



Driver LC 150W 200–1050mA IND sl EXC

EXCITE series

Product description

- Constant current built-in Driver for LED, particularly suitable for industrial applications in tough environments such as cold warehouses or factories with elevated ambient temperatures
- The LED Driver is designed for a life-time stated above under reference conditions and with a failure probability of less than 10 %
- If being operated up to 50 °C ambient temperature for 100,000 h the LED Driver offers a lower failure probability of less than 2.5 %
- Output current adjustable between 200 – 1,050 mA
- Max. output power 150 W
- Dimming range 10 ... 100 % (Depending on load, for details refer to chapter 4.7 Dimming in data sheet.)
- Nominal life-time up to 120,000 h
- 8-year guarantee
- Suitable for mains voltage peaks (burst/surge) up to 4 kV
- Extended temperature range of -40 ... +70 °C



Properties

- White slim metal casing
- Type of protection IP20

Interfaces

- ready2mains (configuration and dimming via mains)

Functions

- Adjustable output current in 1-mA-steps (ready2mains™, I-select 2)
- Dimmable via ready2mains™ interface
- Protective features (overtemperature, short-circuit, overload, no-load, input voltage range)
- Suitable for emergency lighting systems acc. to EN 50172
- Power-up fading at AC
- Intelligent Temperature Guard (overtemperature protection)
- Suitable for emergency escape lighting systems acc. to EN 50172
- Intelligent Voltage Guard (overvoltage and undervoltage monitoring)



Standards, page 5

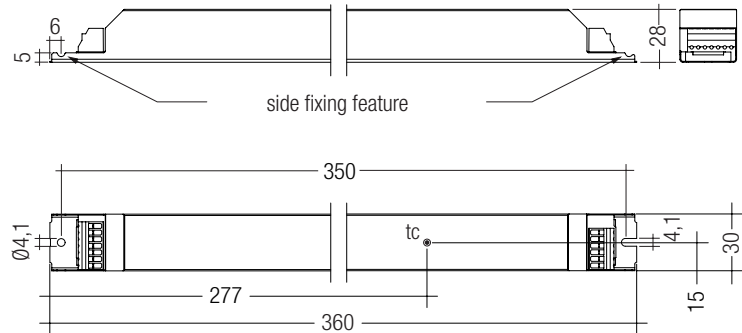
IP20       RoHS

Driver LC 150W 200–1050mA IND sl EXC

EXCITE series

Technical data

Rated supply voltage	220 – 240 V
AC voltage range	198 – 264 V
DC voltage range	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) ^①	703 mA
Typ. current (220 V, 0 Hz, full load, 70 % dimming level) ^②	509 mA
Leakage current (at 230 V, 50 Hz, full load) ^③	< 250 µA
Max. input power	158 W
Typ. efficiency (at 230 V, 50 Hz, full load) ^④	96 %
λ (at 230 V, 50 Hz, full load) ^⑤	0.99
Typ. input current in no-load operation	61 mA
Typ. input power in no-load operation	100 mW
In-rush current (peak / duration)	71 A / 1,180 µs
THD (at 230 V, 50 Hz, full load) ^⑥	< 10 %
Time to light (at 230 V, 50 Hz, full load) ^⑦	≤ 500 ms
Time to light (DC mode)	≤ 500 ms
Switchover time (AC/DC)	≤ 0,2 s
Turn off time (at 230 V, 50 Hz, full load)	< 50 ms
Output current tolerance ^⑧	± 5 %
Output LF current ripple (< 120 Hz)	± 5 %
Max. peak output current	≤ output current + 35 %
Max. output voltage (no-load voltage)	400 V
Dimming range ^⑨	10 – 100 %
Suitable for burst / surge peaks up to (between L - N)	4 kV
Suitable for burst / surge peaks up to (between L/N - PE)	4 kV
Burst / surge peaks output side against PE	4.5 kV
Dimensions L x W x H	360 x 30 x 28 mm



Ordering data

Type	Article number	Packaging carton	Packaging pallet	Weight per pc.
LC 150W 200-1050mA IND sl EXC	28000691	10 pc(s).	780 pc(s).	0.331 kg

