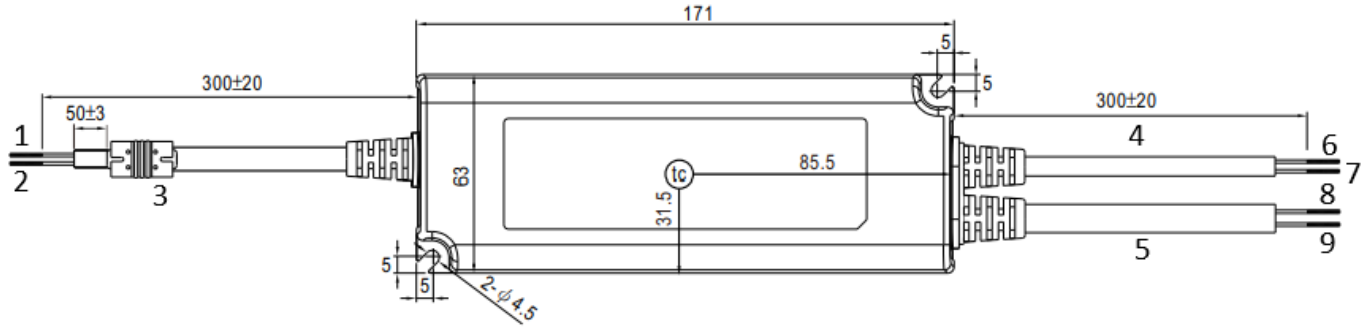


1. EMI FILTER RECTIFIERS
2. PFC CIRCUIT
3. POWER SWITCHING
4. RECTIFIERS & FILTER
5. DIMMING CIRCUIT
6. O.L.P.
7. DETECTION CIRCUIT
8. O.V.P.
9. PWM & PFC CONTROL
10. O.T.P

■ Mechanical Specification

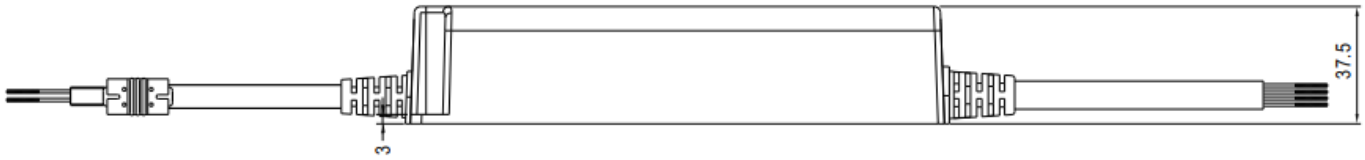
Case No. PWM-90P Unit: mm

Blank-Type

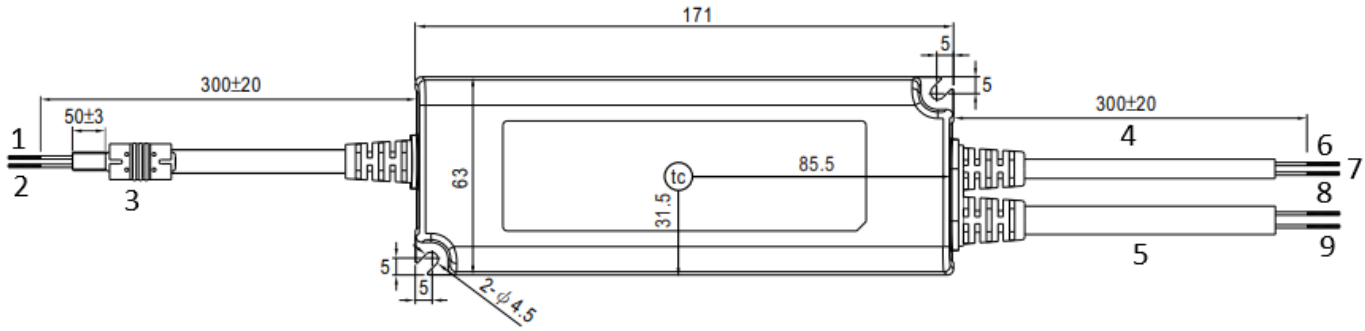


• (tc): Max. Case Temperature

1. AC/L(Brown)
2. AC/N(Blue)
3. SJTW 18AWG×2C
4. UL2464 18AWG×2C
5. SJTW 16AWG×2C
6. DIM+(Purple)*
7. DIM-(Pink)**
8. Vo+(Red)
9. Vo-(Black)



