



## Product Datasheet

The global certified TYKT1K5-C is a non-isolated extremely wide input smart LED driver with multiple output. 20kV surge protection level, 100khour long life and 7-year warranty provide high confidence to luminaire users. It supports not only traditional 4-in-1 control, but also D4i and DMX/RDM protocols. NFC and cable programming are both available. All around protections including digital OTP (internal and external by NTC) with auto-recovery secure 24hour non-stop operation for luminaires.



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## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

### ■ Features

- Absolute Supply Voltage: 180~528Vac
- 20kV Built-in Surge Protector
- 97% Efficiency Max.
- Low Frequency Ripple (Broadcasting Level)
- 0.1% Minimum Analog Output Dimming
- Fast Dimming and Quick Flashing
- Low Inrush Current
- 100,000Hour Life @ Tc=75°C
- 7 Year Warranty @ Tc<=75°C
- Lumen Compensation
- +/-2% Output Current Accuracy
- 0-10V/PWM/D4i/DALI2/DMX/RDM Support
- DALI Type 6 (SimplySnap Compatible)
- Daisy Chain Control Connection
- All-Channel Sync Mode (Parallel Support)
- 1% Energy Report Accuracy
- NFC Programmability
- Glow-free Dim Off
- 24V 3W Auxiliary Power
- IP66 and IK08 Enclosure
- Safety according to UL8750, EN 61347-1, 61347-2-13, 62384

### ■ Model List

| Model Number     | Input Voltage Range                       | Output Power/Channel | Output Voltage | Full Power Settable Current Min | Full Power Settable Current Max | Certification  |
|------------------|-------------------------------------------|----------------------|----------------|---------------------------------|---------------------------------|----------------|
| TYKT1K5-C140-XYC | 180~528Vac                                | 500 W x 3            | 214-500Vdc     | 1A                              | 1.4A                            | UL/ENEC/CB/RCM |
| TYKT1K5-C210-XYC |                                           |                      | 143-357Vdc     | 1.4A                            | 2.1A                            |                |
|                  |                                           |                      |                |                                 |                                 |                |
| XY=              | Dimming Method                            |                      | Programmable   |                                 | Vaux                            | Dim-off        |
| ER               | 0-10V + PWM                               |                      | NFC            |                                 | 24V 120mA                       | √              |
| AR               | D4i + DALI2                               |                      | NFC            |                                 | 24V 120mA                       | √              |
| MR               | RDM + DMX                                 |                      | NFC            |                                 | -                               | √              |
| GR               | RDM + DMX + D4i + DALI2<br>Auto Detective |                      | NFC            |                                 | 24V 120mA                       | √              |

## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

### ■ Technical Data

|                                |                                                                                                                           |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Input Voltage                  | 180~528Vac                                                                                                                |
| Input Frequency                | 47~63Hz                                                                                                                   |
| Power Factor                   | >0.9@60-100%load, refer to PF vs. Load curve                                                                              |
| THD                            | <15%@60-100%load, refer to THD vs. Load curve                                                                             |
| Input Current                  | 7.6Amax@208Vac & Full-Load, 7.1Amax@220Vac & Full-Load<br>5.8Amax@277Vac & Full-Load, 3.5Amax@480Vac & Full-Load          |
| Inrush Current                 | See Inrush Current Section in the datasheet                                                                               |
| Leakage Current                | 0.75MIU max @480Vac 60Hz, UL8750<br>0.7mA max @400Vac 50/60Hz, IEC60598-1                                                 |
| Input Under Voltage            | Shut down and auto-restart                                                                                                |
| Surge Protection               | Line to line 20kV, line to ground 20kV, IEC 61000-4-5                                                                     |
| Current Accuracy               | ±2%Io                                                                                                                     |
| Ripple Current                 | Ip <sub>pk-pk</sub> : low frequency (<=3kHz) 1%Io typ., 2%Io max.<br>high frequency (>3kHz) 12%Io typ., 15%Io max.        |
| TLA (Temporal Light Artifacts) | PstLM<0.02, SVM<0.05, IEC-61547-1                                                                                         |
| Percent Flicker                | 1% max. Broadcasting level, GB/T-38539-2020                                                                               |
| Setup Time                     | 2s max                                                                                                                    |
| Overshoot                      | 10% Io max & LED Load                                                                                                     |
| Output Over Voltage            | 125% Vomax, typ.                                                                                                          |
| Short Circuit                  | Auto recovery. The output recovers when short is removed.                                                                 |
| Over Temperature               | Lower the output current when $T_c \geq 100 \pm 10^\circ\text{C}$ ; Auto Recovery When $T_c \leq 70 \pm 10^\circ\text{C}$ |
| Operating Temperature          | Case Temperature $T_c = -40^\circ\text{C} \sim +85^\circ\text{C}$ ; 10%RH~100%RH                                          |
| Storage Temperature            | $-40^\circ\text{C} \sim +85^\circ\text{C}$ ; 5%RH~100%RH                                                                  |
| MTBF                           | $\geq 320,000$ hours, $75^\circ\text{C}$ case temperature (MIL-HDBK-217F)                                                 |
| Lifetime                       | $\geq 100,000$ hours, $75^\circ\text{C}$ case temperature, refer to life vs. $T_c$ curve                                  |
| Case Temperature               | $85^\circ\text{C}$ max, marked in the $T_c$ point of label                                                                |
| Dimension                      | 500x152x90 mm                                                                                                             |
| Net Weight                     | 7500g                                                                                                                     |
| Packing                        | See Package Information Section in the datasheet                                                                          |

Notes: Unless specified, all the test results are measured in  $25^\circ\text{C}$  room temperature.