Specific technical data

Type	Output current ^⑩	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 ^⑪
LC 150W 200-1050mA IND sl EXC	200 mA	150 V	300 V	60 W	630 W	290 mA	80 °C	-40 ... +70 °C	open
	250 mA	120 V	300 V	75 W	78.0 W	353 mA	80 °C	-40 ... +70 °C	20.00 kΩ
	300 mA	100 V	300 V	90 W	94.3 W	423 mA	80 °C	-40 ... +70 °C	16.67 kΩ
	350 mA	86 V	300 V	105 W	109.5 W	487 mA	80 °C	-40 ... +70 °C	14.29 kΩ
	400 mA	80 V	300 V	120 W	124.9 W	554 mA	85 °C	-40 ... +70 °C	12.50 kΩ
	450 mA	80 V	300 V	135 W	139.2 W	615 mA	85 °C	-40 ... +70 °C	11.11 kΩ
	500 mA	80 V	300 V	150 W	155.7 W	686 mA	85 °C	-40 ... +70 °C	10.00 kΩ
	550 mA	80 V	273 V	150 W	159.5 W	703 mA	85 °C	-40 ... +70 °C	9.09 kΩ
	600 mA	80 V	250 V	150 W	159.3 W	701 mA	85 °C	-40 ... +70 °C	8.33 kΩ
	650 mA	80 V	231 V	150 W	158.2 W	697 mA	85 °C	-40 ... +70 °C	7.69 kΩ
	700 mA	80 V	214 V	150 W	157.8 W	695 mA	85 °C	-40 ... +70 °C	7.14 kΩ
	750 mA	80 V	200 V	150 W	156.4 W	689 mA	90 °C	-40 ... +70 °C	6.67 kΩ
	800 mA	80 V	188 V	150 W	159.8 W	704 mA	90 °C	-40 ... +70 °C	6.25 kΩ
	850 mA	80 V	176 V	150 W	158.1 W	696 mA	90 °C	-40 ... +70 °C	5.88 kΩ
	900 mA	80 V	167 V	150 W	158.4 W	698 mA	90 °C	-40 ... +70 °C	5.56 kΩ
	950 mA	80 V	158 V	150 W	158.1 W	696 mA	90 °C	-40 ... +70 °C	5.26 kΩ
	1,000 mA	80 V	150 V	150 W	159.5 W	703 mA	90 °C	-40 ... +70 °C	5.00 kΩ
	1,050 mA	80 V	143 V	150 W	157.8 W	696 mA	90 °C	-40 ... +70 °C	short circuit (0 Ω)

^① Valid at 100 % dimming level.

^② Depending on the selected output current.

^③ The min. achievable dimming level depends on the connected load. For details refer to chapter 4.7 Dimming in data sheet.

^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.

