# MU150HxxxAQ_CLKS Series General - Outdoor

DWG NO. : MSSD-5453 A0

## ■ Features

- Input voltage: 90-305VAC
- Built-in active PFC function: 0.99 Typ.
- Low THD: 10% Typ.
- High efficiency: 93% Typ.
- IP67 design for indoor or outdoor installations
- High surge immunity
- Support Time-shared dimming function
- Compliance to worldwide safety regulations for lighting
- Suitable for dry/damp locations

## ■ Specification

| Model | | 035 | 045 | 053 | 070 | 085 | 105 | 120 | 140 | 150 | 175 | 185 | 210 | 245 | 280 | 300 | 315 | 350 | 420 | 500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (MU150HXXXAQ_CLKS) (1) | | | | | | | | | | | | | | | | | | | | |
| (MU150HXXXAQ_CLKS/II) (2) | | | | | | | | | | | | | | | | | | | | |
| Input | Efficiency(120Vac)(Typ.)Note.1 | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 89.0% | 89.0% | 89.0% | 89.0% | 89.0% | 89.0% | 89.0% | 89.0% | 89.0% | 88.0% | 88.0% | 88.0% | 88.0% | 88.0% |
| | Efficiency(230Vac)(Typ.)Note.1 | 93.0% | 93.0% | 93.0% | 93.0% | 93.0% | 92.0% | 92.0% | 92.0% | 92.0% | 92.0% | 92.0% | 92.0% | 92.0% | 92.0% | 91.0% | 91.0% | 91.0% | 91.0% | 91.0% |
| | Voltage Range (V)Note.2 | 90 ~ 305Vac, OR 127~ 430Vdc (Derating may be need under low inputs, Refer to 'Derating Curve' ) | | | | | | | | | | | | | | | | | | |
| | Voltage Rate (V)Note.2 | 100Vac-277Vac | | | | | | | | | | | | | | | | | | |
| | Frequency Range (Hz) | 47~63 | | | | | | | | | | | | | | | | | | |
| | Power Factor(Typ.) | 0.99 (Typ.) with 80%~100% load,at 120Vac | | | | | | | | | | | | | | | | | | |
| | | 0.96 (Typ.) with 80%~100% load,at 230Vac | | | | | | | | | | | | | | | | | | |
| | | >0.9 with 80%~100% load,at 277Vac | | | | | | | | | | | | | | | | | | |
| | THD(Typ.) | <10% at 220VAC input 50Hz,80%~100% load | | | | | | | | | | | | | | | | | | |
| | | <15% at 110VAC and 277VAC input 60Hz,80%~100% load | | | | | | | | | | | | | | | | | | |
| | AC Current(Typ.) | 1.8A at 100VAC input, 0.9A at 230VAC | | | | | | | | | | | | | | | | | | |
| | Inrush Current(Max.) | 65A at 230Vac input 25℃ Cold Start ( time wide=500uS, measured at 50% Ipeak,Not applicable for the inrush current to Noise Filter for less than 0.2ms) | | | | | | | | | | | | | | | | | | |
| | Leakage Current(Max.) | 0.75mA at 277VAC/60Hz input for class I; 0.5mA at 277VAC/60Hz input for classII | | | | | | | | | | | | | | | | | | |
| Output | Voltage range (V) | 214-428 | 167-333 | 142-283 | 107-214 | 88-176 | 71-142 | 63-125 | 54-107 | 50-100 | 43-85 | 41-81 | 36-71 | 31-61 | 27-53 | 25-50 | 24-48 | 21-42 | 18-36 | 15-30 |
| | Rated Current(mA) | 350 | 450 | 530 | 700 | 850 | 1050 | 1200 | 1400 | 1500 | 1750 | 1850 | 2100 | 2450 | 2800 | 3000 | 3150 | 3500 | 4200 | 5000 |