## ■ Safety/EMC Compliance

| Safety Standards | Description                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------|
| UL8750           | Light emitting diode(LED) equipment for use in lighting products                                                      |
| UL1012           | Power units other than class 2                                                                                        |
| IEC 61347-1      | Lamp control gear Part 1: general and safety requirements                                                             |
| IEC 61347-2-13   | Lamp control gear Part 2-13: particular requirement for d.c. or a.c. supplied electronic control gear for LED modules |
| IEC 62384        | DC or AC supplied electronic control gear for LED modules - Performance requirements                                  |
| EMC Standards    | Description                                                                                                           |
| IEC 55015        | Conducted emission test & radiated emission test                                                                      |
| IEC 61000-3-2    | Harmonic current emissions; Class C                                                                                   |
| IEC 61000-3-3    | Voltage fluctuations & flicker                                                                                        |
| FCC Part 15      | ANSI C63.4:2009 Class B                                                                                               |
| IEC 61000-4-2    | Electrostatic discharge (ESD): 8 kV air discharge, 4 kV contact discharge                                             |
| IEC 61000-4-3    | Radio frequency electromagnetic field susceptibility test (RS)                                                        |
| IEC 61000-4-4    | Electrical fast transient (EFT)                                                                                       |
| IEC 61000-4-5    | Surge immunity test                                                                                                   |
| IEC 61000-4-6    | Conducted radio frequency disturbances test (CS)                                                                      |
| IEC 61000-4-8    | Power frequency magnetic field test                                                                                   |
| IEC 61000-4-11   | Voltage dips                                                                                                          |
| IEC 61547        | Electromagnetic immunity requirements applies to lighting equipment                                                   |

## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

## ■ Dimming

| Parameter                                                 | Min.                                                                         | Typ.       | Max.                      |
|-----------------------------------------------------------|------------------------------------------------------------------------------|------------|---------------------------|
| 0-10V Vdim Sourcing Current                               | 100uA                                                                        | 150uA      | 200uA                     |
| 0-10V Vdim Allowed Input Voltage                          | -20 V                                                                        |            | 20 V                      |
| 0-10V Dimming Range                                       | 0.1% (Vdim=1V)                                                               | Linear     | 100%<br>(Vdim=9 or 10V)   |
| PWM Dimming Range                                         | 0.1% (Duty=10%)                                                              | Linear     | 100%<br>(Duty=90 or 100%) |
| Dim off threshold                                         | 0.4V or 4%                                                                   | 0.5V or 5% | 0.6V or 6%                |
| Dim on threshold                                          | 0.6V or 6%                                                                   | 0.7V or 7% | 0.8V or 8%                |
| PWM High                                                  | 3.8V                                                                         |            | 10V                       |
| PWM Low                                                   | 0V                                                                           |            | 0.6V                      |
| PWM Frequency                                             | 300Hz                                                                        |            | 2kHz                      |
| External PWM Controller Current Sinking Capability        | 300uA                                                                        |            |                           |
| DALI Interface Standard                                   | IEC62386-101,102,150,207,250,251,252,253                                     |            |                           |
| Dimming Range                                             | 0.1%                                                                         | -          | 100%                      |
| DA1,DA2 High Level                                        | 9.5V                                                                         | 16V        | 22.5V                     |
| DA1,DA2 Low Level                                         | -6.5V                                                                        | 0          | 6.5V                      |
| DA1,DA2 Current                                           | 0                                                                            |            | 2mA                       |
| Default Memory Bank 1 CCT Value (Address 0x22 Definition) | CH1: Red, 0x01, CH2: Green, 0x02, CH3: Blue, 0x03<br>(SimplySnap Compatible) |            |                           |
| Bus Power Supply Voltage                                  | 12Vdc                                                                        | 16Vdc      | 20Vdc                     |
| Bus Power Supply Current                                  | 52mA                                                                         | -          | 60mA                      |
| Auxiliary Power Voltage                                   | 21.6V                                                                        | 24V        | 26.4V                     |
| Auxiliary Power                                           | 3W                                                                           | -          | 4W                        |
| Auxiliary Power Endurance @6W                             | 3.8ms/6ms                                                                    | -          | 4.5ms/6ms                 |
| Auxiliary Power Endurance @10W                            | 1.8ms/6ms                                                                    | -          | 2.2ms/6ms                 |
| Standby Power (Dim Off Mode)                              | 0.5W @220Vac<br>1W @480Vac                                                   |            |                           |
| DALI Bus Power Supply Current                             | 52mA                                                                         | -          | 60mA                      |
| DMX Dimming Range                                         | 0.1%                                                                         | -          | 100%                      |
| DMX+ & DMX- Voltage                                       | -6V                                                                          |            | 6V                        |
| DMX to Ground Resistance                                  | 25Mohm                                                                       |            |                           |
| Logic 0/1 (DMX+ to DMX-) Threshold                        |                                                                              | 0.2V       |                           |
| Communication Baud Rate                                   |                                                                              | 250kbps    |                           |
| DMX Dimming Range                                         | 0.1%                                                                         | -          | 100%                      |
| Fast Dimming On-Off Transition                            |                                                                              | 50ms       |                           |
| Fast Dimming 10-100% Io Transition                        |                                                                              | 30ms       |                           |

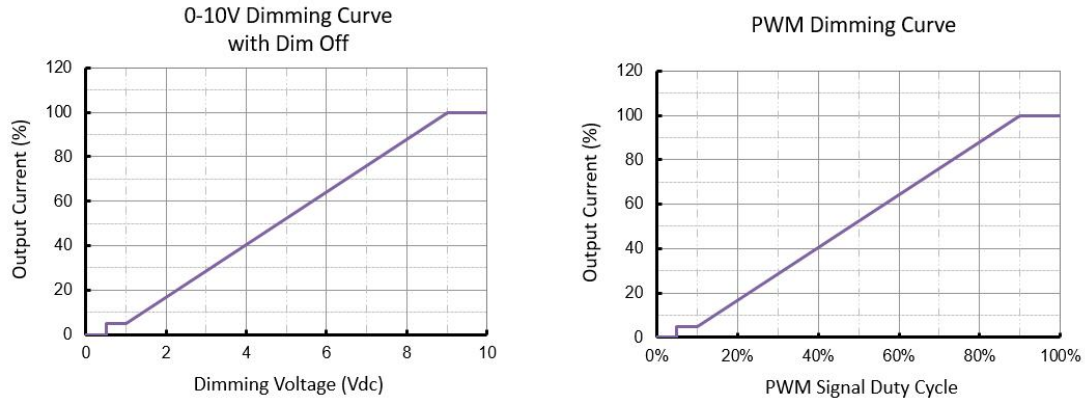
## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

