ICUTRONIC

IT 0-10 50/100-277 P67

The IT 0-10 50/100-277 P67 is a 50W, constant-current, programmable and IP66/IP67 rated LED driver that operates from 90-305Vac input with excellent power factor. It is created for many lighting applications including street and area, etc. The high efficiency of these drivers and compact metal case enables them to run cooler, significantly improving reliability and extending product life. To ensure trouble-free operation, protection is provided against input surge, output over voltage, short circuit, and over temperature.

Features

- Compact Metal Case with Excellent Thermal Performance
- Full Power at Wide Output Current Range (Constant Power)
- Adjustable Output Current (AOC) with T4T(Tuner4TRONIC)
- Isolated 1(0)-5V/1(0)-10V/PWM/Resistor/AstroDIM(Timer) Dimmable
- Dim-to-Off with Standby Power ⩽ 0.5 W
- Adjustable Dimming Curve
- Always-on Auxiliary Power: 12Vdc, 100mA on Specific Models
- End-of-Life Indicator
- Override Dimming
- Constant Lumen
- Input Surge Protection: DM 4kV, CM 6kV
- All-Around Protection: OTP, OVP, SCP
- Class 2 & SELV output.
- 5 Years Warranty

Application

- IP66/IP67 and UL Dry/Damp/Wet Location
- TYPE HL, for use in a Class I, Division 2 Hazardous (Classified) Location
- Suitable for Luminaires with Protection Class I
- Suitable for Luminaires with Protection Class I and II on Specific Models

Models

Adjustable Output Current Range(mA)	Full Power Current Range (mA)[1]	Default Output Current (mA)	Nominal Output Voltage Range(Vdc)	Maximum Output Power(W)	Typical Efficiency[2]	Power Factor λ		Product Name[3][6]
						120Vac	230Vac	
55-900	550-900	700	28~91	50	91.0%	0.99	0.96	IT 0-10 50/100-277/0A9 P67 y[4]
92-1500	920-1500	1050	17~54	50	91.0%	0.99	0.96	IT 0-10 50/100-277/1A5 P67 y[5]

Notes: (1) Output current range with constant power at 50W.
(2) Measured at 100% load and 230Vac input (see below “General Specifications” for details).
(3) Certified input voltage range: 100-277Vac.
(4) SELV output
(5) Class 2 & SELV output
(6) Definition of y (see below “Product Version Description” for details).

Product Version Description

IT 0-10 50/100-277/1A5 P67 G A12

- A12 — Additional Features
- G — Connections
- P67 — IP Rating: IP67
- 1A5 — Output Current
- 50/100-277 — Nominal Input Range
- 50 — Nominal Output Power
- 0-10 — Major Dimming Modes
- IT — Segmentations

Markers	Value	Definition	Notes
Output Current	0A9	0.9A	
	1A5	1.5A	
Connections	G	Global Cable	
	U	UL Cable	
	E	EQUI VDE Cable	Suitable for Luminaires with Protection Class I and II
Additional Features	Blank	-	
	A12	Aux-12V	

Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage AC	90 Vac	-	305 Vac	
Input Voltage DC	127 Vdc	-	300 Vdc	
Mains Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	0.75 MIU	UL 8750; 277Vac/60Hz
	-	-	0.70 mA	IEC 60598-1; 277Vac/60Hz
Nominal Input Current	-	-	0.53 A	Measured at 100% load and 120 Vac input.
	-	-	0.27 A	Measured at 100% load and 230 Vac input.
Power Factor λ	0.9	-	-	At 100-277Vac, 50-60Hz, 60%-100% Load (30-50W)
Total Harmonic Distortion	-	-	20%	
Total Harmonic Distortion Extended Range	-	-	10%	At 220-240Vac, 50-60Hz, 60%-100% Load (30-50W)

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Programmable Output Current IT 0-10 50/100-277/0A9 P67 y IT 0-10 50/100-277/1A5 P67 y	 55 mA 92 mA	 - -	 900 mA 1500 mA	
Nominal Output Voltage IT 0-10 50/100-277/0A9 P67 y IT 0-10 50/100-277/1A5 P67 y	 28 V 17 V	 - -	 91 V 54 V	
Output Current Tolerance	-5%	-	+5%	At 100% load condition
Total Output Current Ripple HF	-	5%Iomax	10%Iomax	At 100% load condition, 20 MHz BW
Output Current Ripple LF	-	2%Iomax	-	At 100% load condition, ＜200Hz (pk-pk)
$P_{st}LM$	-	-	1.0	
SVM	-	-	0.4	
Startup Overshoot Current	-	-	10%Iomax	At 100% load condition
U_{out} IT 0-10 50/100-277/0A9 P67 y IT 0-10 50/100-277/1A5 P67 y	 - -	 - -	 120 V 60 V	
Line Regulation	-	-	±1.5%	Measured at 100% load
Load Regulation	-	-	±5.0%	
Turn-on Delay Time	-	-	0.5 s	Measured at 120-277Vac input, 60%-100% load
Temperature Coefficient	-	0.06%/°C	-	Case temperature = 0°C ~Tc max
Auxiliary Output Voltage	10.8 V	12 V	13.2 V	Return terminal is “Dim−“, on specific models
Auxiliary Output Source Current	0 mA	-	100 mA	

General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 120Vac Input IT 0-10 50/100-277/0A9 P67 y Io=550 mA Io=900 mA IT 0-10 50/100-277/1A5 P67 y Io=920 mA Io=1500 mA	 87.5% 87.0% 87.0% 86.5%	 89.5% 89.0% 89.0% 88.5%	 - - - -	Measured at 100% load and Steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
Efficiency at 230Vac Input IT 0-10 50/100-277/0A9 P67 y Io=550 mA Io=900 mA IT 0-10 50/100-277/1A5 P67 y Io=920 mA Io=1500 mA	 89.0% 89.0% 89.0% 88.5%	 91.0% 91.0% 91.0% 90.5%	 - - - -	Measured at 100% load and Steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
Efficiency at 277Vac Input IT 0-10 50/100-277/0A9 P67 y Io=550 mA Io=900 mA IT 0-10 50/100-277/1A5 P67 y Io=920 mA Io=1500 mA	 89.0% 89.0% 88.5% 88.0%	 91.0% 91.0% 90.5% 90.0%	 - - - -	Measured at 100% load and Steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
Networked Standby Power	-	-	0.5 W	Measured at 230Vac/50Hz; Dimming off
MTBF	-	708,000 Hours	-	Measured at 230Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Operating Case Temperature for Safety Tc_s	-40°C	-	+90°C	
Operating Case Temperature for Warranty Tc_w	-40°C	-	+80°C	Case temperature for 5 years warranty Humidity: 10% RH to 95% RH
Lifetime	-	104,000 Hours	-	Measured at 230Vac input, 80%Load and 70°C case temperature; See lifetime vs. Tc curve for the details
Ambient Temperature	-40°C	-	+60°C	Measured at 230Vac input, 100% load
Permitted rel. Humidity During Operation	5%	-	95%	
Temperature at Storage	-40°C	-	+85°C	Humidity: 5%RH to 95%RH
Mains Switching Cycles	100,000	-	-	
IP Rating	IP66/IP67			
Dimensions (L × W ×H)	3.74 x 2.52 x 1.26 Inches 95 x 64 x 32 mm			With mounting ear 4.41 x 2.52 x 1.26 Inches 112 x 64 x 32 mm
Net Weight	-	426 g	-	

