



### Driver LCA 45W 500–1400mA one4all SR PRE

PREMIUM series

#### Product description

- Independent dimmable LED Driver
- Adjustable output current between 500 and 1,400 mA via ready2mains™ Programmer, I-select 2 plugs or DALI
- Max. output power 45 W
- Up to 90 % efficiency
- Power input on stand-by < 0.15 W
- Dimming range 1 – 100 %
- Nominal life-time up to 100,000 h
- 5-year guarantee



#### Housing properties

- Casing: polycarbonate, white
- Type of protection IP20

#### Interfaces

- one4all (DALI DT 6, DSI, switchDIM, corridorFUNCTION)
- ready2mains™ (configuration and dimming via mains)
- Terminal blocks: 0° push terminals

#### Functions

- Adjustable output current (DALI, ready2mains™, I-select 2)
- Constant light output function (CLO)
- Power-up fading at AC
- Configurable via ready2mains™
- Service monitor to log certain events
- Protective features (overtemperature, short-circuit, overload, no-load, input voltage range, reduced surge amplification)
- Suitable for emergency escape lighting systems acc. to EN 50172

#### Benefits

- Application-oriented operating window for maximum compatibility
- Best energy savings due to low standby losses and high efficiency
- Flexible configuration via DALI, ready2mains™ and I-select 2
- Reliability proven by life-time up to 100,000 h and 5-year guarantee

#### Typical applications

- For linear/area lighting in office applications



Standards, page 5

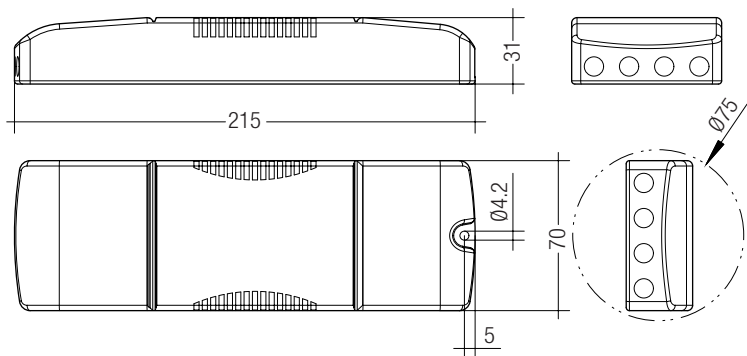
IP20 SELV          RoHS

### Driver LCA 45W 500–1400mA one4all SR PRE

PREMIUM series

#### Technical data

Rated supply voltage	220 – 240 V
Input voltage, AC	198 – 264 V
Input voltage, DC	176 – 280 V
Mains frequency	0 / 50 / 60 Hz
Overvoltage protection	320 V AC, 48 h
Typ. current (at 230 V, 50 Hz, full load) <sup>①</sup> <sup>②</sup>	132 – 224 mA
Typ. current (220 V, 0 Hz, full load, 15 % dimming level) <sup>②</sup>	31 – 46 mA
Leakage current (at 230 V, 50 Hz, full load) <sup>①</sup> <sup>②</sup>	< 160 µA
Max. input power	50.6 W
Typ. efficiency (at 230 V / 50 Hz / full load) <sup>②</sup>	90 %
λ (at 230 V, 50 Hz, full load) <sup>①</sup>	0.98
Typ. power input on stand-by <sup>③</sup>	< 0.15 W
Typ. input current in no-load operation	22 mA
Typ. input power in no-load operation	0.38 W
In-rush current (peak / duration)	21.9 A / 140 µs
THD (at 230 V, 50 Hz, full load) <sup>①</sup>	< 5 %
Time to light (at 230 V, 50 Hz, full load) <sup>①</sup>	< 0.3 s
Time to light (DC mode)	< 0.3 s
Switchover time (AC/DC)	< 0.3 s
Turn off time (at 230 V, 50 Hz, full load)	< 20 ms
Output current tolerance <sup>③</sup> <sup>④</sup>	± 3 %
Max. output current peak (non-repetitive)	≤ output current + 40 %
Output LF current ripple (< 120 Hz)	± 2 %
Max. output voltage (no-load voltage)	60 V
Dimming range	1 – 100 %
Mains surge capability (between L – N)	1 kV
Mains surge capability (between L/N – PE)	2 kV
Surge voltage at output side (against PE)	< 500 V
Dimensions L x W x H	215 x 70 x 31 mm



