

# TD - Power Supply SC DALI & Switch Dim PRE (CC) - IP20

## User Manual - 45W / 500-1400mA



Item no.: NT-845-514

### 1. Product Description

The TD-Power Supply SC DALI & Switch Dim PRE is a dimmable constant current LED driver for ceiling and furniture installation. Power supply and dimmer are in one housing. It can be controlled by means of a DALI signal as well as with commercially available push-buttons (push, touch or switch dim function). The output current is adjustable from 500-1400mA. Suitable for emergency escape lighting systems acc. to EN50172

### 2. Specifications

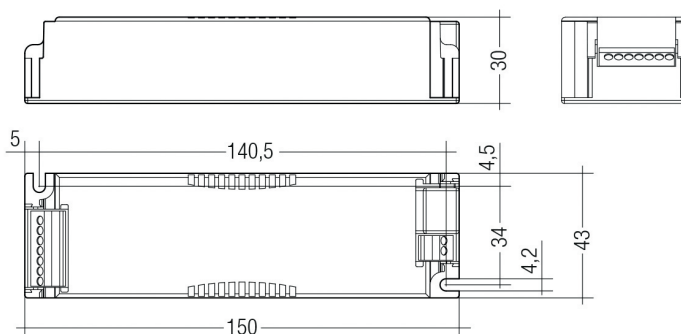
Input Voltage	198-264VAC, 176-280VDC
max. Output Power	500mA-1400mA (max. 45W)
Inrush Current	23A / 200µs   230V
max. wire cross-section	max. 1,5mm <sup>2</sup>
Dimensions (L x W x H)	150 x 43 x 30mm (without strain relief)
weight	145g

### 3. Description

1. Dimmable constant current LED driver
2. Dimming range from 1-100%
3. Dimming and switching on and off of the LEDs by means of DALI signal or commercially available buttons (push, touch or switch dim function)
4. The dimmer has 1 output channel and can be connected by means of resistors  
500mA - 1400mA output current can be adjusted.
5. Suitable for emergency lighting according to EN50172
6. Ideal for using linear and area lighting in office applications
7. Small design (150x43x30mm) with strain relief

## 4. Dimensions

Dimensions without strain-relief



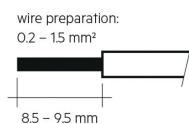
## 6. Installation and wiring

Wiring type and cross section

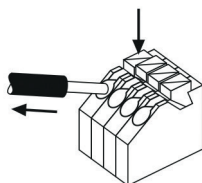
The wiring can be in stranded wires with ferrules or solid with a cross section of 0.2–1.5 mm<sup>2</sup>. Strip 8.5–9.5 mm of insulation from the cables to ensure perfect operation of the push-wire terminals.

Use one wire for each terminal connector only.

Use each strain relief channel for one cable only.



Loose wiring



Press down the „push button“ and remove the cable from the front.

## Wiring guidellines

- The cables should be run separately from the mains connections and mains cables to ensure good EMC conditions.
- The LED wiring should be kept as short as possible to ensure good EMC.  
The max. secondary cable length is 2 m (4 m circuit), this applies for LED output as well as for I-select 2.
- Secondary switching is not permitted.
- The LED Driver has no inverse-polarity protection on the secondary side. Wrong polarity can damage LED modules with no inverse-polarity protection.
- Wrong wiring of the LED Driver can lead to malfunction or irreparable damage.

## Hot plug-in

Hot plug-in is not supported due to residual output voltage of  $> 0$  V.

If a LED load is connected the device has to be restarted before the output will be activated again.

This can be done via mains reset or via interface (DALI, DSI, switchDIM, ready2mains).

## Earth connection

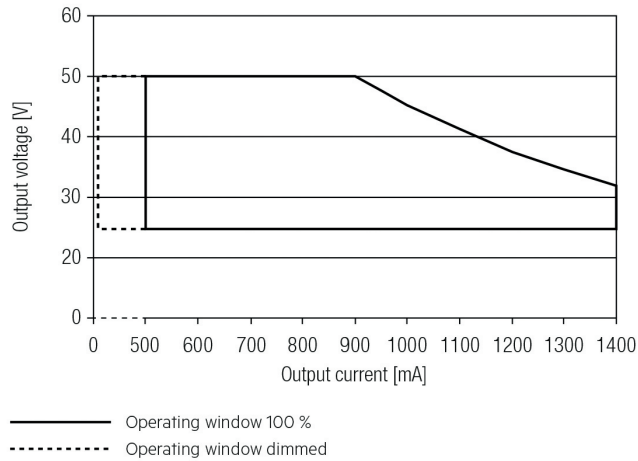
The earth connection is conducted as protection earth (PE). The LED Driver can be earthed via earth terminal. If the LED Driver will be earthed, protection earth (PE) has to be used. There is no earth connection required for the functionality of the LED Driver. Earth connection is recommended to improve following behaviour:

- Electromagnetic interferences (EMI)
- LED glowing at standby
- Transmission of mains transients to the LED output

In general it is recommended to earth the LED Driver if the LED module is mounted on earthed luminaire parts respectively heat sinks and thereby representing a high capacity against earth.