Inrush Current Waveform

Input AC Voltage	Inrush Current I_{peak}	Inrush Current Width t_{width} (@ 50% I_{peak})	The Number of LED Driver can be Configured (MCB)							
			B10A	B16A	B20A	B25A	C10A	C16A	C20A	C25A
120Vac	25.6A	118μs	12	20	25	32	15	24	30	37
230Vac	52.0A	118μs	13	21	27	34	22	36	45	56
277Vac	82.5A	88.0μs	11	18	22	28	18	30	37	46

Notes: The maximum number of units per circuit breaker is an indicative value.

Dimming Specifications

Parameter		Min.	Typ.	Max.	Notes
Absolute Maximum Voltage on the Vdim (+) Pin		-20 V	-	20 V	
Source Current on Vdim (+)Pin		95 μA	100 μA	105 μA	Vdim(+) = 0 V
Dimming Output Range	IT 0-10 50/100-277/0A9 P67 y IT 0-10 50/100-277/1A5 P67 y	10% Ioset	-	Ioset	550 mA ⩽ Ioset ⩽ 900 mA 920 mA ⩽ Ioset ⩽ 1500 mA
	IT 0-10 50/100-277/0A9 P67 y IT 0-10 50/100-277/1A5 P67 y	55 mA 92 mA	-	Ioset	55 mA ⩽ Ioset＜ 550 mA 92 mA ⩽ Ioset＜ 920 mA
AstroDIM (Timer)		10%	-	100%	
Dimming for 1(0)-5V		0.5 V	-	4.5V	Dimming mode set to 1(0)-5V in T4T.
Recommended Dimming for 1(0)-10V		1 V	-	9 V	Default 1-10V dimming mode with positive logic.
Dimming Curve Adjustable		0 V		10V	Dimming mode set to Adjustable Dimming Curve in T4T.
PWM_in High Level		3 V	-	10 V	Dimming mode set to PWM Dimming in T4T.
PWM_in Low Level		-0.3 V	-	0.6 V	
PWM_in Frequency		200 Hz	-	3 KHz	
PWM_in Duty Cycle		1%	-	99%	
PWM Dimming off (Positive Logic)		3%	5%	8%	
PWM Dimming on (Positive Logic)		5%	7%	10%	
PWM Dimming off (Negative Logic)		92%	95%	97%	
PWM Dimming on (Negative Logic)		90%	93%	95%	
Hysteresis		-	2%	-	

Certificates & Standards

Safety Category	Standard
UL/CUL	UL 8750, CAN/CSA-C22.2 No. 250.13
FCC Part 15	ANSI C63.4 Class B
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: [1] this device may not cause harmful interference, and [2] this device must accept any interference received, including interference that may cause undesired Operation.
ENEC	EN 61347-1, EN 61347-2-13, EN IEC 62384
CE	EN 61347-1, EN 61347-2-13, EN IEC 55015, EN 61547, EN IEC 61000-3-2, EN 61000-3-3
CB	IEC 61347-1, IEC 61347-2-13
CCC	GB/T 19510.1, GB/T 19510.213, GB/T 17743, GB 17625.1
KS	KS C 7655

Note: (1) This product meets the requirements for IEC/EN 61347-1(Class II), when the driver is energized, the allowed leakage current is perceptible but harmless. (For the versions of luminaires with protection Class II)
(2) This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.

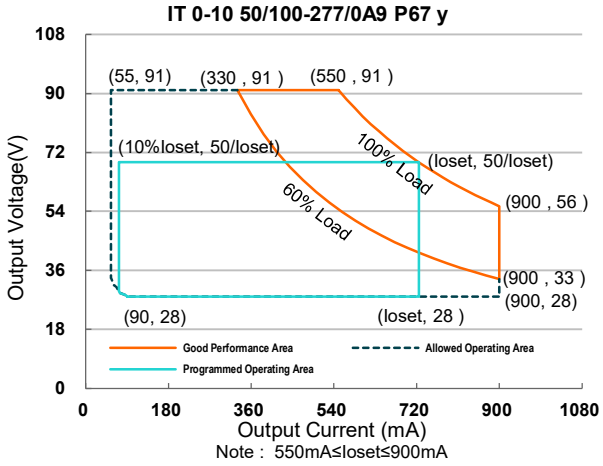
Isolation Levels (For the versions of luminaires with protection Class I)

	Input	Output	Dimming	Aux	Housing
Input	N/A	Reinforced	Reinforced	Reinforced	Basic
Output	Reinforced	N/A	Reinforced	Reinforced	Basic
Dimming	Reinforced	Reinforced	N/A	N/A	Basic
Aux	Reinforced	Reinforced	N/A	N/A	Basic
Housing	Basic	Basic	Basic	Basic	N/A

Isolation Levels (For the versions of luminaires with protection Class I and II)

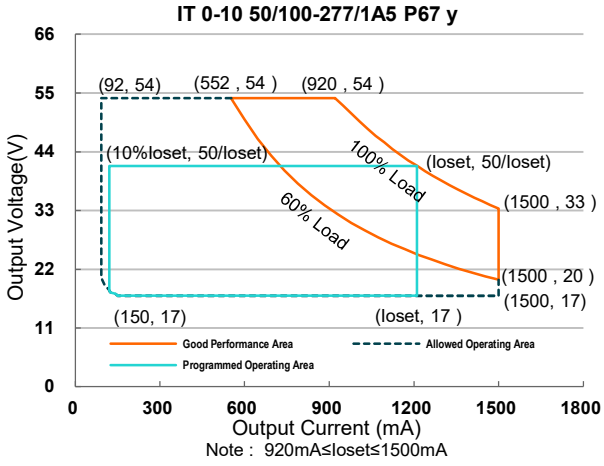
	Input	Output	Dimming	Aux	EQUI
Input	N/A	Reinforced	Reinforced	Reinforced	Reinforced
Output	Reinforced	N/A	Reinforced	Reinforced	Reinforced
Dimming	Reinforced	Reinforced	N/A	N/A	Basic
Aux	Reinforced	Reinforced	N/A	N/A	Basic
EQUI	Reinforced	Reinforced	Basic	Basic	N/A