| | Rated Power (W) | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| | Ripple&Noise Current( Typ.) | ≤10%((PK-AV) /AV) with LED default mode and full load) | | | | | | | | | | | | | | | | | | |
| | Current Tolerance | ±5% | | | | | | | | | | | | | | | | | | |
| | Line Regulation | ±1% | | | | | | | | | | | | | | | | | | |
| | Load Regulation | ±3% | | | | | | | | | | | | | | | | | | |
| | Current ADJ. Range | - | | | | | | | | | | | | | | | | | | |
| | Turn on delay Time | <1.2s, at 120Vac; <1s, at 277Vac | | | | | | | | | | | | | | | | | | |
| Protection | Over Voltage(V) | 599 | 466 | 396 | 300 | 246 | 199 | 175 | 150 | 140 | 119 | 113 | 99 | 85 | 74 | 70 | 67 | 59 | 50 | 42 |
| | | Hiccup mode.The power supply shall be self-recovery when the fault is removed. | | | | | | | | | | | | | | | | | | |
| | Short Circuit | Protection type: Constant current limiting. | | | | | | | | | | | | | | | | | | |
| | Over temperature | Protection type : Decrease output current . When TC reaches 105±10℃ , the output current decrease to 50% rate value until the TC reaches 75±15 | | | | | | | | | | | | | | | | | | |
| Environment | Operating Temp. | -40~+70℃( Refer to 'Derating Curve' ) | | | | | | | | | | | | | | | | | | |
| | Tc | 90℃ max | | | | | | | | | | | | | | | | | | |
| | Operating Humidity | 20~95%RH | | | | | | | | | | | | | | | | | | |
| | Storage Temp., Humidity | -40~+80℃ , 10-95%RH | | | | | | | | | | | | | | | | | | |
| | Temp. Coefficient | 0.03%/℃ ( 0~50℃ ) | | | | | | | | | | | | | | | | | | |
| | Vibration | 10-500Hz,5G 12min/cycle , period for 72min each along X、Y、Z axes | | | | | | | | | | | | | | | | | | |
| Safety & EMC | Safety Standard | UL8750, UL1012, CAN/CSA-C22.2No.107.1-01,EN61347-1, EN61347-2-13 ,EN60598-1,EN62384,GB19510.1,GB19510.14,GB7000.1 | | | | | | | | | | | | | | | | | | |
| | Withstand Voltage | I/P-O/P:3.75KVAC I/P-FG:1.875KV O/P-FG:1.5KV for class I;I/P-O/P:3.75KVAC I/P-Case:3.75KV O/P--Case:1.5KV for class II | | | | | | | | | | | | | | | | | | |
| | Isolation Resistance | I/P-O/P ,I/P-FG,O/P-FG:100M Ohms/500VDC/25℃/70%RH for class I;I/P-O/P ,I/P-Case,O/P-Case:100M Ohms/500VDC/25℃/70%RH for class II | | | | | | | | | | | | | | | | | | |
| | EMC Emission | EN55015/FCC Part 15 Class B , EN61000-3-2 Class C , EN61000-3-3 | | | | | | | | | | | | | | | | | | |
| | EMC Immunity | 0-4-2,3,4,5,6,8,11 ( Surge L,N-FG 6KV , L-N 4KV ) , EN61547 for class I;EN61000-4-2,3,4,5,6,8,11 ( Surge L,N-Case 4KV , L-N 4KV ) , EN61547 fo | | | | | | | | | | | | | | | | | | |
| Others | MTBF | 300,000 Hours,measured at full load,25℃ ambient temperature | | | | | | | | | | | | | | | | | | |
| | Lifetime | 50,000 Hours at Tc 75℃(Refer to"Life Time VS. Tcase (Ref.)") | | | | | | | | | | | | | | | | | | |
| | Dimension | 221 x 67.5 x 40 (mm) ( LxWxH ) | | | | | | | | | | | | | | | | | | |
| | Weight | 1.05kg(Typ.) | | | | | | | | | | | | | | | | | | |