#### Ordering data

Type	Article number	Packaging carton	Packaging pallet	Weight per pc.
LCA 45W 500-1400mA one4all SR PRE	28000672	10 pc(s).	400 pc(s).	0.2 kg

# Specific technical data

Type	Output current <sup>①</sup> ②	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 tc	Ambient temperature ta max.	I-select 2 resistor value <sup>③</sup>
<b>LCA 45W 500-1400mA one4all SR PRE</b>	500 mA	25 V	50.0 V	25.0 W	30.1 W	136 mA	75 °C	-25 ... +50 °C	open
	550 mA	25 V	50.0 V	27.5 W	32.5 W	146 mA	75 °C	-25 ... +50 °C	9.09 kΩ
	600 mA	25 V	50.0 V	30.0 W	35.1 W	157 mA	75 °C	-25 ... +50 °C	8.33 kΩ
	650 mA	25 V	50.0 V	32.5 W	37.6 W	168 mA	75 °C	-25 ... +50 °C	7.69 kΩ
	700 mA	25 V	50.0 V	35.0 W	40.2 W	179 mA	75 °C	-25 ... +50 °C	7.14 kΩ
	750 mA	25 V	50.0 V	37.5 W	42.8 W	189 mA	75 °C	-25 ... +50 °C	6.67 kΩ
	800 mA	25 V	50.0 V	40.0 W	45.4 W	201 mA	75 °C	-25 ... +50 °C	6.25 kΩ
	850 mA	25 V	50.0 V	42.5 W	48.0 W	212 mA	75 °C	-25 ... +50 °C	5.88 kΩ
	900 mA	25 V	50.0 V	45.0 W	50.6 W	223 mA	75 °C	-25 ... +50 °C	5.56 kΩ
	950 mA	25 V	47.4 V	45.0 W	50.6 W	223 mA	75 °C	-25 ... +50 °C	5.26 kΩ
	1,000 mA	25 V	45.0 V	45.0 W	50.4 W	223 mA	75 °C	-25 ... +50 °C	5.00 kΩ
	1,050 mA	25 V	42.9 V	45.0 W	50.5 W	223 mA	75 °C	-25 ... +50 °C	4.76 kΩ
	1,100 mA	25 V	40.9 V	45.0 W	50.4 W	223 mA	75 °C	-25 ... +50 °C	4.55 kΩ
	1,150 mA	25 V	39.1 V	45.0 W	50.3 W	223 mA	75 °C	-25 ... +50 °C	4.35 kΩ
	1,200 mA	25 V	37.5 V	45.0 W	50.3 W	223 mA	75 °C	-25 ... +50 °C	4.17 kΩ
	1,250 mA	25 V	36.0 V	45.0 W	50.3 W	223 mA	75 °C	-25 ... +50 °C	4.00 kΩ
	1,300 mA	25 V	34.6 V	45.0 W	50.4 W	223 mA	75 °C	-25 ... +50 °C	3.85 kΩ
	1,350 mA	25 V	33.3 V	45.0 W	50.4 W	224 mA	75 °C	-25 ... +50 °C	3.70 kΩ
	1,400 mA	25 V	32.1 V	44.9 W	50.5 W	224 mA	75 °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).

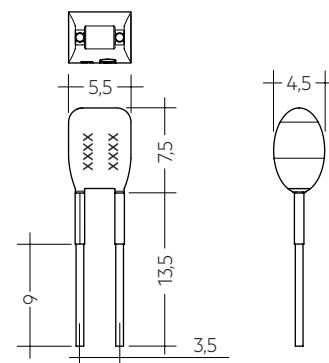
⑥ Output current is mean value.