### - Quick Flashing Mode

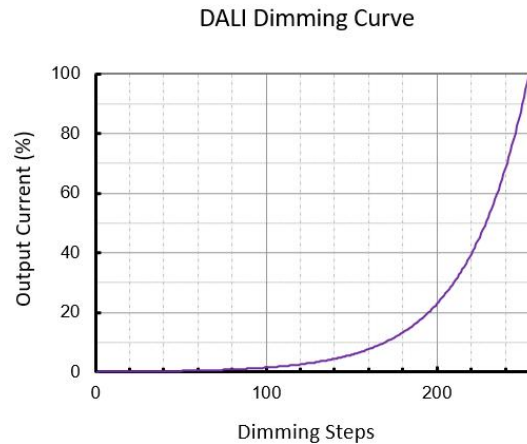
| Parameter                   | Min. | Typ. | Max.  |
|-----------------------------|------|------|-------|
| 0-10V Dimming Models        | -    | -    | 30fps |
| DALI and DMX Dimming Models | -    | -    | 44fps |

### - Default Dimming Curves

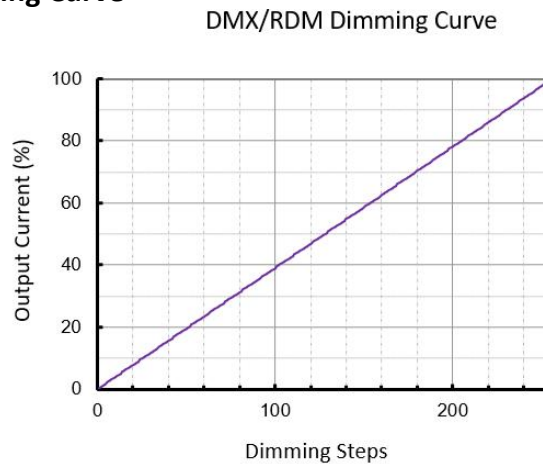
#### - 0-10V/PWM Dimming Curve (Minimum dimming level can be customized by PC software)



### - DALI/D4i Dimming Curve



### - DMX512/RDM Dimming Curve



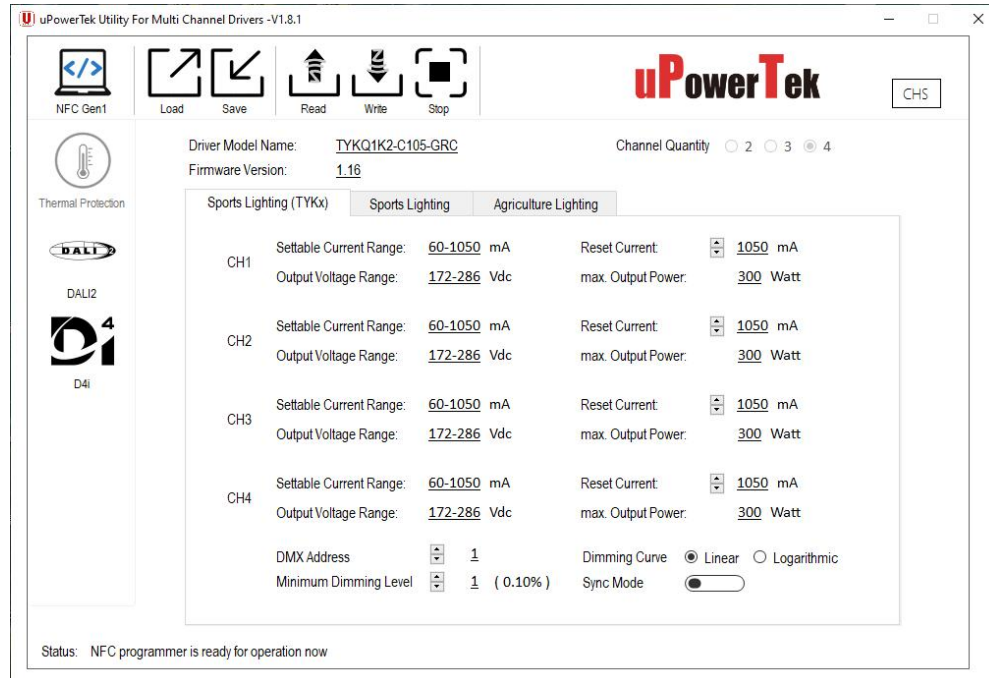
Note: Both DALI and DMX dimming curves can be customized to be linear or logarithmic as default.

## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

### ■ Programming

#### - Programmable Functions

uPowerTek LED drivers offer a range of configurable functions to meet specific lighting requirements. The Output Current, Dimming Mode, Dim Off/On Voltage Threshold, and Minimum Dimming Level can be set as basic programming functions. Users can also benefit from programming Thermal Protection, DALI/D4i Features, and DMX addressing. And Sync Mode provides possibility to control multiple channels by single DALI or DMX address.



uPowreTek Programming Software Interface

#### - Required Equipment

To program uPowerTek LED drivers, users will need specific equipment based on their preferred method. For NFC wireless programming, users can use a smartphone with either IOS or Android, the uPowerTek NFC Programmer, or the FEIG NFC Programmers. These tools ensure a seamless and efficient setup process, realizing precise customization of the LED driver settings.



NFC Programmer V1



NFC Programmer V2



FEIG NFC Programmer



Android or iPhone

## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

### - Connection Guide

This guide provides simple connection diagrams to help users understand the programming system. For more detailed operating instructions, including step-by-step procedures and additional configurations, please visit our website. You can download the comprehensive user manual and necessary software from the following link:

<https://www.upowertek.com/download-2/>.