7. Electrical values

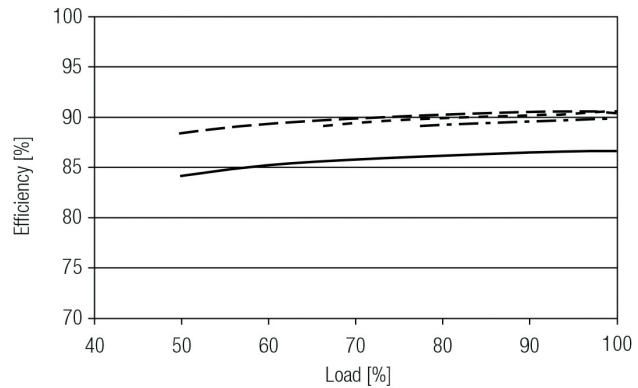
Operating window



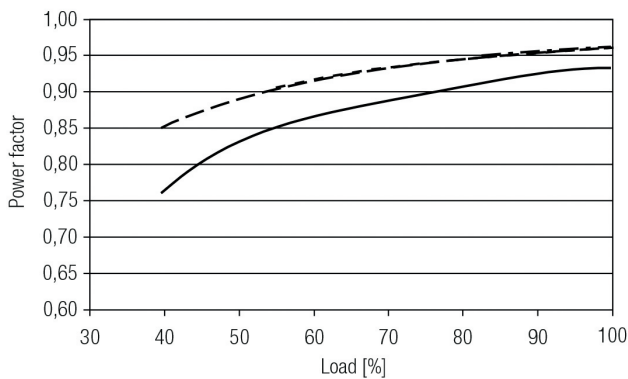
Make sure that the LED Driver is operated within the given window under all operating conditions. Special attention needs to be paid at dimming and DC emergency operation as the forward voltage of the connected LED modules varies with the dimming level, due to the implemented amplitude dimming technology.

Coming below the specified minimum output voltage of the LED Driver may cause the device to shut-down.

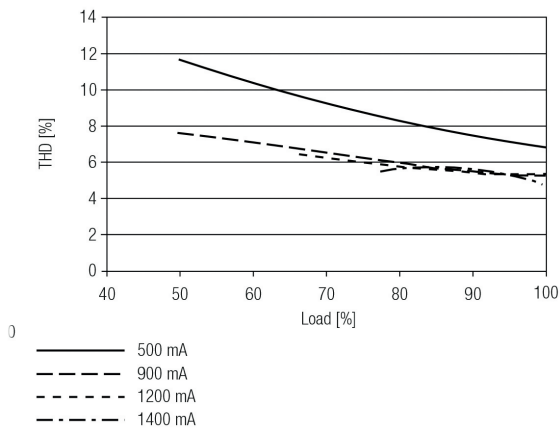
Efficiency vs load



Power factor vs load



THD vs load  
(without harmonic < 5mA  
or 0,6% of the input current)



100 % load corresponds to the max. output power (full load) according to the table on page 2.