### Product description

- Ready-for-use resistor to set output current value
- Compatible with LED Driver featuring I-select 2 interface; not compatible with I-select (generation 1)
- Resistor is base isolated
- Resistor power 0.25 W
- Current tolerance  $\pm 2\%$  additional to output current tolerance
- Compatible with LED Driver series PRE and EXC

### Example of calculation

- $R [k\Omega] = 5 V / I_{out} [mA] \times 1000$
- Resistor value tolerance  $\leq 1\%$ ; resistor power  $\geq 0.1 W$ ; base isolation necessary
- When using a resistor value beyond the specified range, the output current will automatically be set to the minimum value (resistor value too big), respectively to the maximum value (resistor value too small)



### Ordering data

Type	Article number	Colour	Marking	Current	Packaging bag	Weight per pc.
I-SELECT 2 PLUG 500MA BL	28001114	Blue	0500 mA	500 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 550MA BL	28001115	Blue	0550 mA	550 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 600MA BL	28001116	Blue	0600 mA	600 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 650MA BL	28001117	Blue	0650 mA	650 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 700MA BL	28001118	Blue	0700 mA	700 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 750MA BL	28001119	Blue	0750 mA	750 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 800MA BL	28001120	Blue	0800 mA	800 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 850MA BL	28001121	Blue	0850 mA	850 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 900MA BL	28001122	Blue	0900 mA	900 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 950MA BL	28001123	Blue	0950 mA	950 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1000MA BL	28001124	Blue	1000 mA	1,000 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1050MA BL	28001125	Blue	1050 mA	1,050 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1100MA BL	28001126	Blue	1100 mA	1,100 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1150MA BL	28001127	Blue	1150 mA	1,150 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1200MA BL	28001128	Blue	1200 mA	1,200 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1250MA BL	28001129	Blue	1250 mA	1,250 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1300MA BL	28001130	Blue	1300 mA	1,300 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1350MA BL	28001131	Blue	1350 mA	1,350 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1400MA BL	28001132	Blue	1400 mA	1,400 mA	10 pc(s).	0.001 kg
I-SELECT 2 PLUG MAX BL	28001099	Blue	MAX	MAX	10 pc(s).	0.001 kg

## 1. Standards

EN 55015  
EN 61000-3-2  
EN 61000-3-3  
EN 61347-1  
EN 61347-2-13  
EN 62384  
EN 61547  
EN 62386-101 (according to DALI standard V2)  
EN 62386-102  
EN 62386-207  
According to EN 50172 for use in central battery systems  
According to EN 60598-2-22 suitable for emergency lighting installations

## 2. Thermal details and life-time

### 4.1 Expected life-time

Expected life-time					
Type	Output current	ta	40 °C	45 °C	50 °C
LCA 45W 500-1400mA one4all SR PRE	500 mA	tc	63 °C	68 °C	75 °C
		Life-time	> 100,000 h	> 100,000 h	> 100,000 h
	> 500 – 750 mA	tc	65 °C	70 °C	75 °C
		Life-time	> 100,000 h	> 100,000 h	95,000 h
	> 750 – 1,100 mA	tc	67 °C	72 °C	75 °C
		Life-time	> 100,000 h	> 100,000 h	80,000 h
	> 1,100 – 1,400 mA	tc	64 °C	68 °C	75 °C
		Life-time	> 100,000 h	> 100,000 h	85,000 h