Operating Window



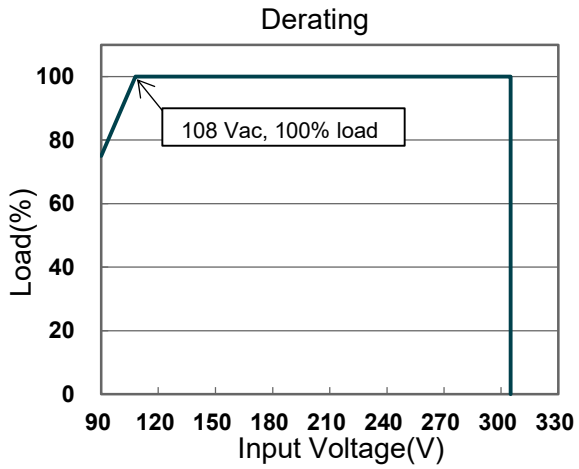
Note : 550mA≤Ioset≤900mA

Operating Window

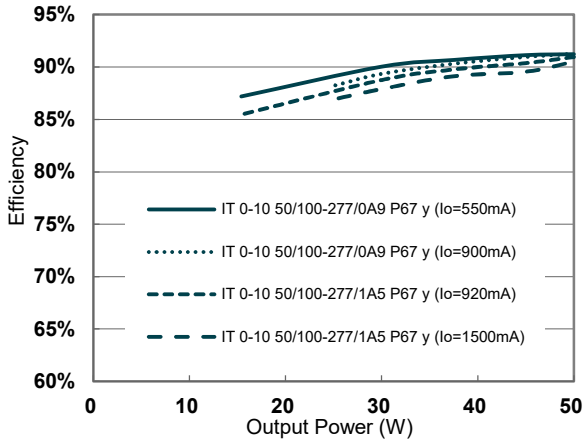


Note : 920mA≤Ioset≤1500mA

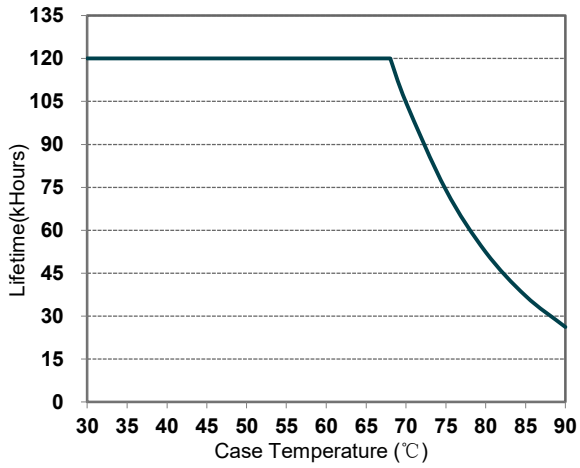
Derating



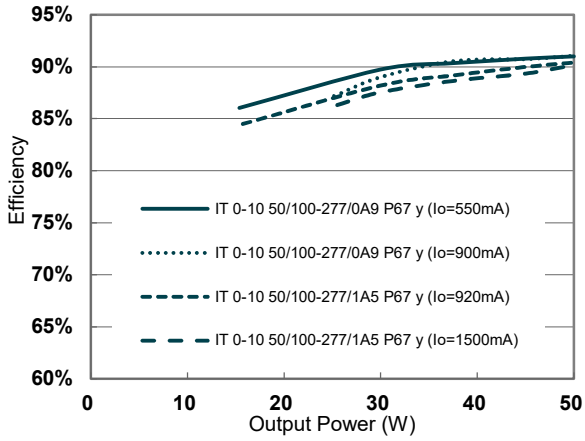
Efficiency vs. Load@230Vac



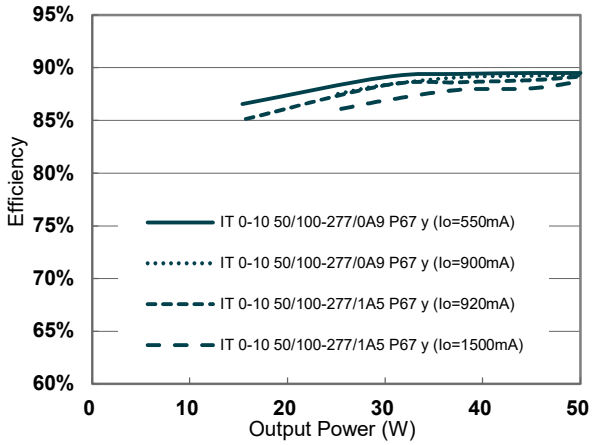
Lifetime vs. Case Temperature



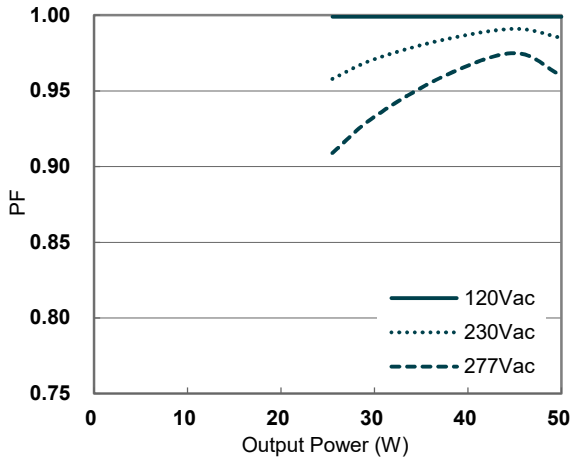
Efficiency vs. Load@277Vac



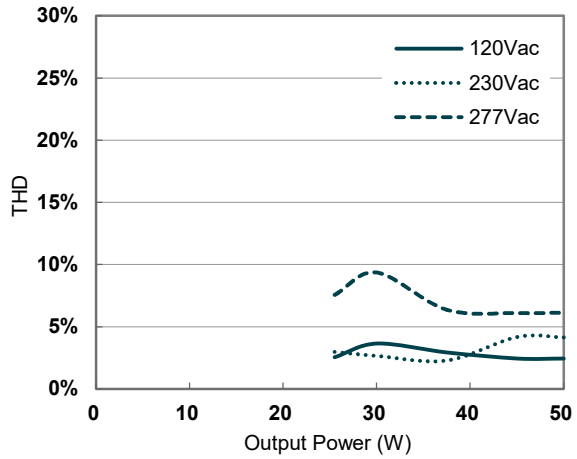
Efficiency vs. Load@120Vac



Power Factor



Total Harmonic Distortion



Protection Functions

Over Temperature Protection(OTP)

Protection based on safety: decreases output current if maximum internal temperature is reached, returning to normal value after over temperature is removed.
When output current reaches 20%, switch-off until over temperature is removed.