Specific technical data

Type	Output current <sup>®</sup>	Min. forward voltage	Max. forward voltage	Max. output power	Typ. power consumption (at 230 V, 50 Hz, full load)	Typ. current consumption (at 230 V, 50 Hz, full load)	Max. casing temperature t <sub>c</sub>	Ambient temperature t <sub>a</sub> max.	I-select 2 resistor value <sup>®</sup>
LCA 45W 500-1400mA one4all SC PRE	500 mA	25 V	500 V	250 W	29.3 W	133 mA	80 °C	-25 ... +50 °C	open
	550 mA	25 V	500 V	275 W	31.8 W	144 mA	80 °C	-25 ... +50 °C	909 kΩ
	600 mA	25 V	500 V	300 W	34.4 W	150 mA	85 °C	-25 ... +50 °C	833 kΩ
	650 mA	25 V	500 V	325 W	370 W	166 mA	85 °C	-25 ... +50 °C	769 kΩ
	700 mA	25 V	500 V	350 W	39.5 W	176 mA	85 °C	-25 ... +50 °C	714 kΩ
	750 mA	25 V	500 V	375 W	421 W	187 mA	85 °C	-25 ... +50 °C	667 kΩ
	800 mA	25 V	500 V	400 W	44.7 W	198 mA	85 °C	-25 ... +50 °C	6.25 kΩ
	850 mA	25 V	500 V	425 W	47.3 W	210 mA	85 °C	-25 ... +50 °C	5.88 kΩ
	900 mA	25 V	500 V	450 W	499 W	221 mA	85 °C	-25 ... +50 °C	5.56 kΩ
	950 mA	25 V	474 V	450 W	499 W	221 mA	85 °C	-25 ... +50 °C	5.26 kΩ
	1,000 mA	25 V	450 V	450 W	498 W	220 mA	85 °C	-25 ... +50 °C	5.00 kΩ
	1,050 mA	25 V	429 V	450 W	498 W	220 mA	85 °C	-25 ... +50 °C	4.76 kΩ
	1,100 mA	25 V	409 V	450 W	497 W	220 mA	85 °C	-25 ... +50 °C	4.55 kΩ
	1,150 mA	25 V	391 V	450 W	497 W	220 mA	85 °C	-25 ... +50 °C	4.35 kΩ
	1,200 mA	25 V	375 V	450 W	498 W	220 mA	85 °C	-25 ... +50 °C	4.17 kΩ
	1,250 mA	25 V	36.0 V	450 W	498 W	220 mA	85 °C	-25 ... +50 °C	4.00 kΩ
	1,300 mA	25 V	34.6 V	450 W	499 W	221 mA	85 °C	-25 ... +50 °C	3.85 kΩ
	1,350 mA	25 V	33.3 V	450 W	499 W	221 mA	85 °C	-25 ... +50 °C	3.70 kΩ
	1400 mA	25 V	321 V	44.9 W	500 W	221 mA	85 °C	-25 ... +50 °C	short circuit (0 Ω)

- 1) Valid at 100 % dimming level.
- 2) Depending on the selected output current.
- 3) Depending on the DALI traffic at the interface.
- 4) The table only lists a number of possible operating points but does not cover each single point. The output current can be set within the total value range in 1-mA-steps.
- 5) Not compatible with I-select (generation 1).
- 6) Output current is mean value.

#### Maximum loading of automatic circuit breakers

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20	Inrush current	
Installation Ø	15 mm <sup>2</sup>	15 mm <sup>2</sup>	25 mm <sup>2</sup>	4 mm <sup>2</sup>	15 mm <sup>2</sup>	15 mm <sup>2</sup>	25 mm <sup>2</sup>	4 mm <sup>2</sup>	I <sub>max</sub>	time
<b>LCA 45W 500-1400mA one4all SC PRE</b>	23	31	38	48	14	19	23	29	23 A	200 µs

Calculation uses typical values from ABB series S200 as a reference.

Actual values may differ due to used circuit breaker types and installation environment.

#### Harmonic distortion in the mains supply (at 230V/50Hz and full load)

	THD	3.	5.	7.	9.	11.
<b>LCA 45W 500-1400mA one4all SC PRE</b>	< 5	< 3	< 1	< 1	< 1	< 1

Acc. to 61000-3-2. Harmonics < 5 mA or < 0.6% (whatever is greater) of the input current are not considered for calculation of THD.

#### Dimming

Dimming range 1 % bis 100 %

Digital control with:

- DSI signal: 8 bit Manchester Code, Speed 1% to 100% in 1,4 s
- DALI signal: 16 Bit Manchester Code, Speed 1% to 100% in 0,2 s

Programmable parameter:

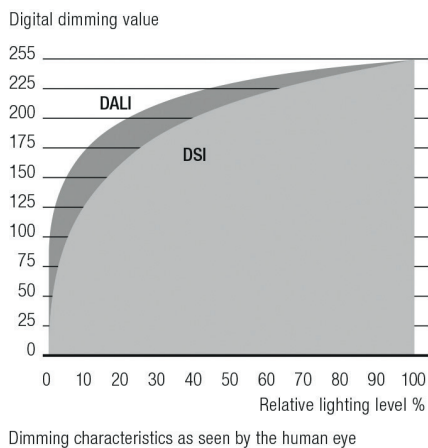
Minimum dimming level = 1 %, Programmable range  $1\% \leq \text{MIN} \leq 100\%$

Maximum dimming level = 100 %, Programmable range  $100\% \geq \text{MAX} \geq 1\%$

Dimming curve is adapted to the eye sensitiveness.

