



Driver LC 150W 200–1050mA IND sI EXC (INDUSTRY) excite series non-SELV

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 lifetime 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
- Suitable for mains voltage peaks (burst/surge) up to 4 kV
- Extended temperature range of -40 ... +70 °C
- Nominal lifetime up to 120,000 h
- 8 years guarantee (conditions at www.tridonic.com)

Housing properties

- White slim metal casing
- Type of protection IP20

Interfaces

- ready2mains (configuration via mains)

Functions

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



Standards, page 6

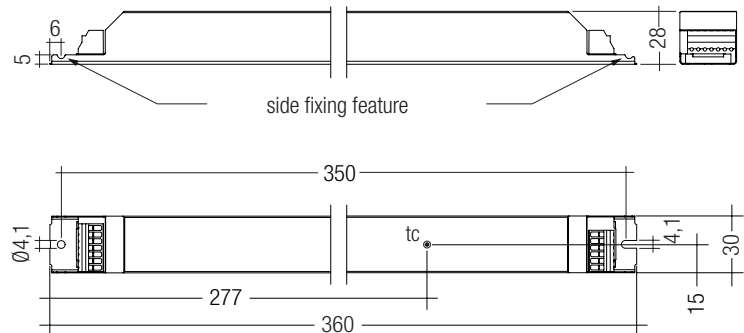
IP20   

Driver LC 150W 200–1050mA IND sl EXC (INDUSTRY)

excite series non-SELV

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) ^① | 509 mA |
| Leakage current (at 230 V, 50 Hz, full load) ^① | < 250 µA |
| Max. input power | 158 W |
| Typ. efficiency (at 230 V, 50 Hz, full load) ^① | 96 % |
| λ (at 230 V, 50 Hz, full load) | 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) | < 10 % |
| Starting time (at 230 V, 50 Hz, full load) | ≤ 500 ms |
| Starting time (DC mode) | ≤ 500 ms |
| Switchover time (AC/DC) ^② | ≤ 0,2 s |
| Turn off time (at 230 V, 50 Hz, full load) | < 50 ms |
| Output current tolerance ^③ | ± 5 % |
| Output LF current ripple (< 120 Hz) | ± 5 % |
| Max. peak output current | ≤ output current + 35 % |
| Output P_{ST}^{LM} (at full load) | ≤ 1 |
| Output SVM (at full load) | ≤ 0.4 |
| Max. output voltage (no-load voltage) | 400 V |
| 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 |
| Type of protection | IP20 |
| Lifetime | up to 120,000 h |
| Guarantee (conditions at www.tridonic.com) | 8 years |
| 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 ^{② ④} | 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_c | Ambient temperature t_a max. | I-SELECT 2 resistor value ^③ |
|-------------------------------|-------------------------------|----------------------|----------------------|-------------------|---|---|-------------------------------|--------------------------------|--|
| LC 150W 200-1050mA IND sl EXC | 200 mA | 150 V | 300 V | 60 W | 63.0 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 Depending on the selected output current.

② 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.

③ Not compatible with I-SELECT (generation 1). Calculated resistor value.

④ Output current is mean value.

⑤ Valid for immediate change of power supply type otherwise the starting time is valid.

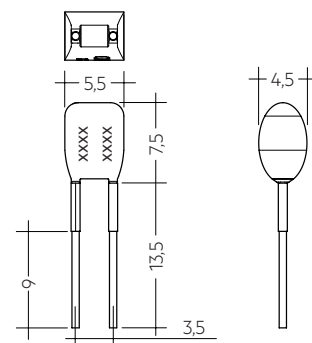
I-SELECT 2 PLUG PRE / EXC

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 insulated
- 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