Driver Guard

Default setting: disabled.
Protection based on lifetime: It can be activated via T4T. Set a lower internal temperature threshold (Thermal Settings: reduce the temperature threshold by 5°C, 10°C, 15°C or 20°C) to activate the over temperature protection.

The driver is protected against temporary overheating by automatically reduction of the output current.

Over Voltage Protection(OVP)

Limits output voltage at no load and in case the normal voltage limit fails.

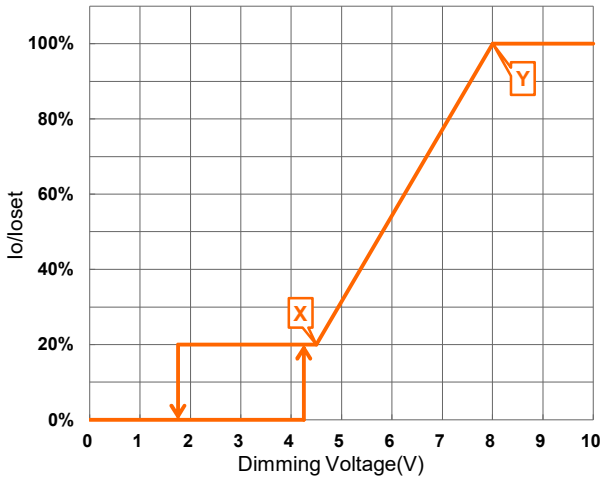
Short Circuit Protection(SCP)

Auto Recovery. No damage will occur when any output is short circuited. The output shall return to normal when the fault condition is removed.

Dimming

Adjustable Dimming Curve

0-10V curve can be set as corresponding dimming voltage by T4T. Take the 0-10V positive logic dimming mode as an example, the recommended implementation of the dimming control is provided below:

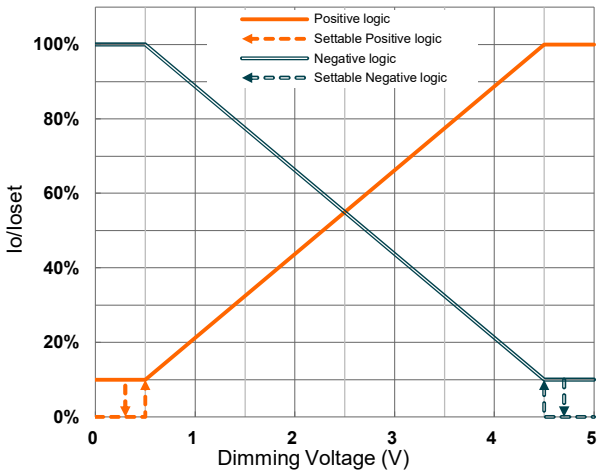


Notes:

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like zener.
3. When dimming voltage X point is set to be smaller than Y point, the dimming curve is positive logic; conversely, when X point is set to be bigger than Y point, the dimming curve is negative logic.
4. For best dimming accuracy, the difference between X point and Y point is advised not less than 4V.

1(0)-5V Dimming

The recommended implementation of the dimming control is provided below:

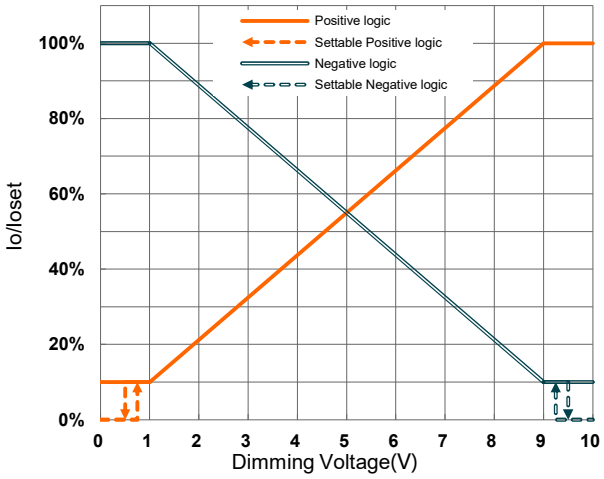


Notes:

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. The dimmer can also be replaced by an active 1-5V voltage source signal or passive components like Zener.

1(0)-10V Dimming

The recommended implementation of the dimming control is provided below:

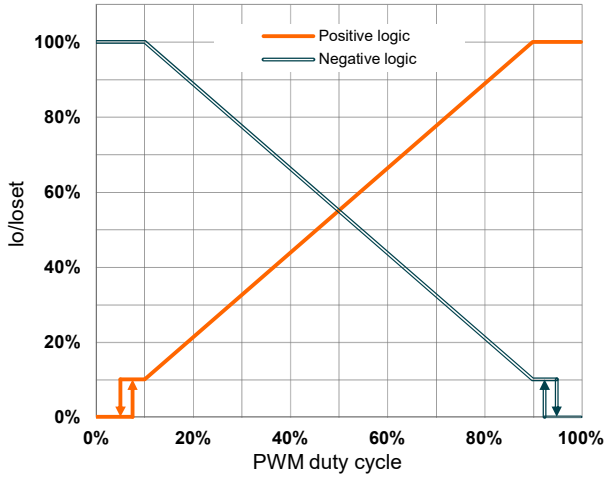


Notes:

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. The dimmer can also be replaced by an active 1-10V voltage source signal or passive components like zener.