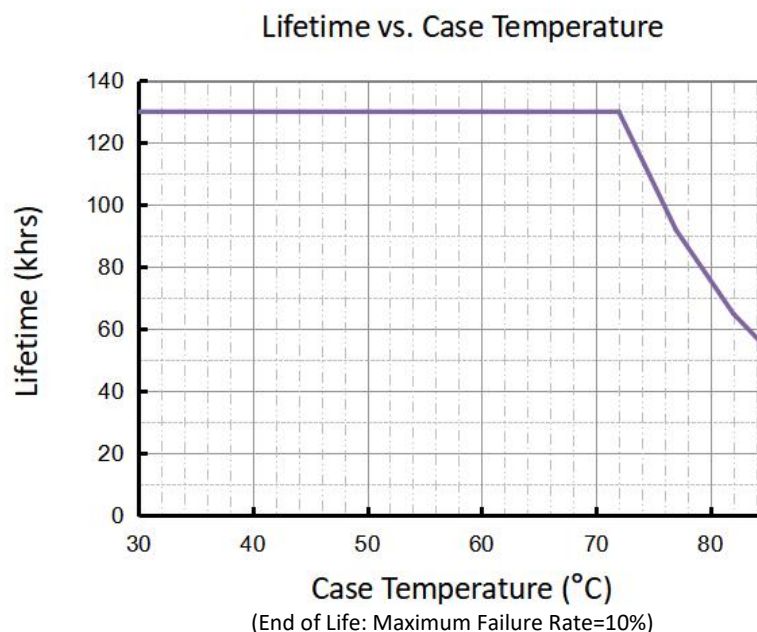


PC NFC Programming

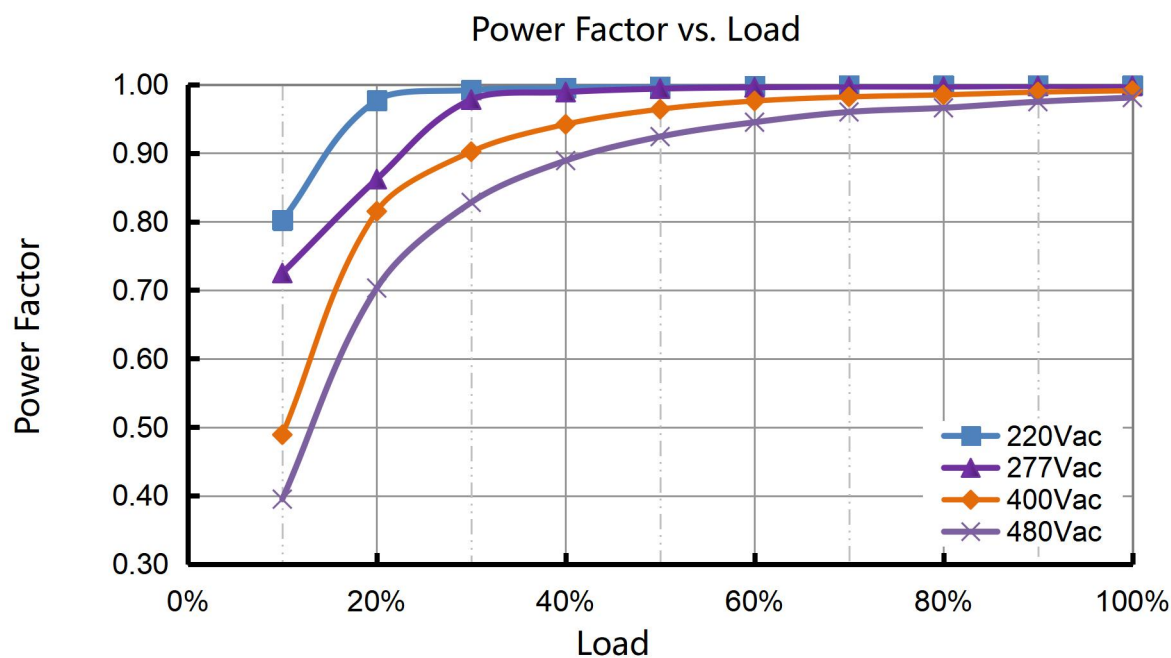


Cellphone NFC Programming

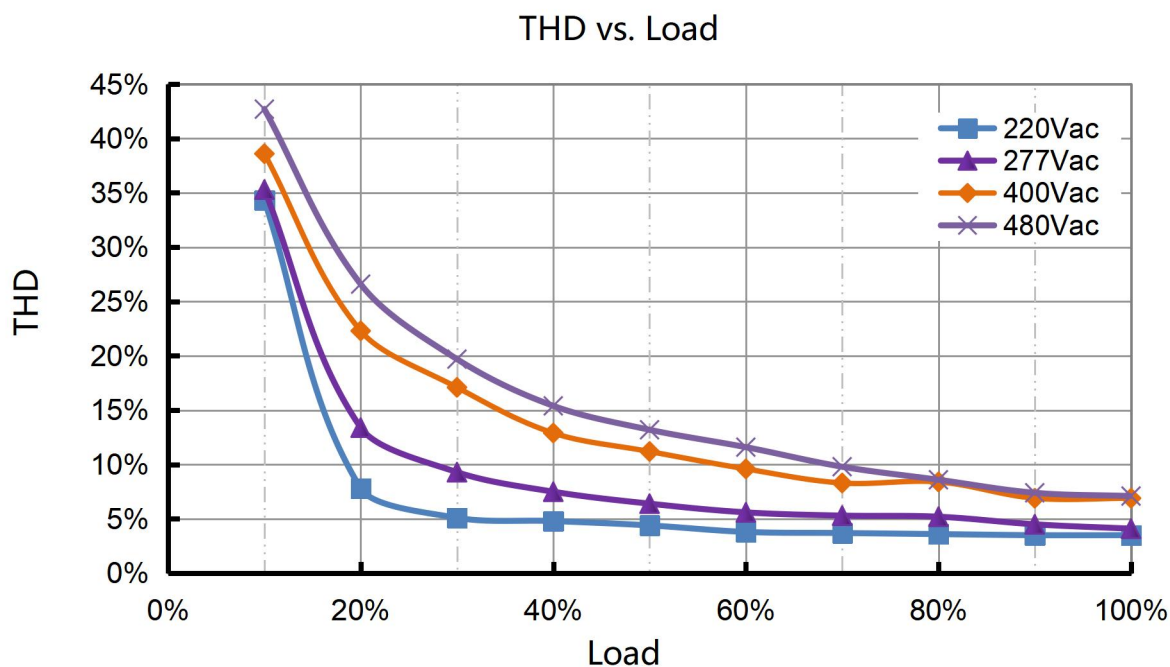
### ■ Lifetime vs. Case Temperature



## Power Factor vs. Load