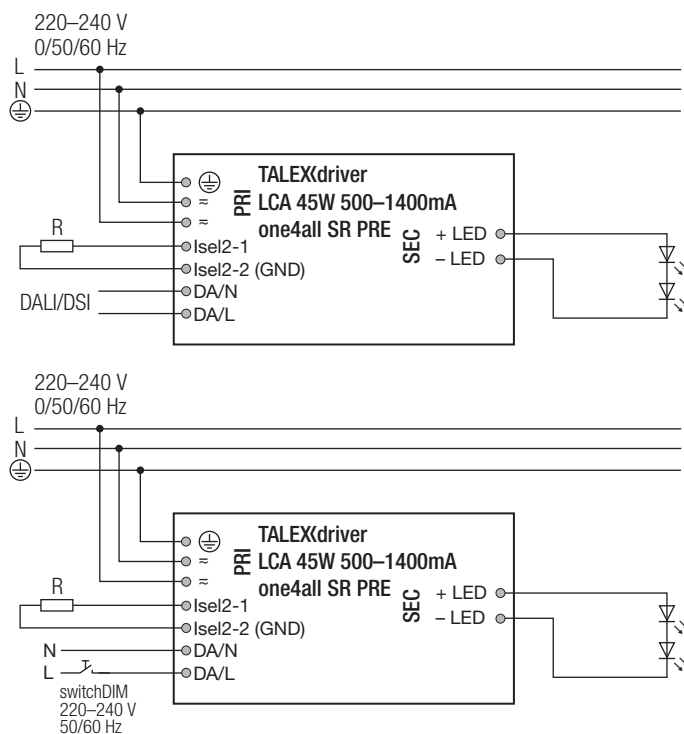
The LED Driver is designed for a life-time stated above under reference conditions and with a failure probability of less than 10 %.

The relation of tc to ta temperature depends also on the luminaire design.

If the measured tc temperature is approx. 5 K below tc max., ta temperature should be checked and eventually critical components (e.g. ELCAP) measured. Detailed information on request.

## 3. Installation / wiring

### 3.1 Circuit diagram



For wiring in dimming operation with ready2mains refer to the ready2mains Gateway data sheet.

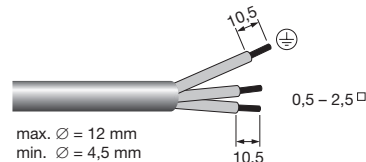
### 3.2 Wiring type and cross section

#### Mains supply wires

Stranded wire or solid wire from 0.5 to 2.5 mm<sup>2</sup> may be used for wiring. Strip 10–11 mm of insulation from the cables to ensure perfect operation of the push terminals.

Use one wire for each terminal connector only.

Use each strain relief channel for one cable only.



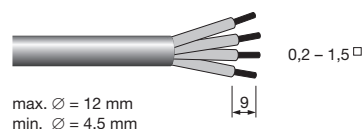
#### Secondary wires (LED module)

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.

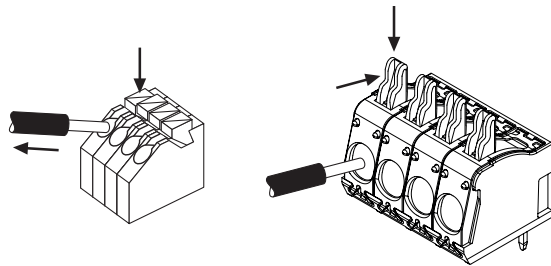
Use one wire for each terminal connector only.

Use each strain relief channel for one cable only.



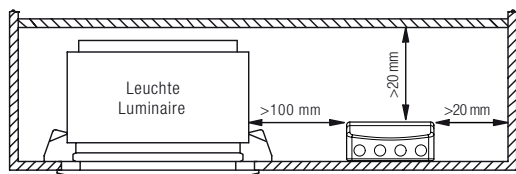
### 3.3 Loose wiring

Press down the "push button" and remove the cable from front.



### 3.4 Fixing conditions

Dry, acidfree, oilfree, fatfree. It is not allowed to exceed the maximum ambient temperature ( $t_a$ ) stated on the device. Minimum distances stated below are recommendations and depend on the actual luminaire. Is not suitable for fixing in corner.



### 3.5 Wiring guidelines

- 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.
- Through wiring of mains is for connecting additional LED Driver only. Max. permanent current of 16 A may not be exceeded.