PWM Dimming

The recommended implementation of the dimming control is provided below:

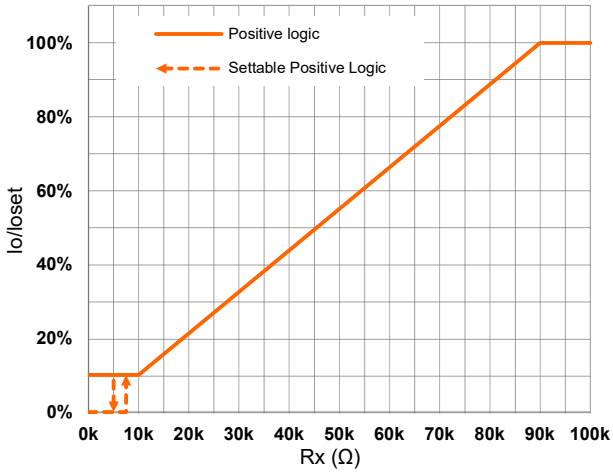


Notes:

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. When PWM negative logic dimming mode and Dim+ is open, the driver will dim to off and be standby.

Resistor Dimming

The recommended implementation of the dimming control is provided below:



Notes:

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.

AstroDIM(Timer)

AstroDIM (Timer) includes 2 kinds of modes, they are Astro Based and Time Based.

- **Astro Based**: The benchmark for the dimming profile is based on the average midnight each year, which is precisely calculated using theoretical sunrise and sunset times. The LED driver strictly adheres to daily power-on and power-off times to execute the corresponding dimming configuration file. Furthermore, the adjustment of the dimming schedule is dynamic, automatically adapting according to the actual length of the night to ensure that the lighting effect aligns with nighttime environmental needs.
- **Time Based:** The dimming profile defined in the reference schedule is referenced to the switch-on time of the LED driver.
- **Override Dimming:** When the integrated “AstroDIM(Timer)+Override” is enabled, it is possible to override the dimming mode from ‘AstroDIM’ into ‘Adjustable Dimming Curve’ mode by applying a voltage of 1(0)-10V between DIM+ and DIM-. Once a voltage ⩽10.5 Vdc is detected the output current will coincide with the dimming voltage. By opening the DIM+ and DIM- circuitry, the LED driver will switch again to AstroDIM mode. During override, our product continues to count while the AstroDIM is being overridden. Once the override is removed, the output current returns to the same point in its AstroDIM cycle.

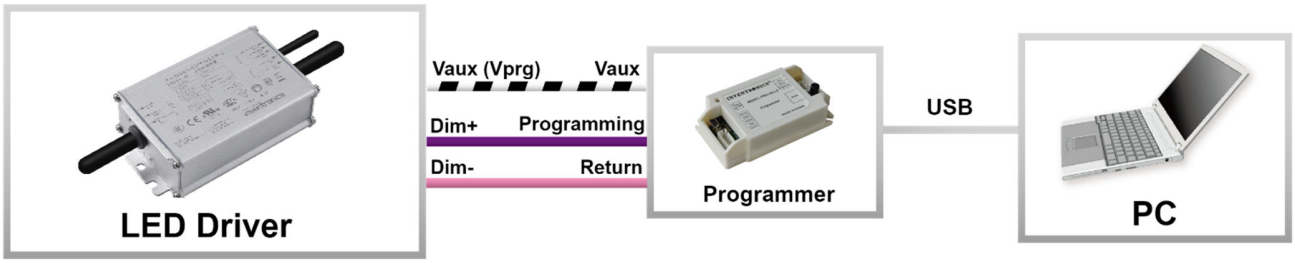
Constant Lumen

Constant lumen function may be used to maintain constant light output over the life of the LEDs by driving them at a reduced current when new, then gradually increasing the drive current over time to counteract LED lumen degradation. This function is disabled by default.

End Of Life

End-of-Life (EOL) is providing a visual notification to a user that the LED module has reached the end of manufacturer-specified life and that the replacement is recommended. Once active, an indication is given at each power-up of the driver, which the driver indicates this through a lower light output (minimum output current level) during the first 10 minutes before normal operation is continue.