Note.1: Measured at full load and steady-state temperature in 25℃ ambient(Efficiency will be about 2% lower if measured immediately after startup ); Note. 2: Derating may be needed under low input voltages , Please Refer to 'Derating Curve' ; Note. 3: All parameters NOT specially mentioned are measured at 230VAC input , rated load and 25℃ of ambient temperature ;



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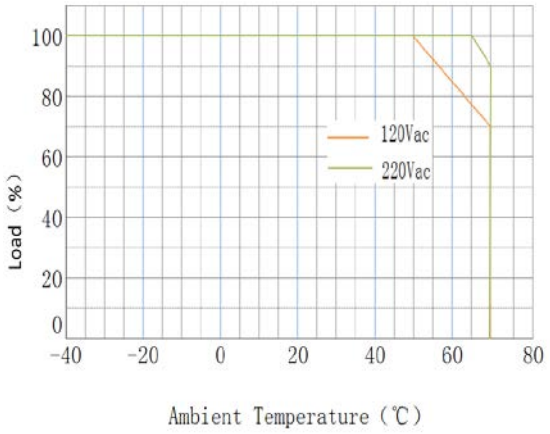
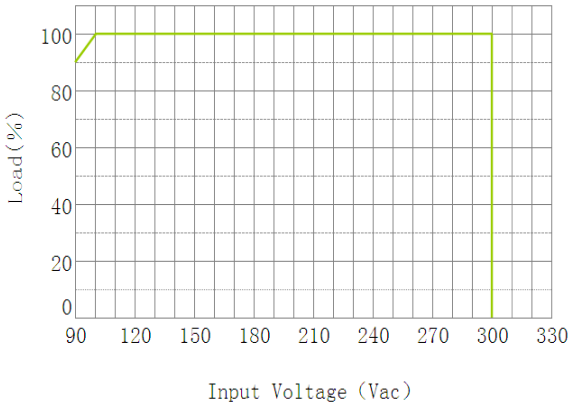
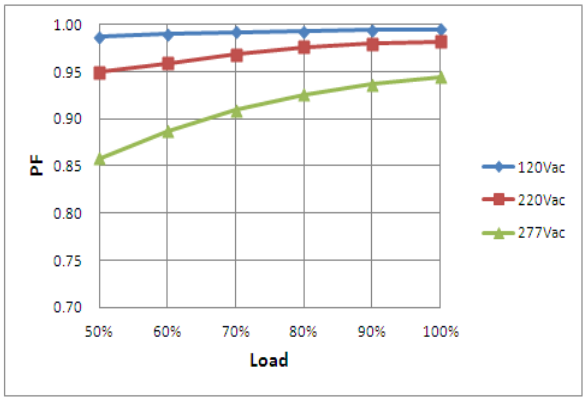
## Derating Curve