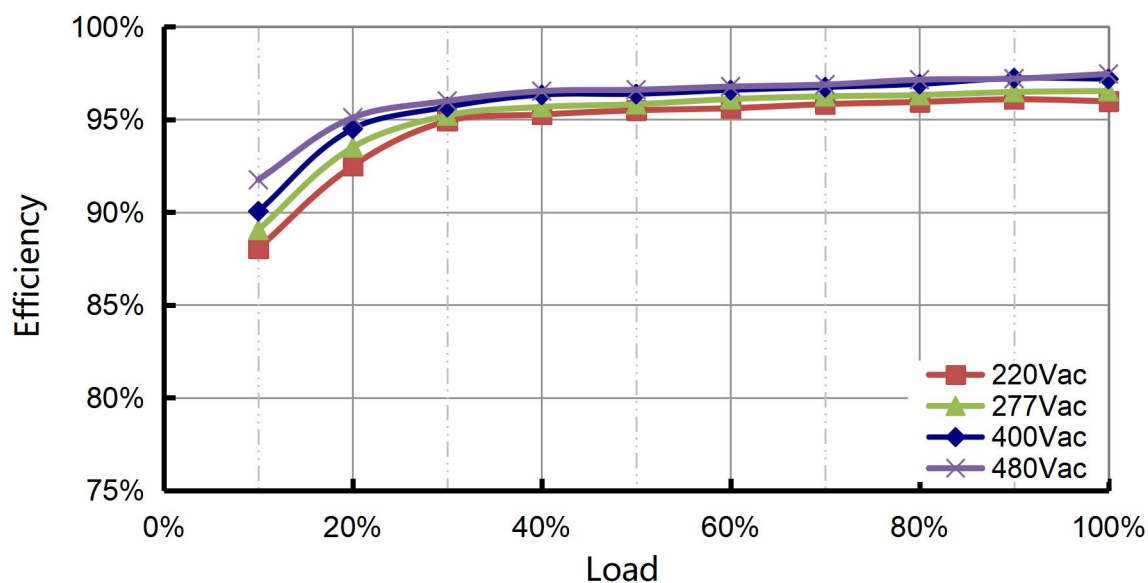


## THD vs. Load

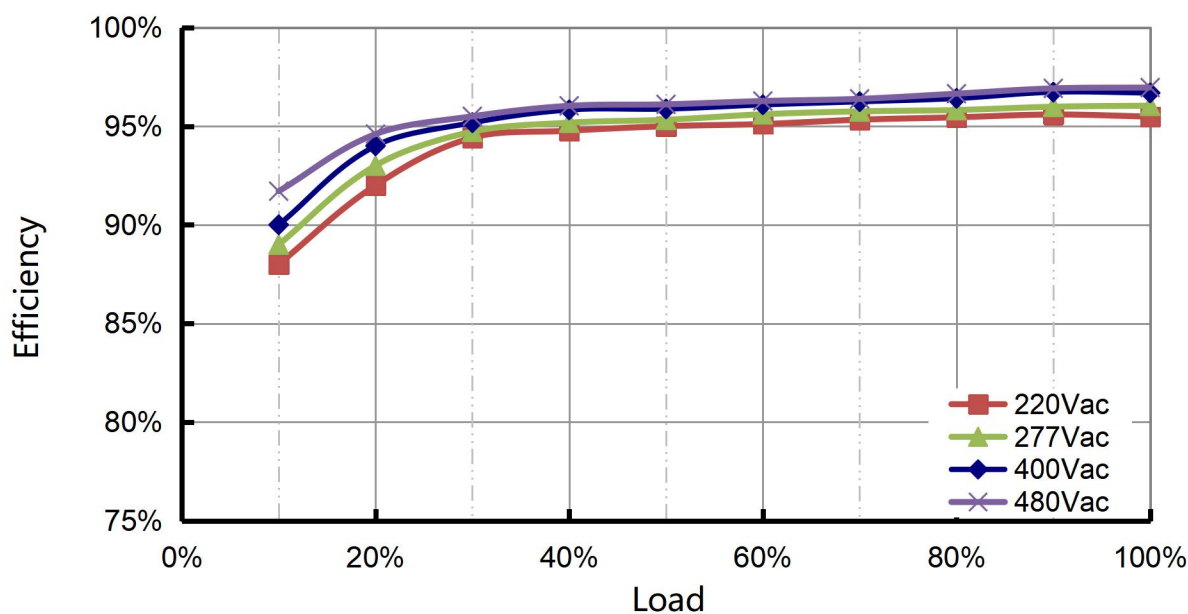


## ■ Efficiency vs. Load

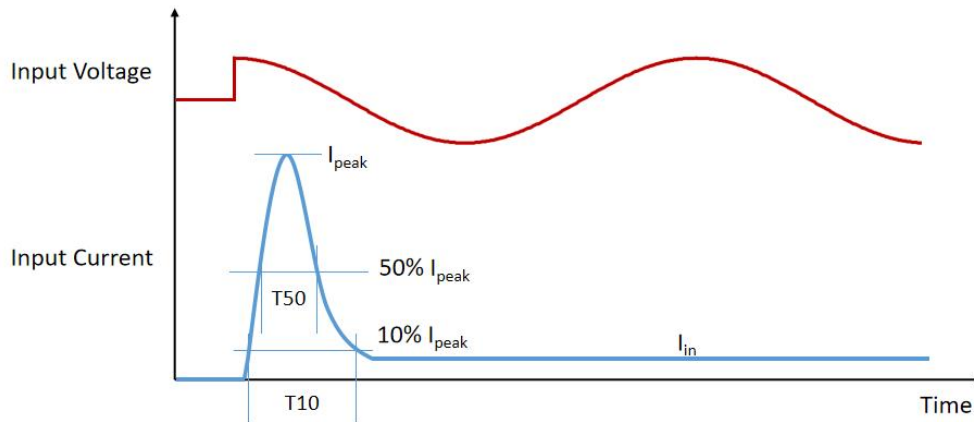
Efficiency vs. Load (C140)



Efficiency vs. Load (C210)