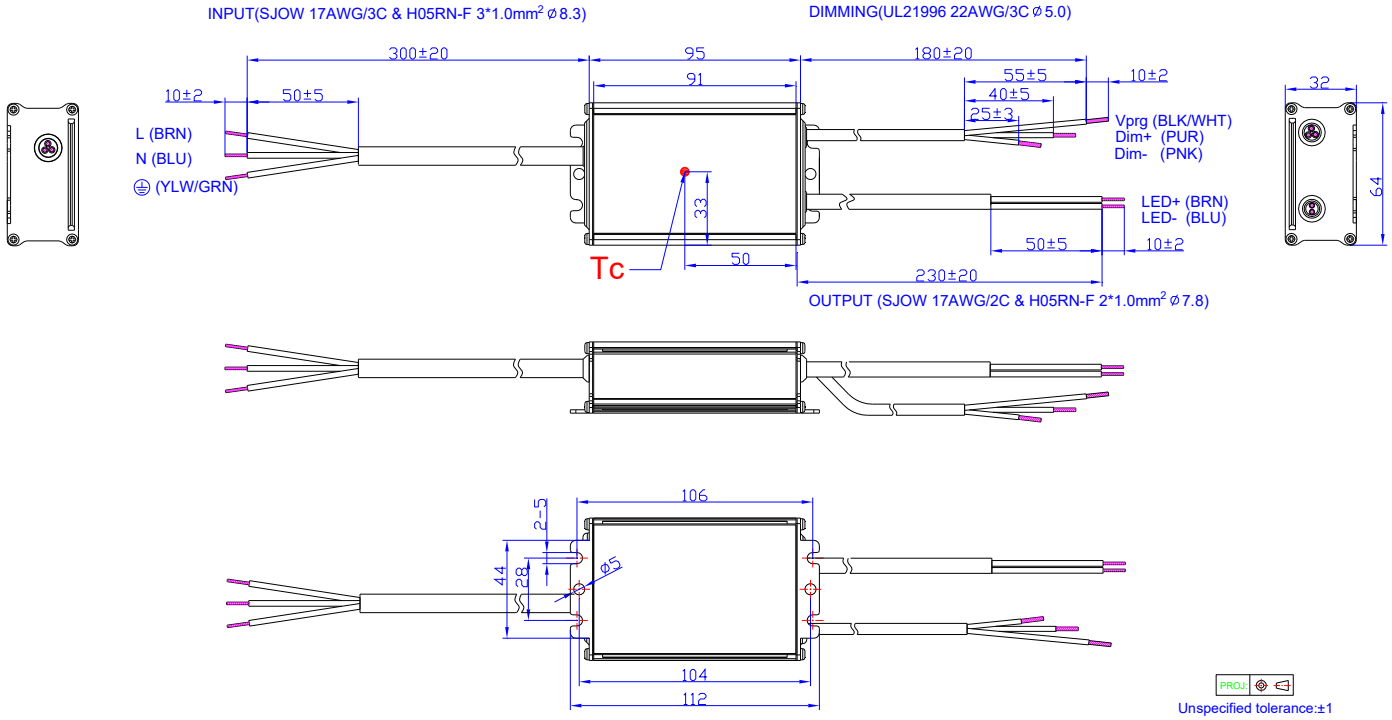
Programming Connection Diagram



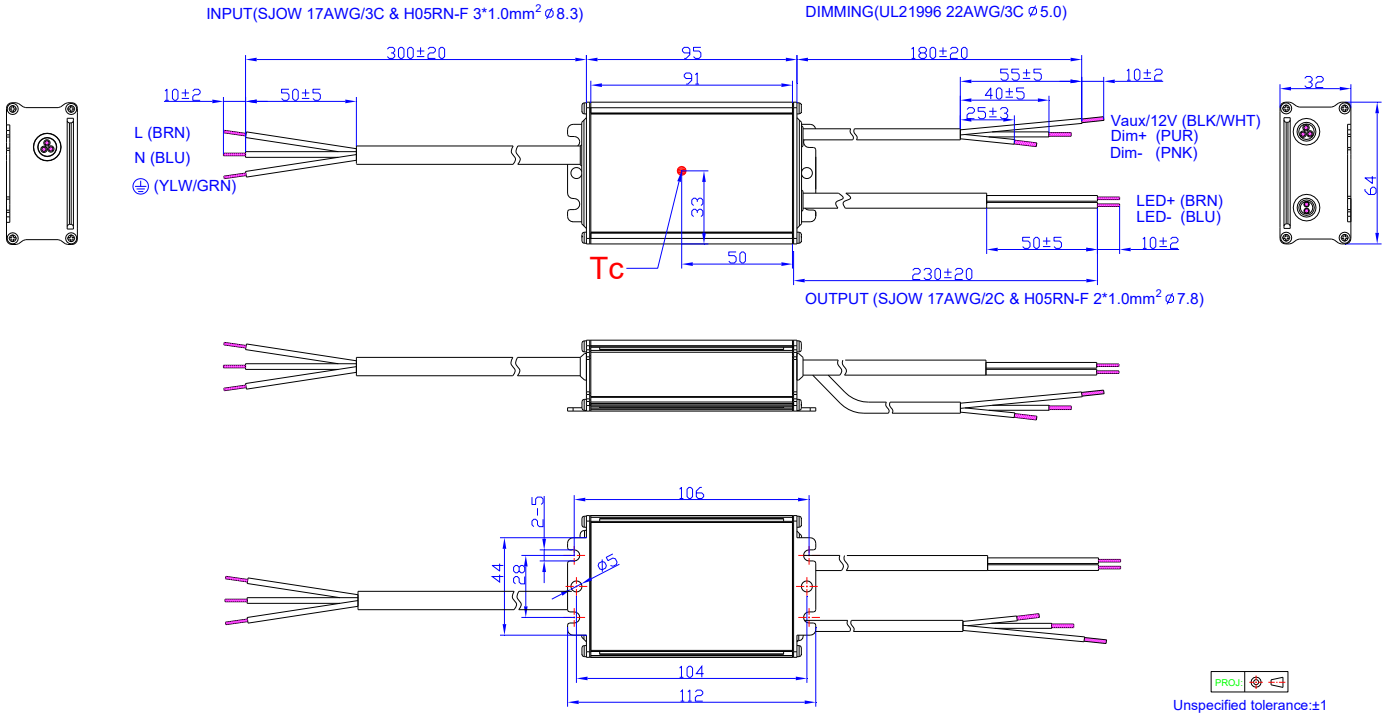
Note: (1) The driver does not need to be powered on during the programming process.
(2) Please refer to PRG-MUL2 (Programmer) datasheet for details.
(3) Supports T4T functionality.

Mechanical Outline

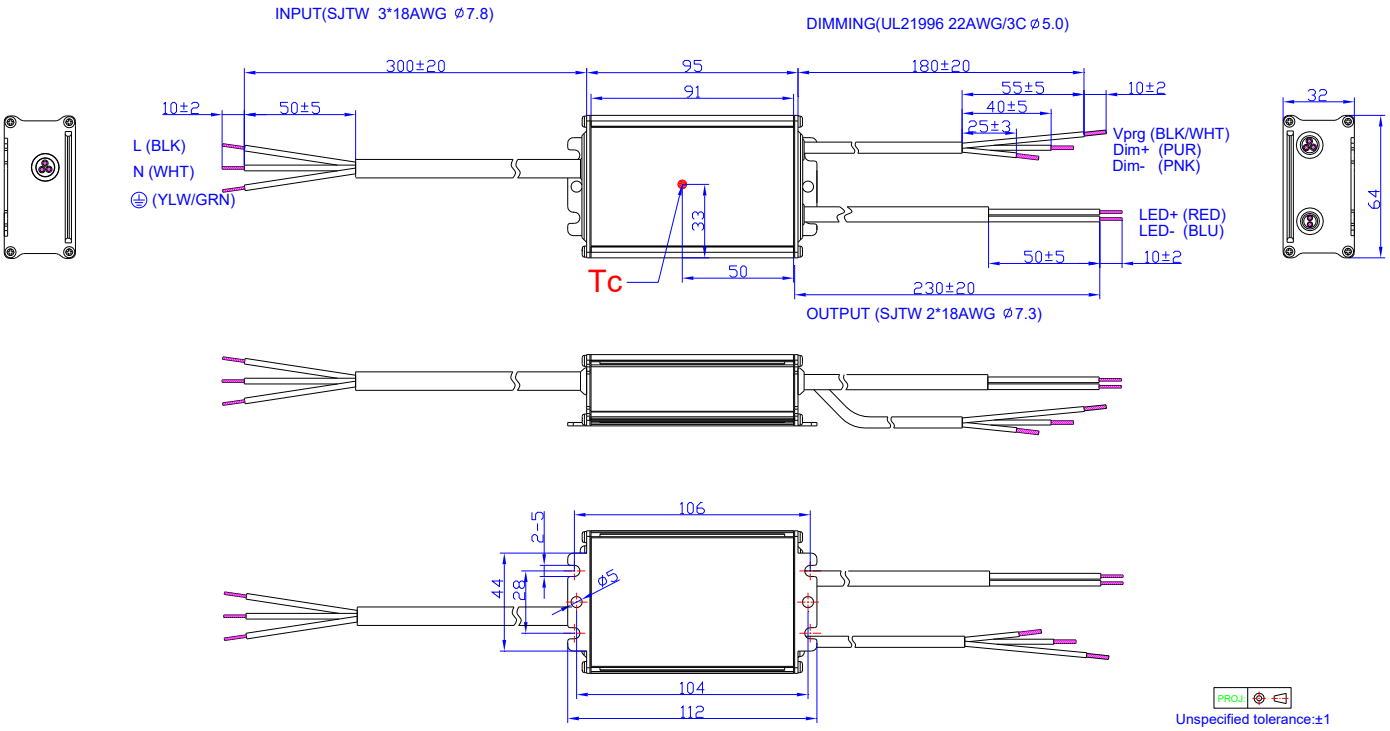
IT 0-10 50/100-277/0A9 P67 G
IT 0-10 50/100-277/1A5 P67 G