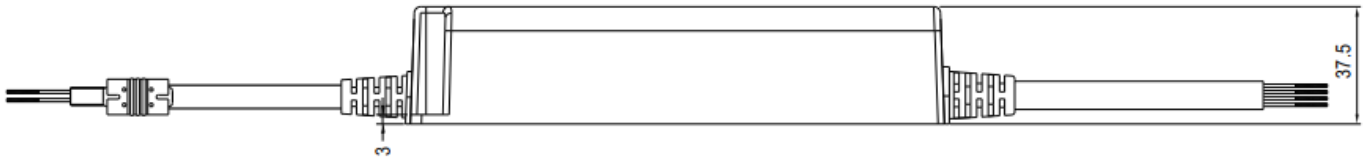
DA/DA2-Type



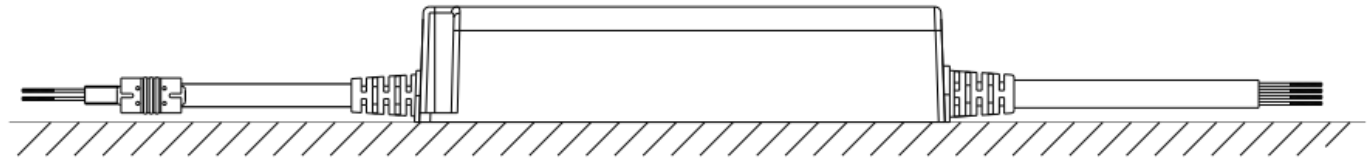
• (tc): Max. Case Temperature

1. AC/L(Brown)
2. AC/N(Blue)
3. SJOW 17AWG×2C&H05RN-F1.0mm2
4. UL2464 18AWG×2C
5. SJOW 17AWG×2C&H05RN-F1.0mm2
6. DA+(Purple)*
7. DA-(Pink)**
8. Vo+(Red)
9. Vo-(Black)

NOTE: DA/DA2 Type is no distinction between “+” and “-” poles

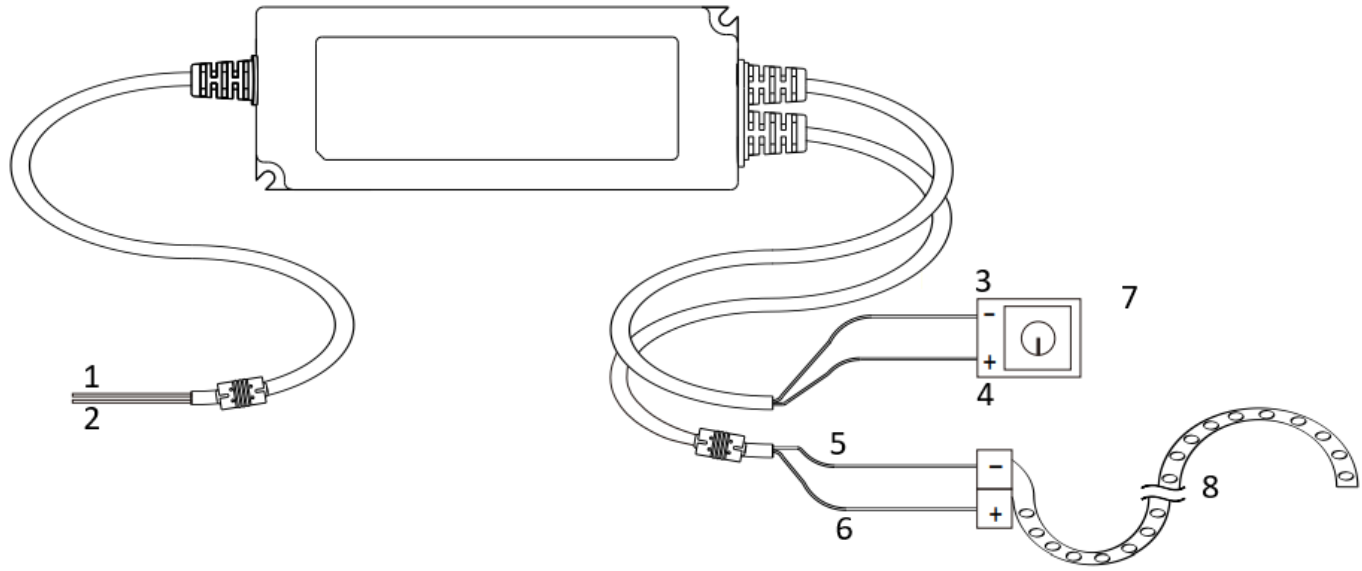


■ **Recommend Mounting Direction**



■ **Installation Manual**

◎ **Connection for Blank-type**



1. AC/L(BROWN)
2. AC/N(BLUE)
3. DIM-(PINK)
4. DIM+(PURPLE)
5. -V(BLACK)
6. +V(RED)
7. 0~10Vdc or 10V PWM
   or resistance Dimmer
   or DALI Dimmer
8. LED Strip

Cautions

- Before commencing any installation or maintenance work, please disconnect the power supply from the utility. Ensure that it cannot be re-connected inadvertently!

- Keep proper ventilation around the unit and do not stack any object on it. Also a 10-15 cm clearance must be kept when the adjacent device is a heat source.
- Mounting orientations other than standard orientation or operate under high ambient temperature may increase the internal component temperature and will require a de-rating in output current.
- Current rating of an approved primary /secondary cable should be greater than or equal to that of the unit. Please refer to its specification.
- For LED drivers with waterproof connectors, verify that the linkage between the unit and the lighting fixture is tight so that water cannot intrude into the system.
- For dimmable LED drivers, make sure that your dimming controller is capable of driving these units. PWM series require 0.15mA each unit.
- Tc max. is identified on the product label. Please make sure that temperature of Tc point will not exceed limit.
- DO NOT connect “DIM- to Vo-“.
- Suitable for indoor use or outdoor use without direct sunlight exposure. Please avoid immerse in the water over 30 minutes.
- 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.

File Name:PWM-90-SPEC 2022-11-28

Documents / Resources

	**MEAN WELL PWM-90 Series 90W Constant Voltage PWM Output LED Driver** [pdf] Owner's Manual PWM-90 Series 90W Constant Voltage PWM Output LED Driver, PWM-90 Series, 90W Constant Voltage PWM Output LED Driver, Voltage PWM Output LED Driver, PWM Output LED Driver, Output LED Driver, LED Driver