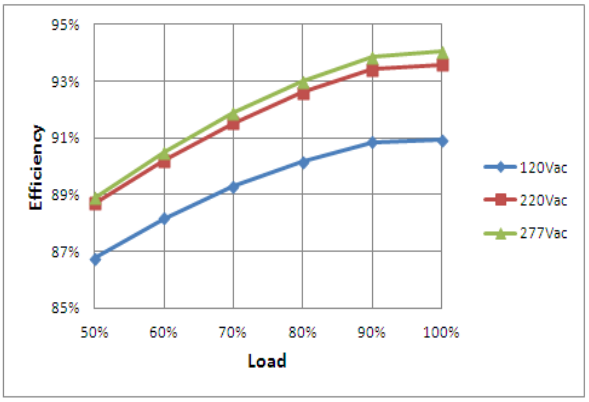


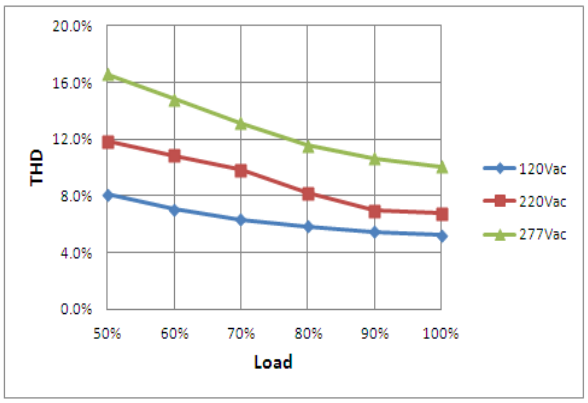

## Power Factor VS. Load Curve



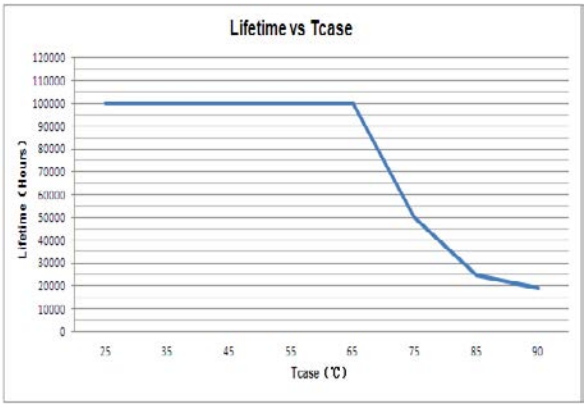

## Efficiency VS. Load Curve




## THD Curve




## Life Time VS. Tcase (Ref.)



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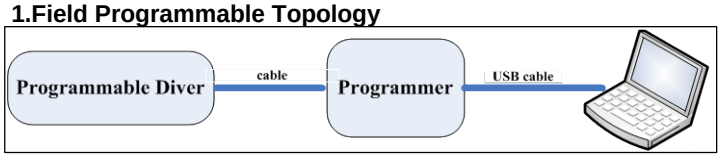
## ■ Instruction

### 1.Field Programmable Topology

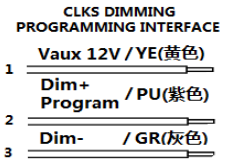



The programmable driver can be programmed by using special PC software and the programmer module.

### 2.Dimming Interface Description

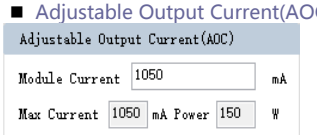
Pin description

| Pin | Name | Value | Description |
|---|---|---|---|
| 1 | Vaux 12V | 10.8V-13.2V | Passive dimmers power supply |
| 2 | Dim+/Program | 0-10V | Dimming/Programming input |
| 3 | Dim- | 0V | DC Ground |




### 3.Dimming Software Function Instruction

■ Adjustable Output Current(AOC)

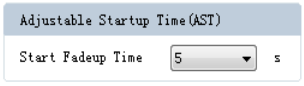



Users can set the rated current between 10%*Max Current and 100%*Max Current

■ PWM

Input a PWM signal from the 2nd pin(Dim+/Program) of the dimming interface to change the output current.User can set “Positive Logic” or “ Negative Logic” of the PWM signal. PWM duty circle: 1%~99%(it has both positive and negative logics ), frequency: 500Hz~5kHz, 3V~10V is

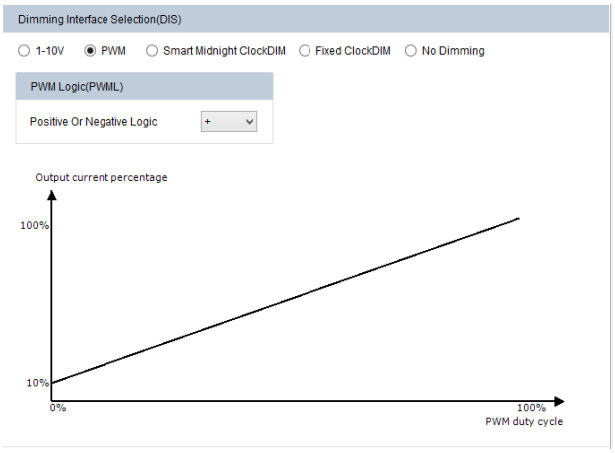
■ Adjustable Startup Time(AST)




Set driver’s “Start Fade up Time”. It means how much time the driver costs to achieve the “Module Current ” that the user set. The valid value is 0s, 1s, 2s, 5s, 10s, 20s, 40s.

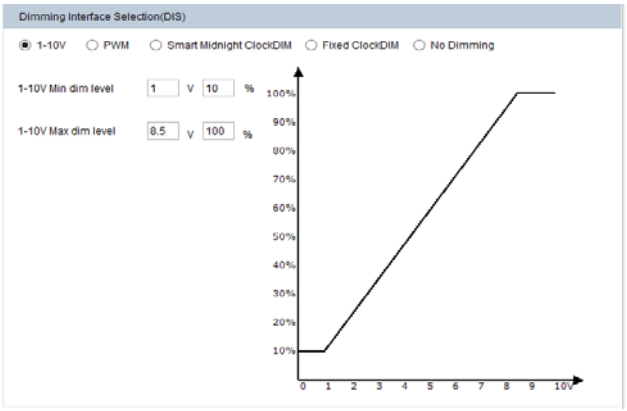
■ Fade Time(FT)


Set driver’s “Fade up Time”. This function is available in the Smart Midnight ClockDIM and Fixed ClockDIM mode; It means how much time the driver costs to achieve another dimming level from previous dimming level. The valid value is 0s, 1s, 2s, 5s, 10s, 20s, 40s.