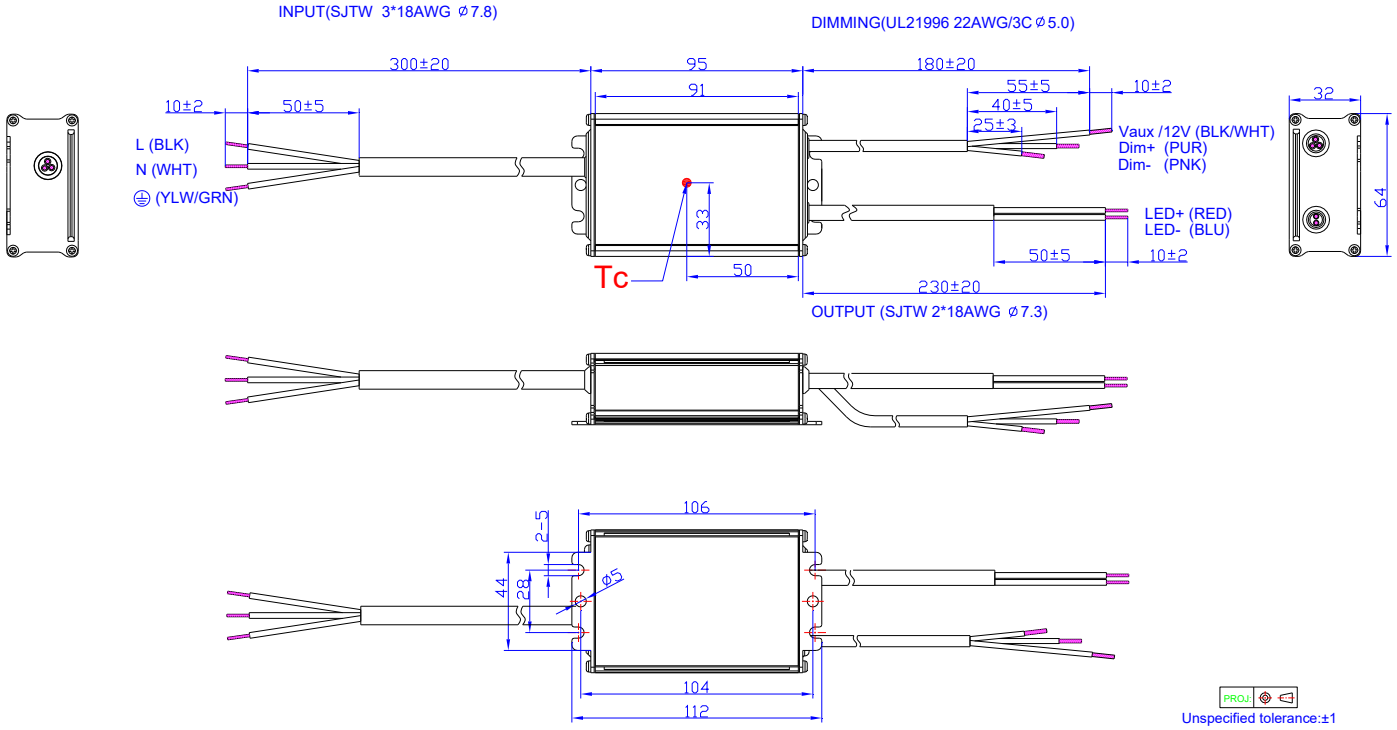
IT 0-10 50/100-277/0A9 P67 G A12
IT 0-10 50/100-277/1A5 P67 G A12



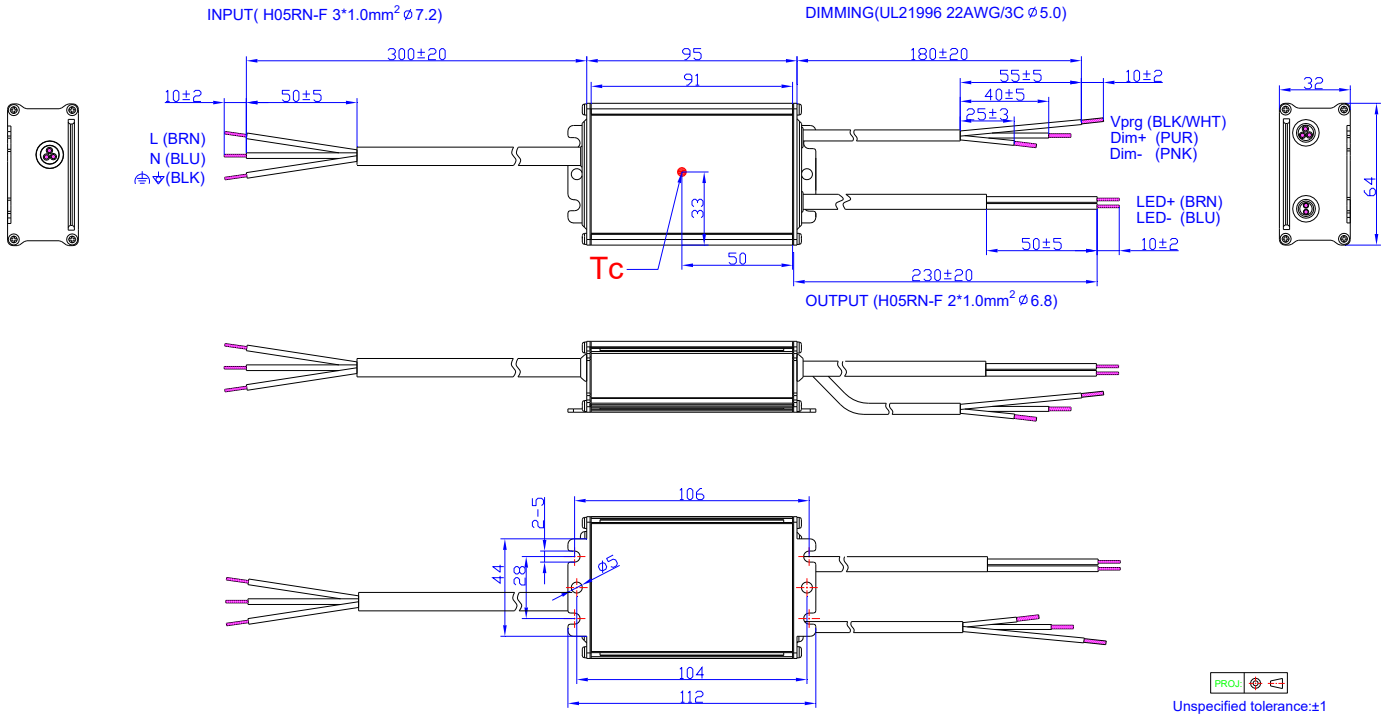
IT 0-10 50/100-277/0A9 P67 U
IT 0-10 50/100-277/1A5 P67 U