### 3.6 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).

### 3.7 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.

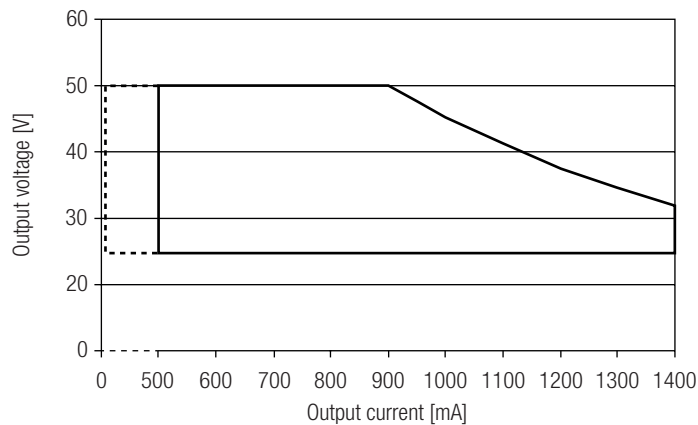
### 3.8 I-select 2 resistors connected via cable

For details see:

[http://www.tridonic.com/com/en/download/technical/LCA\\_PRE\\_LC\\_EXC\\_ProductManual\\_en.pdf](http://www.tridonic.com/com/en/download/technical/LCA_PRE_LC_EXC_ProductManual_en.pdf).

## 4. Electrical values

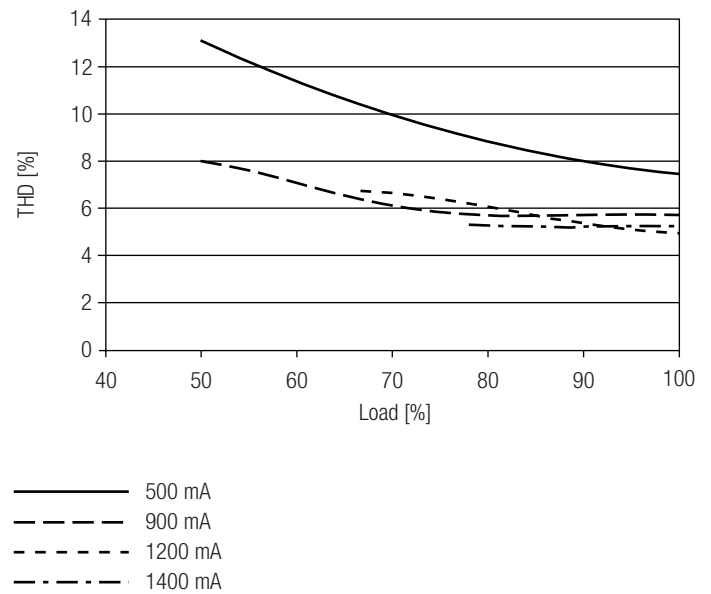
### 4.1 Operating window



— Operating window 100 %  
- - - Operating window dimmed

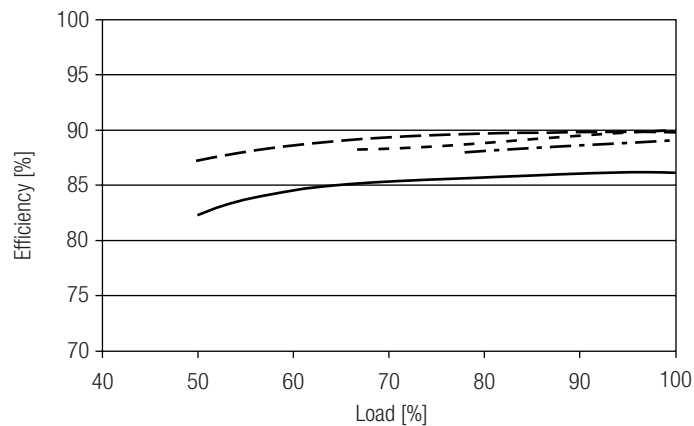
Make sure that the LED Driver is operated within the given window under all operating conditions. Special attention needs to be paid at dimming and DC emergency operation as the forward voltage of the connected LED modules varies with the dimming level, due to the implemented amplitude dimming technology. Coming below the specified minimum output voltage of the LED Driver may cause the device to shut-down. See chapter "6.11 Light level in DC operation" for more information.