■ 1-10V

Allow users to set the max and min output current and corresponding output voltage to clarify the 1-10V dimming curve. Input a 0~10V signal from 2nd pin of the dimming interface. Default: input ≤1V, output current 10%; input ≥



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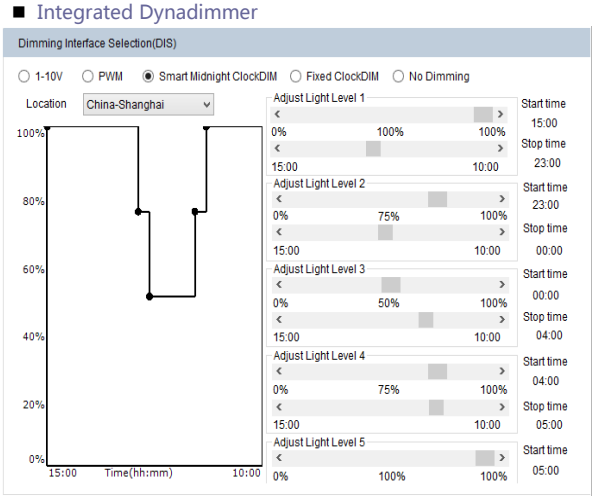
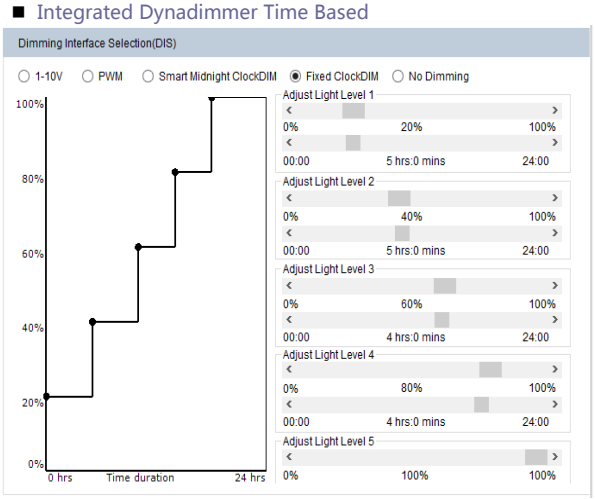
## ■ Instruction

### ■ Integrated Dynadimmer



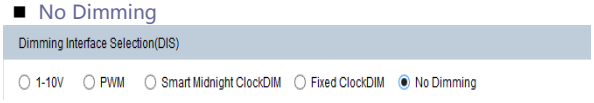

Integrated Dynadimmer allows dimming to predefined light levels based on the nightly operating time. With flexibility in setting time and light levels, the user can configure the driver for specific locations and application needs. Using Integrated Dynadimmer, it is possible to set up to 5 dim levels and time intervals. The driver does not have a real time clock. Instead it runs a virtual clock, determined by the length of nightly operating hours. After 3 ON-OFF cycles, the driver will calculate the virtual clock time. A valid ON-time is defined as a period during which the driver operates continuously for ⩾4 hours to ⩽24 hours. For example, if the requirement in summer is: 23:00-00:00: 75%, 00:00-04:00: 50%, 04:00-05:00: 75% (other time 100% or Off). The driver should be powered on for 7h, so it can calculate the virtual clock time as 22:00. Then we can set the dimming plan: 22:00~23:00: 100%, 23:00-00:00: 75%, 00:00-04:00: 50%, 04:00-05:00: 75%. From summer to winter, the valid ON-time changes day by day. The driver should be powered on for 17h in winter, and it also can calculate the virtual clock time as 17:00. Then the dimming plan is 17:00~23:00: 100%, 23:00-00:00: 75%, 00:00-04:00: 50%, 04:00-05:00: 75%, 05:00~10:00: 100%. From the above, if we set the dimming plan as shown in the picture, after repeating the driver ON-time for 3 consecutive days, the dimming plan takes effect from the 4th day onwards. Each day the driver powered on, it has a different start time according to the virtual clock

### ■ Integrated Dynadimmer Time Based



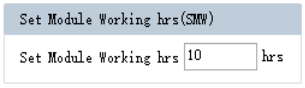

Allow users to separate 24hrs into 5 sections and corresponding output current.