Dimming is realized by amplitude dimming.

## Dimming characteristic



## 8. Interface / Communication

### Control Input (DA/N, DA/L)

Digital DALI signal or switchDIM can be wired on the same terminals (DA/N and DA/L).

The control input is non-polar for digital control signals (DALI, DSI).

The control signal is not SELV.

Control cable has to be installed in accordance to the requirements of low voltage installations.  
Different functions depending on each module.

### Control input ready2mains (L, N)

The digital ready2mains protocol is modulated onto the mains signal which is wired to the mains terminal (L and N).

### switchDIM

Integrated switchDIM function allows a direct connection of a pushbutton for dimming and switching.

Brief push (< 0.6 s) switches LED Driver ON and OFF. The dimm level is saved at power-down and restored at power-up. When the pushbutton is held, LED modules are dimmed. After repush the LED modules are dimmed in the opposite direction.

In installations with LED Drivers with different dimming levels or opposite dimming directions (e.g. after a system extension), all LED Drivers can be synchronized to 50 % dimming level by a 10 s push. Use of pushbutton with indicator lamp is not permitted.

## 9. Functions

### Adjustable current

The output current of the LED Driver can be adjusted in a certain range.  
For adjustment there are three options available.

Option 1: DALI

Adjustment is done by masterCONFIGURATOR (see masterCONFIGURATOR documentation).

Option 2: I-select 2

By inserting a suitable resistor into the I-select 2 interface, the current value can be adjusted. The relationship between output current and resistor value as follows:

$$R \text{ [k}\Omega\text{]} = 5 \text{ V} / I_{\text{out}} \text{ [mA]} \times 1000$$

Please note that the resistor values for I-select 2 are not compatible with I-select (generation 1).  
Installation of an incorrect resistor may cause irreparable damage to the LED module(s).

Option 3: ready2mains

Adjustment is done by the ready2mains programmer and the corresponding configuration software (see ready2mains documentation).

The priority for current adjustment methods is DALI (highest priority), I-select 2, ready2mains (lowest priority).

### ready2mains – Configuration

The ready2mains interface can be used to configure the main parameters of LED Drivers via the mains wiring, such as LED output current, CLO and DC level. These parameters can be adjusted either via ready2mains-capable configuration software or directly via the ready2mains programmer (output current only).

### ready2mains – Dimming

ready2mains allows for mains-based group dimming, controlled via the ready2mains protocol and appropriate dimming interfaces.

For details on the operation of ready2mains and its components see the relevant technical information.



## **Short-circuit behaviour**

In case of a short-circuit at the LED output the LED output is switched off.

After restart of the LED Driver the output will be activated again.

The restart can either be done via mains reset or via interface (DALI, DSI, switchDIM, ready2mains).

## **No-load operation**

The LED Driver will not be damaged in no-load operation. The output will be deactivated and is therefore free of voltage. If a LED load is connected the device has to be restarted before the output will be activated again.

## **Overload protection**

If the output voltage range is exceeded the LED Driver turns off the LED output.

After restart of the LED Driver the output will be activated again.

The restart can either be done via mains reset or via interface (DALI, DSI, switchDIM, ready2mains).

## **Overtemperature protection**

The LED Driver is protected against temporary thermal overheating. If the temperature limit is exceeded the output current of the LED module(s) is reduced.

The temperature protection is activated approx. +5 °C above  $t_{c\ max}$  (see page 2).

On DC operation this function is deactivated to fulfill emergency requirements.

## **corridorFUNCTION**

The corridorFUNCTION can be programmed in two different ways.

To program the corridorFUNCTION by means of software a DALI-USB interface is needed in combination with a DALI PS. The software can be the masterCONFIGURATOR.

To activate the corridorFUNCTION without using software a voltage of 230 V has to be applied for five minutes at the switchDIM connection. The unit will then switch automatically to the corridorFUNCTION.

Note:

If the corridorFUNCTION is wrongly activated in a switchDIM system (for example a switch is used instead of pushbutton), there is the option of installing a pushbutton and deactivating the corridorFUNCTION mode by five short pushes of the button within three seconds.

switchDIM and corridorFUNCTION are very simple tools for controlling gears with conventional pushbuttons or motion sensors.

To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input.

Special attention must be paid to achieving clear zero crossings.

Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

### **Constant light output (CLO)**

The luminous flux of a LED decreases constantly over the life-time. The CLO function ensures that the emitted luminous flux remains stable. For that purpose the LED current will increase continuously over the LED life-time.

In masterCONFIGURATOR it is possible to select a start value (in percent) and an expected life-time. The LED Driver adjusts the current afterwards automatically.