### 4.4 THD vs load

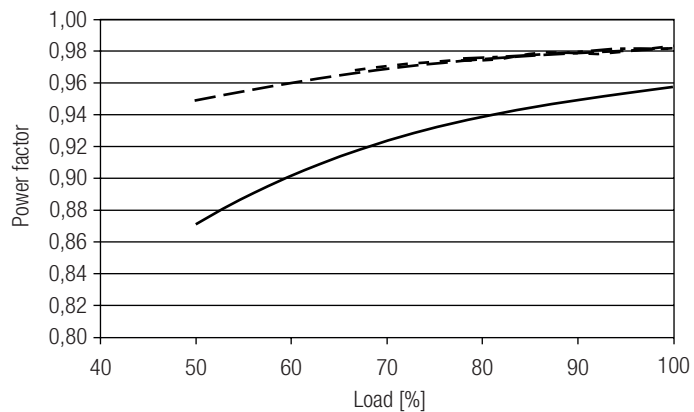


100 % load corresponds to the max. output power (full load) according to the table on page 2.

### 4.2 Efficiency vs load



### 4.3 Power factor vs load



#### 4.5 Maximum loading of automatic circuit breakers

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20	Inrush current	
Installation Ø	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	I <sub>max</sub>	time
<b>LCA 45W 500-1400mA one4all SR PRE</b>	21	30	36	46	13	18	22	28	28 A	195 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.

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

	THD	3.	5.	7.	9.	11.
<b>LCA 45W 500-1400mA one4all SR PRE</b>	< 5	< 4	< 2	< 2	< 1	< 1

#### 4.7 Dimming

Dimming range 1 % to 100 %

Digital control with:

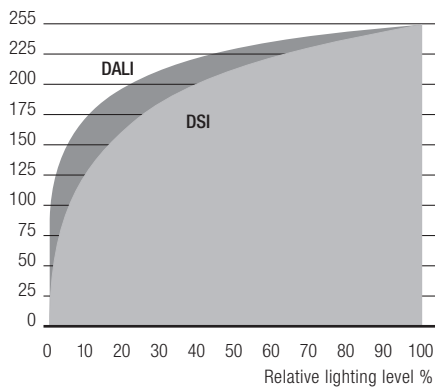
- DSI signal: 8 bit Manchester Code  
Speed 1 % to 100 % in 1.4 s
- DALI signal: 16 bit Manchester Code  
Speed 1 % to 100 % in 0.2 s  
Programmable parameter:  
Minimum dimming level  
Maximum dimming level  
Default minimum = 1 %  
Programmable range 1 % ≤ MIN ≤ 100 %  
Default maximum = 100 %  
Programmable range 100 % ≥ MAX ≥ 1 %

Dimming curve is adapted to the eye sensitiveness.

Dimming is realized by amplitude dimming.

#### 4.8 Dimming characteristics

Digital dimming value



Dimming characteristics as seen by the human eye

### 5. Interfaces / communication

#### 5.1 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.

#### 5.2 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).

#### 5.3 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.

### 6. Functions

#### 6.1 Function: 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 can be found in the chapter "Accessories I-SELECT 2 Plugs".



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).

Resistors for the main output current values can be ordered from Tridonic (see accessories).

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).



## 6.2 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).

## 6.3 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.

## 6.4 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).

## 6.5 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.

## 6.6 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).

## 6.7 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.

## 6.8 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.

## 6.9 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.

## 6.10 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).

## 6.11 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 % (EOFx = 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: < 25.7 mA

DC: < 1.4 mA

## 6.12 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.

## 6.13 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.

## **7. Miscellaneous**

### **7.1 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<sub>DC</sub> 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<sub>AC</sub> (or 1.414 x 1500 V<sub>DC</sub>). To avoid damage to the electronic devices this test must not be conducted.

### **7.2 Conditions of use and storage**

Environmental 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.

### **7.3 Additional information**

Additional technical information at [www.tridonic.com](http://www.tridonic.com) → Technical Data

Guarantee conditions at [www.tridonic.com](http://www.tridonic.com) → Services

Life-time declarations are informative and represent no warranty claim.  
No warranty if device was opened.