### ■ No Dimming



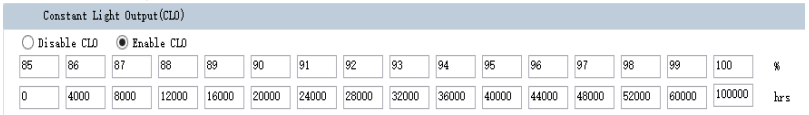

The driver will be in constant output mode.

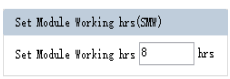
### ■ Set MODULE Working hrs(SMW)

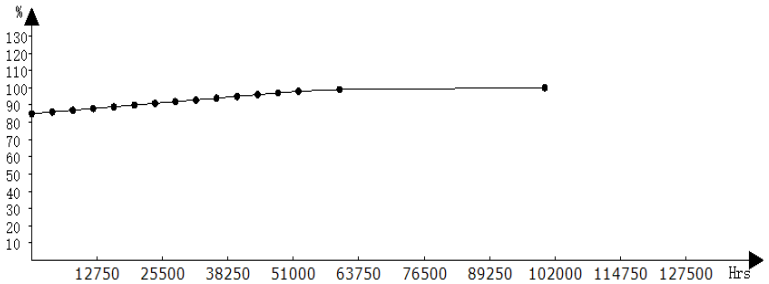



User can check how much time the driver works through this function.

### ■ Constant Light Output(CLO)




Traditional light sources suffer from depreciation in light output over time. This applies to LED light sources as well. The CLO feature enables LED solutions to deliver constant lumen output through the life of the light engine. Based on the type of LEDs used, heat sinking and driver current, it is possible to estimate the depreciation of light output for specific LEDs and this information can be entered into the driver. The driver counts the number of light source working hours and will increase output current based on this input to enable CLO.
When the CLO feature is enabled, the driver nominal output current will be defined by the CLO percentage as shown by the equation below:
Driver target nominal output current = CLO percentage * AOC. For example, in the CLO profile shown in Figure, between 52,000-60,000 working hours, the CLO percentage is set at 98%. Assuming the nominal AOC is set to 500mA, the driver output current with CLO enabled will be 0.98 x 500 = 600 mA.
The CLO percentage can be set to a value between 85%-100%, in increments of 1%. The LED module



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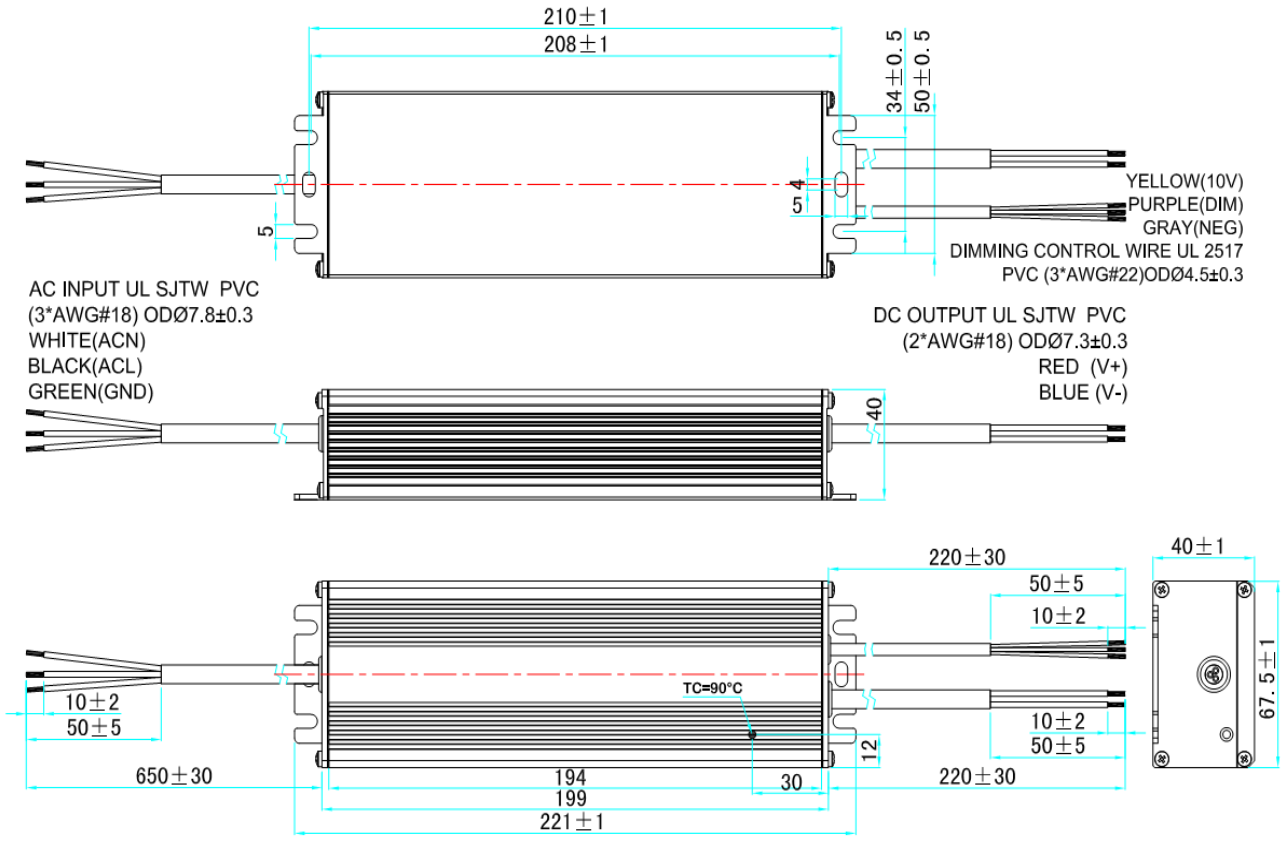
## ■ Mechanical Specification