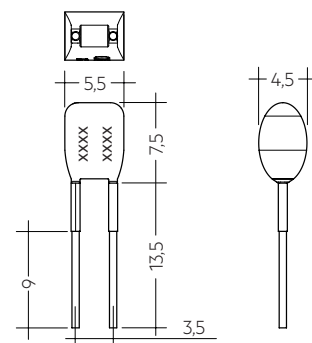
I-SELECT 2 PLUG PRE / EXC

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	Resistor value	Packaging bag	Weight per pc.
I-SELECT 2 PLUG 200MA BL	28001104	Blue	0200 mA	200 mA	25.00 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 225MA BL	28001105	Blue	0225 mA	225 mA	22.22 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 250MA BL	28001106	Blue	0250 mA	250 mA	20.00 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 275MA BL	28001107	Blue	0275 mA	275 mA	18.18 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 300MA BL	28001108	Blue	0300 mA	300 mA	16.67 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 325MA BL	28001109	Blue	0325 mA	325 mA	15.38 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 350MA BL	28001110	Blue	0350 mA	350 mA	14.29 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 375MA BL	28001111	Blue	0375 mA	375 mA	13.33 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 400MA BL	28001112	Blue	0400 mA	400 mA	12.50 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 425MA BL	28001251	Blue	0425 mA	425 mA	11.76 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 450MA BL	28001113	Blue	0450 mA	450 mA	11.11 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 475MA BL	28001252	Blue	0475 mA	475 mA	10.53 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 500MA BL	28001114	Blue	0500 mA	500 mA	10.00 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 525MA BL	28001960	Blue	0525 mA	525 mA	9.52 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 550MA BL	28001115	Blue	0550 mA	550 mA	9.09 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 600MA BL	28001116	Blue	0600 mA	600 mA	8.33 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 650MA BL	28001117	Blue	0650 mA	650 mA	7.69 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 700MA BL	28001118	Blue	0700 mA	700 mA	7.14 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 750MA BL	28001119	Blue	0750 mA	750 mA	6.67 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 800MA BL	28001120	Blue	0800 mA	800 mA	6.25 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 850MA BL	28001121	Blue	0850 mA	850 mA	5.88 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 900MA BL	28001122	Blue	0900 mA	900 mA	5.56 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 950MA BL	28001123	Blue	0950 mA	950 mA	5.26 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1000MA BL	28001124	Blue	1000 mA	1000 mA	5.00 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG 1050MA BL	28001125	Blue	1050 mA	1050 mA	4.76 k Ω	10 pc(s).	0.001 kg
I-SELECT 2 PLUG MAX BL	28001099	Blue	MAX	MAX	0.00 k Ω	10 pc(s).	0.001 kg

1. Standards

EN 55015

EN 60068-2-27 (shock – test case: 1,000 shocks in 6 directions wit
30 g / 18 ms)

EN 60068-2-64 (vibration – test case: acc. to table A.1 transport / category 2)

EN 61000-3-2

EN 61000-3-3

EN 61347-1

EN 61347-2-13

EN 62384

EN 61547

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

2.1 Expected life-time

Expected life-time							
Type	Output current	ta	50 °C	55 °C	60 °C	65 °C	70 °C
LC 150W 200-1050mA IND sl EXC	< 400 mA	tc	60 °C	65 °C	70 °C	75 °C	80 °C
		Life-time	>120,000 h	>120,000 h	>120,000 h	>120,000 h	90,000 h
	400 – 700 mA	tc	65 °C	70 °C	75 °C	80 °C	85 °C
		Life-time	>120,000 h	>120,000 h	>120,000 h	90,000 h	65,000 h
	> 700 – 1,050 mA	tc	70 °C	75 °C	80 °C	85 °C	90 °C
		Life-time	>120,000 h	>120,000 h	100,000 h	70,000 h	50,000 h

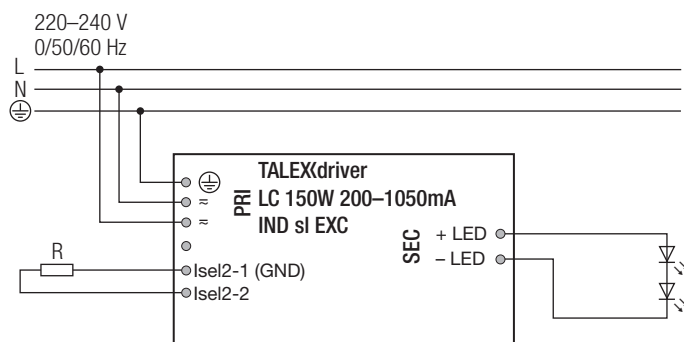
The LED Driver is designed for a life-time stated above under reference conditions and with a failure probability of less than 10 %.

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

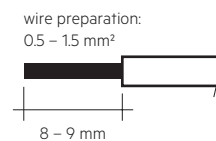


For wiring in dimming operation refer to the ready2mains Gateway data sheet.

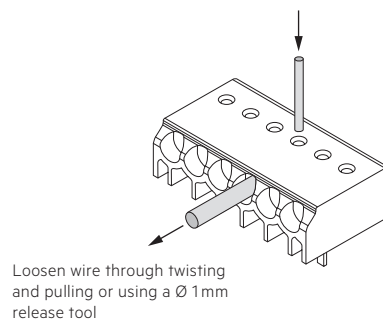
3.2 Wiring type and cross section

Solid wire with a cross section of 0.5 – 1.5 mm². Strip 8 – 9 mm of insulation from the cables to ensure perfect operation of terminals.