## Inrush Current

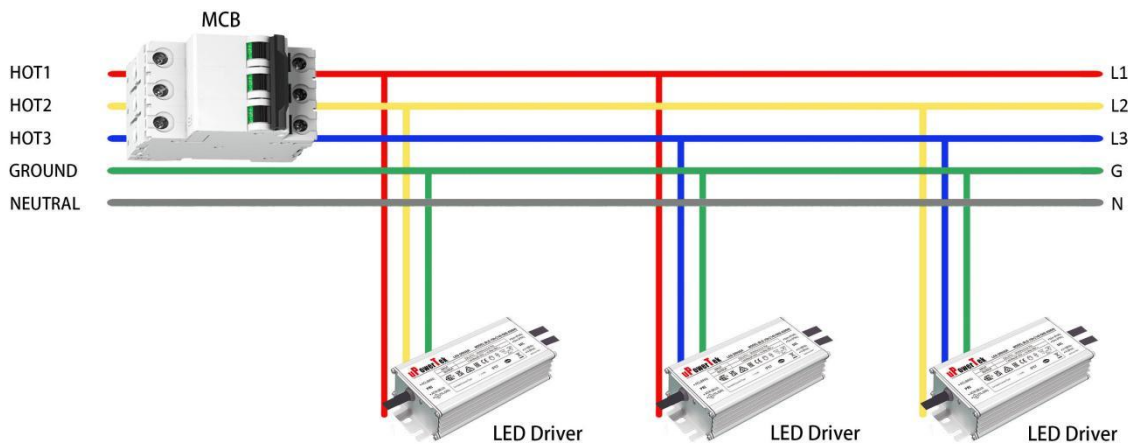


| Input Voltage | $I_{peak}$ | 10% -10% T10 Duration | 50% -50% T50 Duration |
|---------------|------------|-----------------------|-----------------------|
| 220Vac        | 6A         | 18.4ms                | 8ms                   |
| 277Vac        | 8A         | 20ms                  | 9ms                   |
| 400Vac        | 15A        | 25ms                  | 11ms                  |
| 480Vac        | 15.3A      | 25ms                  | 11ms                  |

## - MCB Suggestion

| Type   | B10   | B16   | B25   | B32   | C10   | C16   | C25   | C32   | D10   | D16   | D25   | D32   |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 220Vac | 0     | 1     | 2     | 2     | 0     | 1     | 2     | 3     | 1     | 1     | 2     | 3     |
| 277Vac | 1     | 1     | 2     | 3     | 1     | 1     | 3     | 3     | 1     | 2     | 3     | 4     |
| 400Vac | 0(x3) | 1(x3) | 2(x3) | 2(x3) | 0(x3) | 1(x3) | 2(x3) | 3(x3) | 1(x3) | 1(x3) | 2(x3) | 3(x3) |
| 480Vac | 1(x3) | 1(x3) | 2(x3) | 3(x3) | 1(x3) | 1(x3) | 3(x3) | 3(x3) | 1(x3) | 2(x3) | 3(x3) | 4(x3) |

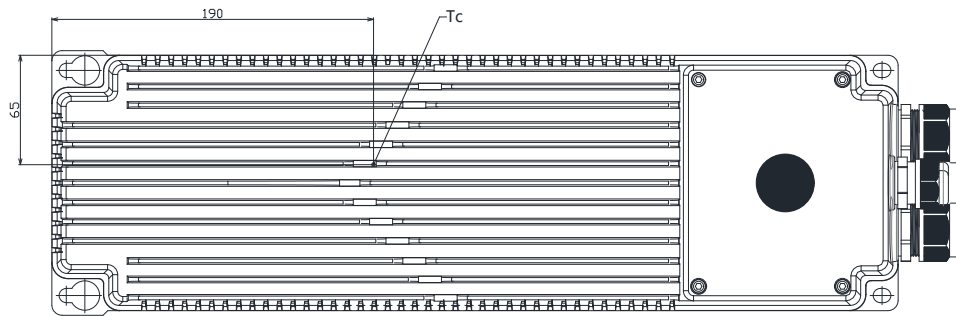
Three phase wiring suggestion.



## ■ Dielectric Strength

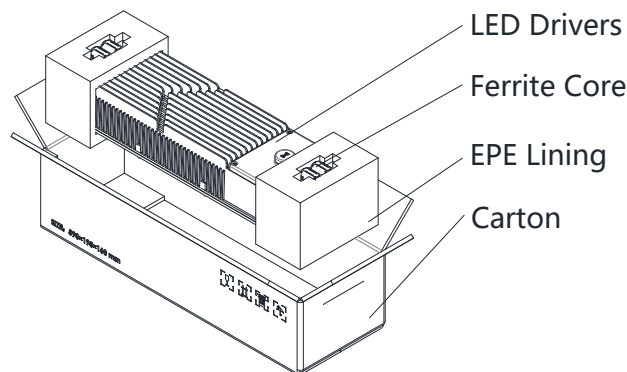
| Unit: Vac | Input | Output | Dimming | Case |
|-----------|-------|--------|---------|------|
| Input     | -     | -      | 3920    | 1960 |
| Output    | -     | -      | 3920    | 1960 |
| Dimming   | 3920  | 3920   | -       | 1960 |
| Case      | 1960  | 1960   | 1960    | -    |

## ■ Tc Point



## ■ Packaging Information

|                                 |                |
|---------------------------------|----------------|
| Typical Carton Dimension(L×W×H) | 590×195×160 mm |
| EPE Lining/EPE                  | 2pcs/carton    |
| LED Drivers/LED                 | 1pcs/carton    |
| Net Weight                      | 7.5kg/ carton  |
| Gross Weight                    | 7.9kg/ carton  |
| Ferrite Core                    | 2pcs/carton    |

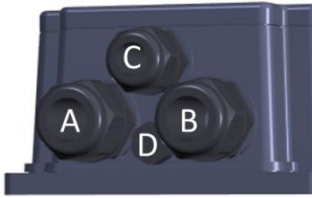


Note: There are 2 pieces of ferrite cores for EMI enhancement due to various of different installations, please contact us for installation manual on how to use them correctly.

## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

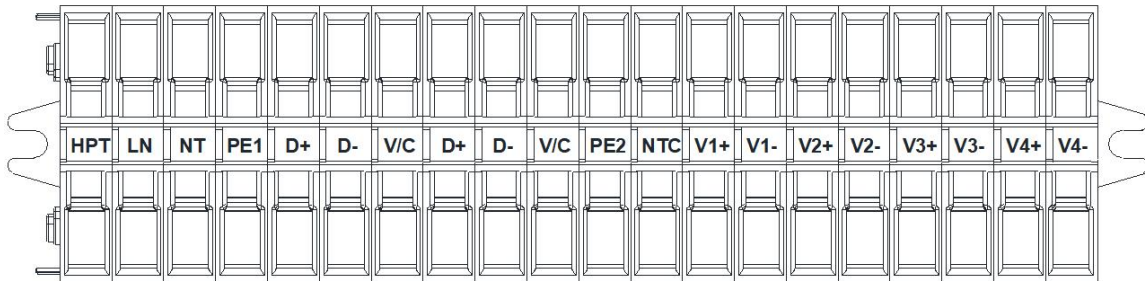
### ■ Connection

#### - Waterproof Connectors



| Part | Description         | Type | Cable Diameter (mm) | AWG     | Cross Section (mm <sup>2</sup> ) | Torque (N*m) |
|------|---------------------|------|---------------------|---------|----------------------------------|--------------|
| A    | Input               | M25  | 13~18               | #15~#12 | 1.5~2.5                          | 5.5          |
| B    | Output              | M25  | 13~18               | #15~#12 | 1.5~2.5                          | 5.5          |
| C    | Daisy Chain Dimming | M20  | 6~12                | #18~#12 | 0.75~2.5                         | 3.5          |
| D    | Ventilation Valve   | -    | -                   | -       | -                                | -            |

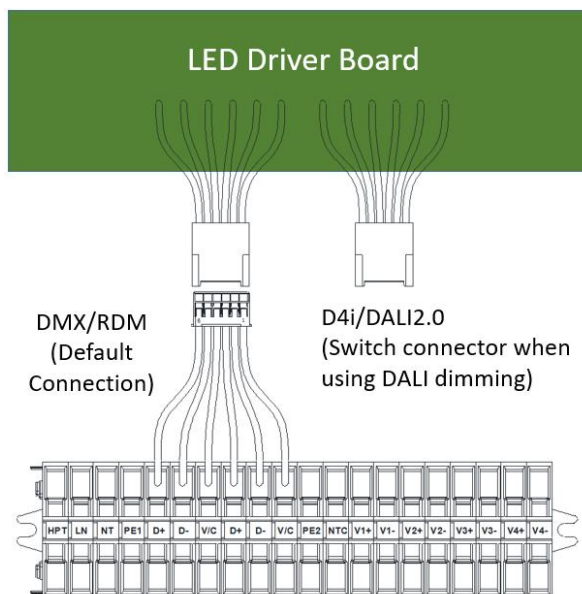
#### - Terminal Block Definition



Note: Wire Stripping Length: 8-9mm

| Position | Name | Description                                                          |
|----------|------|----------------------------------------------------------------------|
| 1        | HPT  | Remove the cable connection when doing the hi-pot test               |
| 2        | LN   | Line Input                                                           |
| 3        | NT   | Neutral Input or Line Input with 3 phase electricity                 |
| 4        | PE1  | Ground or Protective Earth from input                                |
| 5        | D+   | 0-10V + for -ERC models, DALI or DMX Signal + for -GRC models        |
| 6        | D-   | 0-10V - for -ERC models, DALI or DMX Signal - for -GRC models        |
| 7        | V/C  | Vaux Power @ 0-10V or DALI dimming, COM for shielding @DMX dimming   |
| 8        | D+   | Daisy chain connection for D+                                        |
| 9        | D-   | Daisy chain connection for D-                                        |
| 10       | V/C  | Daisy chain connection for COM@DMX, NOT for Vaux Power@0-10V or DALI |
| 11       | PE2  | Ground or Protective Earth to light fixture                          |
| 12       | NTC  | External NTC signal for luminaire over temperature protection        |
| 13       | V1+  | LED Channel 1 +                                                      |
| 14       | V1-  | LED Channel 1 -                                                      |
| 15       | V2+  | LED Channel 2 +                                                      |
| 16       | V2-  | LED Channel 2 -                                                      |
| 17       | V3+  | LED Channel 3 +                                                      |
| 18       | V3-  | LED Channel 3 -                                                      |
| 19       | V4+  | -                                                                    |
| 20       | V4-  | -                                                                    |

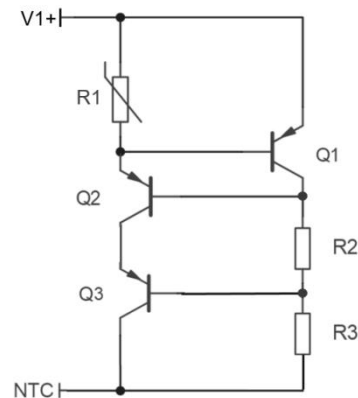
- **DMX (RDM) Mode and D4i (DALI) Mode Connection**



- **Over Temperature Protection by NTC**

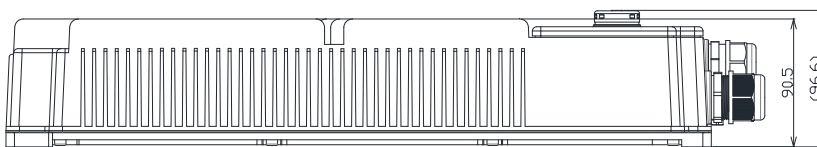
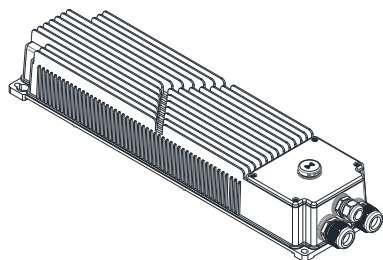
Besides the internal thermal protection, external thermal protection is also provided by TYK series. Compared with other uPowerTek drivers, TYK series only offers single connector for NTC rather than 2 connectors like NTC+ and NTC-. The suggested thermal detection circuitry is a constant current regulator and the NTC pin current is dependent on the NTC (R1) resistance thus TYK gets the current information to know the temperature of the luminaire. And the protection parameters can be set by uPowerTek programming software.