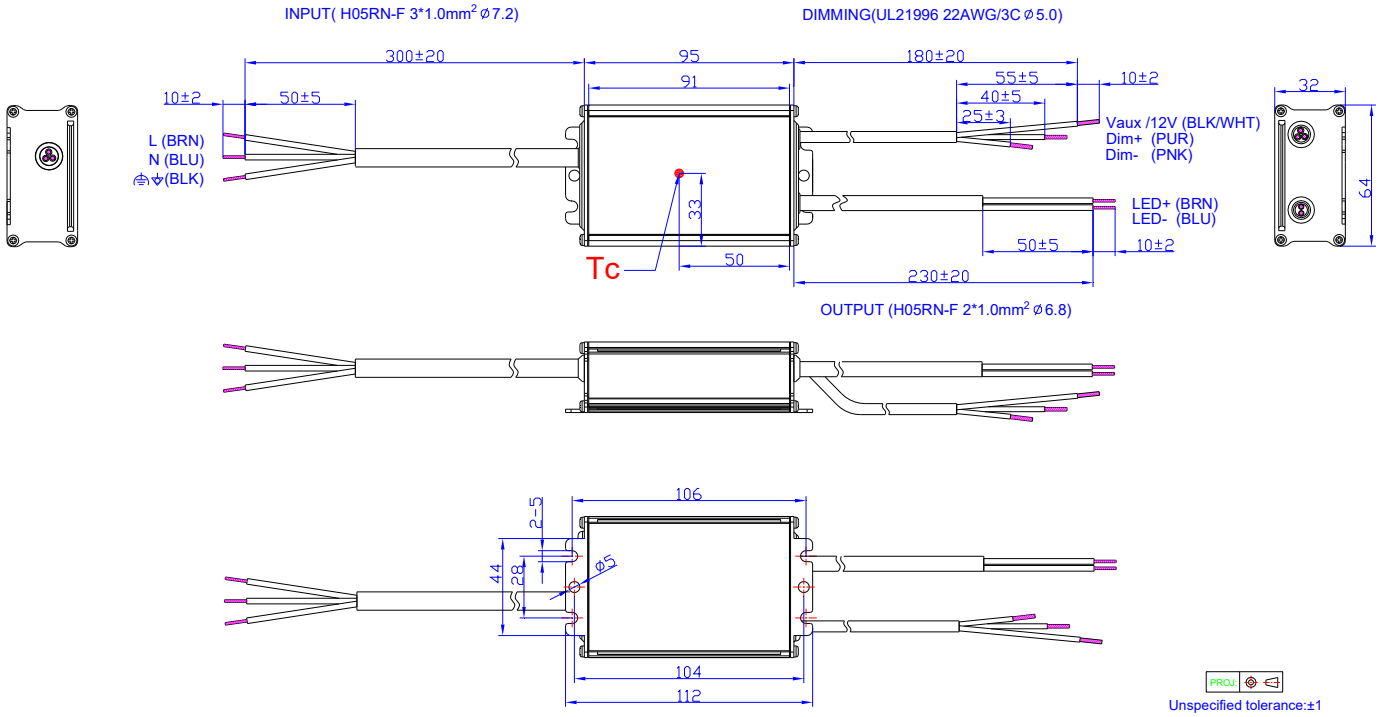
IT 0-10 50/100-277/0A9 P67 U A12
IT 0-10 50/100-277/1A5 P67 U A12



IT 0-10 50/100-277/0A9 P67 E
IT 0-10 50/100-277/1A5 P67 E



IT 0-10 50/100-277/0A9 P67 E A12
IT 0-10 50/100-277/1A5 P67 E A12



Environmental Compliance

RoHS

Our products comply with reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU, calling for the elimination of lead and other hazardous substances from electronic products.

Product Order Overview

Order Code & Packaging

Order Code (EAN)	Product Version Name	Certification Markings on Product	Packaging unit (Pieces/Box)	Packing Dimensions (L × W × H)(mm)
6937186132390	IT 0-10 50/100-277/0A9 P67 G	UL, CE, ENEC, CCC	48	540 × 355 × 310
6937186132413	IT 0-10 50/100-277/0A9 P67 G A12	UL, CE, ENEC, CCC	48	540 × 355 × 310
6937186132437	IT 0-10 50/100-277/1A5 P67 G	UL, CE, ENEC, CCC	48	540 × 355 × 310
6937186132451	IT 0-10 50/100-277/1A5 P67 G A12	UL, CE, ENEC, CCC	48	540 × 355 × 310
6937186132475	IT 0-10 50/100-277/0A9 P67 U	UL Class P, CE	48	540 × 355 × 310
6937186132499	IT 0-10 50/100-277/0A9 P67 U A12	UL Class P, CE	48	540 × 355 × 310
6937186132512	IT 0-10 50/100-277/1A5 P67 U	UL Class P, CE	48	540 × 355 × 310
6937186132536	IT 0-10 50/100-277/1A5 P67 U A12	UL Class P, CE	48	540 × 355 × 310
6937186132697	IT 0-10 50/100-277/0A9 P67 E	ENEC, CE	48	540 × 355 × 310
6937186132710	IT 0-10 50/100-277/0A9 P67 E A12	ENEC, CE	48	540 × 355 × 310
6937186132734	IT 0-10 50/100-277/1A5 P67 E	ENEC, CE	48	540 × 355 × 310
6937186132758	IT 0-10 50/100-277/1A5 P67 E A12	ENEC, CE	48	540 × 355 × 310