1.Dimensions(Unit:mm)




### RoHS Compliance:

Our products comply with the European Directive 2002/95/EC, calling for the elimination of lead and other hazardous substances from electronic products.

2.Terminal wire Type

| Products | AC Input | | | DC output | | | Dimming control | | |
|---|---|---|---|---|---|---|---|---|---|
| | Wire Type | Assignment | Description | Wire Type | Assignment | Description | Wire Type | Assignment | Description |
| ENEC/CE apporval for claas II | RUBBER CCC+VDE 60245 IEC57 YZW/H05RN-F | BROWN/L<br>BLUE/N | 2*1.0mm$^2$ ODΦ 6.8±0.3mm | RUBBER CCC+VDE 60245 IEC57 YZW/H05RN-F | Brown/+<br>Blue/- | 2*1.0mm$^2$ ODΦ 6.8±0.3mm | H05HRN-FODΦ 6.3±0.2mm or UL2517 PVCODΦ 4.5±0.3mm | BK/WH or YE/10V<br>PU/DIM+<br>GR/DIM- | 3*0.5mm2 or 3*AWG#22 |
| UL apporval | UL SJTW PVC | BLACK/L<br>WHITE/N<br>GREEN/GN | 3*AWG#18 | UL SJTW PVC | RED/+<br>BLUE/- | 2*AWG#18 | UL2517 PV CODΦ 4.5±0.3mm | YE/10V<br>PU/DIM+<br>GR/NEG | 3*AWG#22 |
| PSE apporval | PSE HVCTF/VCTF/VCTFK PVC | BLACK/L<br>WHITE/N<br>YE-GN/GND | 3*0.75mm$^2$ ODΦ 6.8±0.3mm | PSE HVCTF/VCTF/VCTFK PVC | WHITE/+<br>BLACK/- | 2*0.75mm$^2$ ODΦ 6.7±0.3mm | UL2517 PVCODΦ 4.5±0.3mm | YE/10V<br>PU/DIM+<br>GR/NEG | 3*AWG#22 |
| CCC/CB/CE apporval | RUBBER CCC+VDE 60245 IEC57 YZW/H05RN-F | BROWN/L<br>BLUE/N<br>YE-GN/GND | 3*1.0mm$^2$ ODΦ 7.3±0.3mm | RUBBER CCC+VDE 60245 IEC57 YZW/H05RN-F | Brown/+<br>Blue/- | 2*1.0mm$^2$ ODΦ 6.8±0.3mm | H05HRN-FODΦ 6.3±0.2mm or UL2517 PVCODΦ 4.5±0.3mm | BK/WH or YE/10V<br>PU/DIM+<br>GR/DIM- | 3*0.5mm2 or 3*AWG#22 |



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