LED module/LED Driver/supply



3.3 Loose wiring



3.4 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).
- 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.
- To avoid the damage of the Driver, the wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.).

3.5 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 ready2mains.

3.6 Earth connection

The earth connection is conducted as protection earth (PE). 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)
- 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.

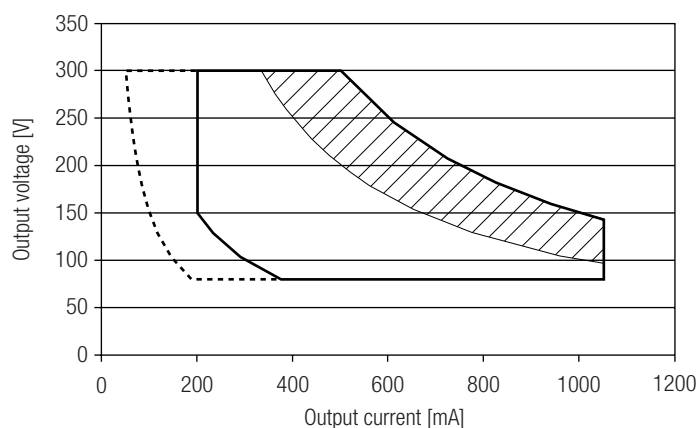
3.7 I-select 2 resistors connected via cable

For details see:

http://www.tridonic.com/com/en/download/technical/LCA_PRE_LC_EXC_ProductManual_en.pdf.

4. Electrical values

4.1 Operating window

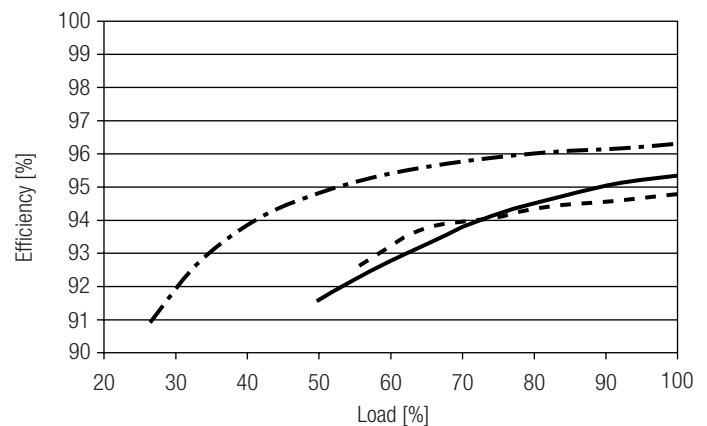


- Operating window 100 %
- - - - - Operating window dimmed
- ▨ LED modules having their non-dimmed operating point within this area can be dimmed down to 15 % light level. For loads outside this area, the achievable minimum dimming level is higher.

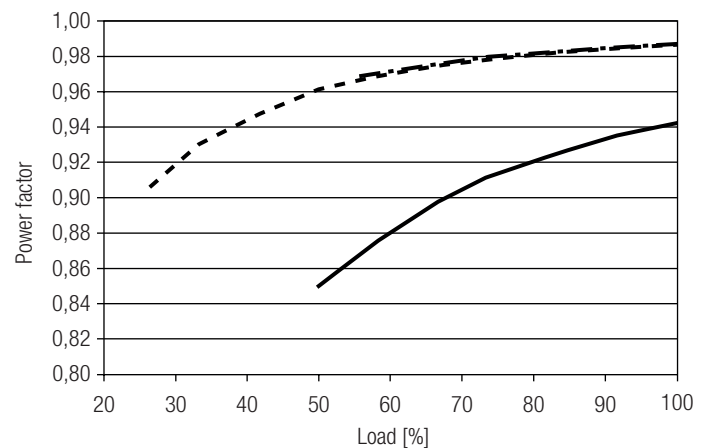
Make sure that the LED Driver is operated within the given window under all operating conditions. Special attention needs to be paid at dimming and DC emergency operation as the forward voltage of the connected LED modules varies with the dimming level, due to the implemented amplitude dimming technology.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

See chapter "6.8 DC emergency operation" for more information.