| Reference | Part      | Manufacturer | Description                |
|-----------|-----------|--------------|----------------------------|
| Q1/Q2/Q3  | PBHV9050T | NEXPERIA     | 500V 150 mA PNP Transistor |
| R1        | -         | -            | 10kOhm Thermistor          |
| R2/R3     | -         | -            | 500V 1MOhm Resistor 1% -   |

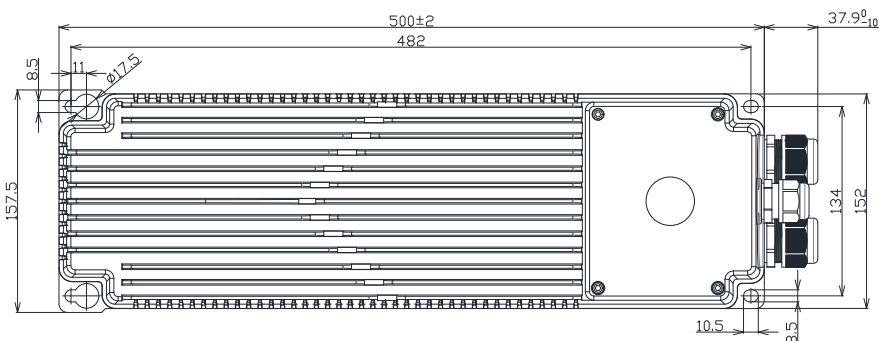
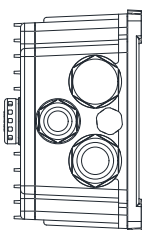


This connection saves one wire by sharing output positive and please contact with us for traditional NTC connection with dual wires of NTC+ and NTC-.

## Mechanical Design



Unspecified tolerance: ±1

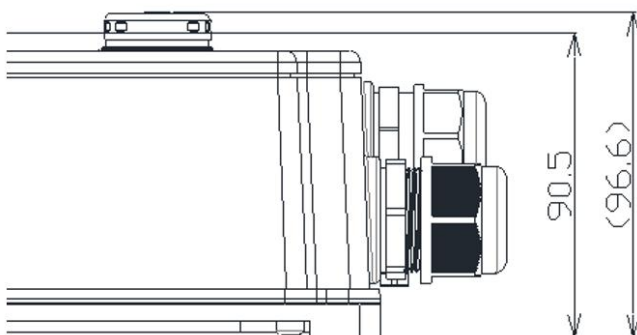


### Zhaga Device Option:

TYK series provides standard ZHAGA option for smart control devices as the example below shows.



ZHAGA Socket



## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

## ■ Output Operation Range

| Model | Typical Set Output Current (mA) | Max Output Power (W) Total/CH | Output Voltage Min (V) | Output Voltage Max(V) |
|-------|---------------------------------|-------------------------------|------------------------|-----------------------|
| -C210 | 2100                            | 1500/500                      | 143                    | 238                   |
|       | 2000                            | 1500/500                      | 150                    | 250                   |
|       | 1900                            | 1500/500                      | 158                    | 263                   |
|       | 1800                            | 1500/500                      | 167                    | 278                   |
|       | 1700                            | 1500/500                      | 176                    | 294                   |
|       | 1600                            | 1500/500                      | 188                    | 313                   |
|       | 1500                            | 1500/500                      | 200                    | 333                   |
|       | 1400                            | 1500/500                      | 214                    | 357                   |
|       | 1300                            | 1392/464                      | 214                    | 357                   |
|       | 1200                            | 1287/429                      | 214                    | 357                   |
|       | 1100                            | 1179/393                      | 214                    | 357                   |
|       | 1000                            | 1071/357                      | 214                    | 357                   |
|       | ...                             | ...                           | ...                    | ...                   |
|       | 140                             | 150/50                        | 214                    | 357                   |

| Model | Typical Set Output Current (mA) | Max Output Power (W) Total/CH | Output Voltage Min (V) | Output Voltage Max(V) |
|-------|---------------------------------|-------------------------------|------------------------|-----------------------|
| -C140 | 1400                            | 1500/500                      | 214                    | 357                   |
|       | 1300                            | 1500/500                      | 231                    | 385                   |
|       | 1200                            | 1500/500                      | 250                    | 417                   |
|       | 1100                            | 1500/500                      | 273                    | 455                   |
|       | 1000                            | 1500/500                      | 300                    | 500                   |
|       | 900                             | 1350/450                      | 300                    | 500                   |
|       | 800                             | 1200/400                      | 300                    | 500                   |
|       | 700                             | 1050/350                      | 300                    | 500                   |
|       | 600                             | 900/300                       | 300                    | 500                   |
|       | 500                             | 750/250                       | 300                    | 500                   |
|       | 400                             | 600/200                       | 300                    | 500                   |
|       | 300                             | 450/150                       | 300                    | 500                   |
|       | ...                             | ...                           | ...                    | ...                   |
|       | 100                             | 150/50                        | 300                    | 500                   |

## 1500W, 200-480Vac Input, Triple Output Non-isolated LED Driver

### ■ Revision History

| Revision | Date       | Contents                                                                                                                                                                                                                                         |
|----------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A        | 2023-12-22 | 1. Product release.                                                                                                                                                                                                                              |
| B        | 2024-1-22  | 1. Dielectric strength updated.<br>2. DMX dimming range updated.<br>3. Standby power updated.<br>4. No load voltage updated.<br>5. Tc point added.<br>6. Package information added.                                                              |
| C        | 2024-5-14  | 1. ARC MRC models added.                                                                                                                                                                                                                         |
| D        | 2024-6-22  | 1. Package information updated.                                                                                                                                                                                                                  |
| E        | 2024-8-20  | 1. Fast dimming and quick flashing description added<br>2. Percentage Flicker added<br>3. Power factor, THD, efficiency curves updated by 10-100% load range<br>4. MCB usage and driver quantity section added<br>5. Inrush current data updated |
| F        | 2024-9-12  | 1. Weight updated                                                                                                                                                                                                                                |
| G        | 2024-11-16 | 1. DALI memory bank 1 definition for RGB(W) application<br>2. ZHAGA socket compliance                                                                                                                                                            |