### **Power-up/-down Fading**

The power-up/-down function offers the opportunity to modify the on-/off behavior.

The time for fading on or off can be adjusted in a range of 0.2 to 16 seconds.

According to this value, the device dims either from 0 % up to the power-on level or from the current set dim level down to 0 %.

This feature applies while operating via switchDIM, ready2mains and when switching the mains voltage on or off. By factory default no fading time is set (= 0 seconds).

### **Light level in DC operation**

The LED Driver is designed to operate on DC voltage and pulsed DC voltage.

For a reliable operation, make sure that also in DC emergency operation the LED Driver is run within the specified conditions as stated in chapter "4.1 operating window".

Light output level in DC operation: programmable 1 – 100 % (EOfi = 0.13).

Programming by DALI or ready2mains.

In DC operation dimming mode can be activated.

The voltage-dependent input current of Driver incl. LED module is depending on the used load.

The voltage-dependent no-load current of Driver (without or defect LED module) is for:

AC: < 22.5 mA

DC: < 1.4 mA

### **Software / programming**

With appropriate software and an interface different functions can be activated and various parameters can be configured in the LED Driver.

To do so, a DALI-USB or ready2mains programmer and the software (masterCONFIGURATOR) are required.

### **masterCONFIGURATOR**

From version 2.8:

For programming functions (CLO, I-select 2, power-up fading, corridorFUNCTION) and device settings (fade time, ePowerOnLevel, DC level, etc.). For further information see masterCONFIGURATOR manual.

## **10. Miscellaneous**

### **Isolation and electric strength testing of luminaires**

Electronic devices can be damaged by high voltage. This has to be considered during the routine testing of the luminaires in production.

According to IEC 60598-1 Annex Q (informative only!) or ENEC 303-Annex A, each luminaire should be submitted to an isolation test with 500 V DC for 1 second. This test voltage should be connected between the interconnected phase and neutral terminals and the earth terminal.

The isolation resistance must be at least 2 MΩ.

As an alternative, IEC 60598-1 Annex Q describes a test of the electrical strength with 1500 V AC (or 1.414 x 1500 V DC). To avoid damage to the electronic devices this test must not be conducted.

## Conditions of use and storage

Enviromental conditions:

5 % up to max. 85 %,

not condensed

(max. 56 days/year at 85 %)

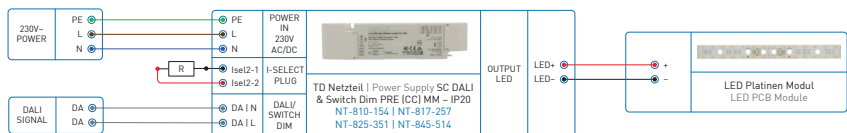
Storage temperature:

-40 °C up to max. +80 °C

The devices have to be acclimatised to the specified temperature range (ta) before they can be operated.

## 11. Wiring diagram

Variante DALI



Der Ausgangsstrom kann mittels Einsteckwiderständen, Programmiergerät oder DALI eingestellt werden. Wird kein Widerstand oder Drahtbrücke zwischen den I-SELECT Anschlüssen gesetzt, so gilt der am Gerät niedrigste Ausgangsstrom. Wird eine Drahtbrücke am I-SELECT Anschluss gesetzt, so gilt der am Gerät höchste Ausgangsstrom. Für Einstellwerte dazwischen werden Einsteckwiderstände benötigt.

The output current can be adjusted by means of plug-in resistors, programming unit or DALI. Is no resistance or wire bridge set between the I-SELECT plug, the lowest output current on the device applies. If a wire bridge is set at the I-SELECT plug, the highest output current on the device applies. For setting values between, plug-in resistors are required.

Variante Switch/Touch/Push DIM



Der Ausgangsstrom kann mittels Einsteckwiderständen, Programmiergerät oder DALI eingestellt werden. Wird kein Widerstand oder Drahtbrücke zwischen den I-SELECT Anschlüssen gesetzt, so gilt der am Gerät niedrigste Ausgangsstrom. Wird eine Drahtbrücke am I-SELECT Anschluss gesetzt, so gilt der am Gerät höchste Ausgangsstrom. Für Einstellwerte dazwischen werden Einsteckwiderstände benötigt.

The output current can be adjusted by means of plug-in resistors, programming unit or DALI. Is no resistance or wire bridge set between the I-SELECT plug, the lowest output current on the device applies. If a wire bridge is set at the I-SELECT plug, the highest output current on the device applies. For setting values between, plug-in resistors are required.