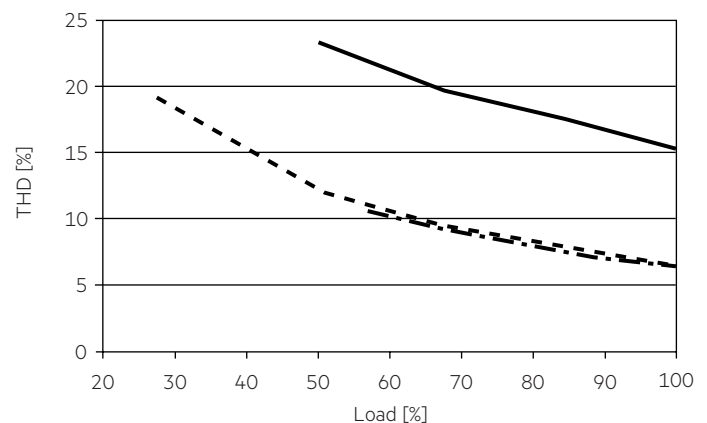
4.2 Efficiency vs load



4.3 Power factor vs load



4.4 THD vs load (without harmonic < 5 mA or 0.6 % of the input current)



- 200 mA
- - - - - 500 mA
- . - . - 1050 mA

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

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 ²	1.5 mm ²	2.5 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	2.5 mm ²	I _{max}	time
LC 150W 200-1050mA IND sl EXC	11	14	18	22	11	14	18	22	71 A	1,180 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.
LC 150W 200-1050mA IND sl EXC	< 7	< 6	< 3	< 3	< 3	< 3

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.

4.7 Dimming

Dimming range 10 to 100%

The minimum achievable dimming level depends on the connected load.

The operating window shows the minimum reachable power in dimmed state. For loads below the max. output power, the minimum dimming level can be higher.

To determine the minimum dimming level for a certain load carefully read the operating window.

For further information please refer to your Tridonic sales contact.

5. Interfaces / communication

5.1 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).

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 two options available.

Option 1: I-select 2

By inserting a suitable resistor or third party 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 2: ready2mains

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



Current adjustment can only be done five times over ready2mains. To program the LED Driver a connected load is necessary that is within the operating window of the LED Driver.

The priority for current adjustment methods is I-select 2 followed by ready2mains (lowest priority).

6.2 ready2mains – configuration

The ready2mains interface enables the configuration of the mostly used parameters via the mains wiring.

In the case of EXC LED Driver, it is the LED output current as well as an optional lockbit to prevent any accidental configuration at a later stage.

The configuration is done via the ready2mains Programmer, either directly at the Programmer itself or via a respective software tool. For details on the configuration via ready2mains see the technical information of the Programmer and its tools.

6.3 ready2mains – dimming

The ready2mains interface also allows for mains-based group dimming, without the need for dedicated control wires.

The dimming commands from the control unit are transferred into the digital ready2mains protocol by a ready2mains Gateway. This device then broadcasts the dimming signal to all connected LED Drivers via the mains wiring. For details on the dimming functionality via ready2mains see the technical information to ready2mains as well as to the Gateways.

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 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 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 DC emergency 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 (EOF_i): 70 % (cannot be adjusted)

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: < 70 mA (at 230 V, 50 Hz)

DC: 6 – 7 mA (at 275 – 186 V, 0 Hz)

6.9 Intelligent Voltage Guard

Intelligent Voltage Guard is the name of the electronic monitoring of the mains voltage. It immediately shows if the mains voltage rises above certain thresholds. Measures can then be taken quickly to prevent damage to the LED Driver.

- If the mains voltage rises above approx. 280 V_{rms} (voltage depends on the Driver type), the LED light starts flashing on and off.
- To avoid a damage of the LED Driver the mains supply has to be switched off at this signal.

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_{DC} for one 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.

7.2 Conditions of use and storage

Humidity: 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 (t_a) before they can be operated.

7.3 Maximum number of switching cycles

All LED Driver are tested with 50,000 switching cycles. The actually achieved number of switching cycles is significantly higher.

7.4 Additional information

Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

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