- $R [k\Omega] = 5 V / I_{out} [mA] \times 1000$
- E96 resistor value used
- Resistor value tolerance $\leq 1\%$; resistor power $\geq 0.1 W$;
base insulation 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 | 24.90 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 225MA BL | 28001105 | Blue | 0225 mA | 225 mA | 22.10 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 | 18.20 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 300MA BL | 28001108 | Blue | 0300 mA | 300 mA | 16.50 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 325MA BL | 28001109 | Blue | 0325 mA | 325 mA | 15.40 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 350MA BL | 28001110 | Blue | 0350 mA | 350 mA | 14.30 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 375MA BL | 28001111 | Blue | 0375 mA | 375 mA | 13.30 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 400MA BL | 28001112 | Blue | 0400 mA | 400 mA | 12.40 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 425MA BL | 28001251 | Blue | 0425 mA | 425 mA | 11.80 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 450MA BL | 28001113 | Blue | 0450 mA | 450 mA | 11.00 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 475MA BL | 28001252 | Blue | 0475 mA | 475 mA | 10.50 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 | 9.53 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 | 8.25 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 650MA BL | 28001117 | Blue | 0650 mA | 650 mA | 7.68 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 700MA BL | 28001118 | Blue | 0700 mA | 700 mA | 7.15 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 750MA BL | 28001119 | Blue | 0750 mA | 750 mA | 6.65 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 800MA BL | 28001120 | Blue | 0800 mA | 800 mA | 6.19 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 850MA BL | 28001121 | Blue | 0850 mA | 850 mA | 5.90 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 900MA BL | 28001122 | Blue | 0900 mA | 900 mA | 5.62 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 950MA BL | 28001123 | Blue | 0950 mA | 950 mA | 5.23 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 1000MA BL | 28001124 | Blue | 1000 mA | 1000 mA | 4.99 k Ω | 10 pc(s). | 0.001 kg |
| I-SELECT 2 PLUG 1050MA BL | 28001125 | Blue | 1050 mA | 1050 mA | 4.75 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 lifetime

2.1 Expected lifetime

| Expected lifetime | | | | | | | |
|-------------------------------|------------------|----------|------------|------------|------------|------------|----------|
| 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 |
| | | Lifetime | >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 |
| | | Lifetime | >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 |
| | | Lifetime | >120,000 h | >120,000 h | 100,000 h | 70,000 h | 50,000 h |

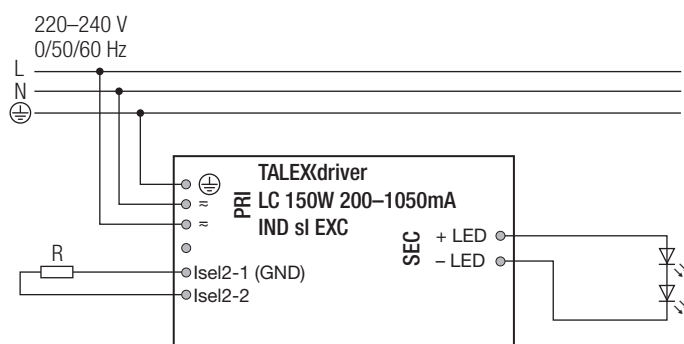
The LED Driver is designed for a lifetime stated above under reference conditions and with a failure probability of less than 10 %.

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

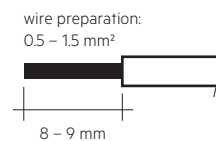
3.1 Circuit diagram



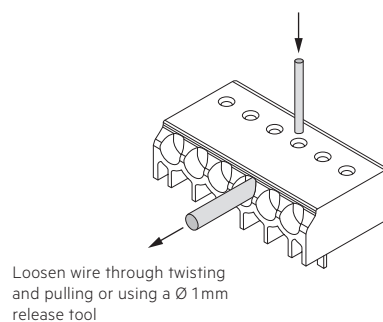
3.2 Wiring type and cross section

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

- Run the secondary lines separately from the mains connections and lines to achieve good EMC performance.
- The max. secondary cable length is 2 m (4 m circuit).
- For good EMC performance, keep the LED wiring as short as possible.
- 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.

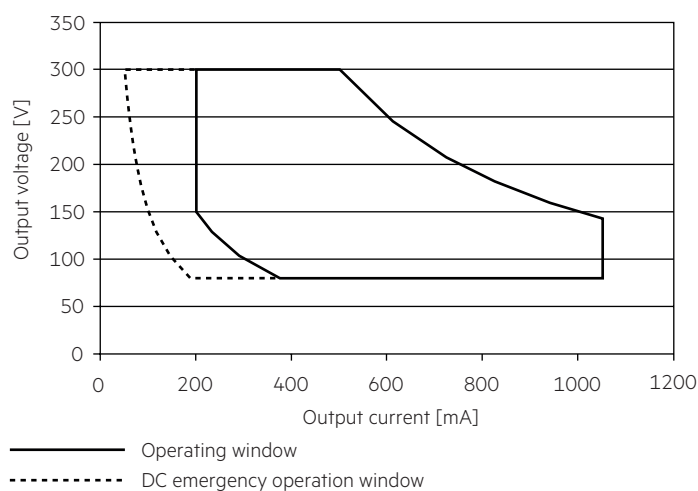
3.7 I-SELECT 2 resistors connected via cable

For details see:

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

4. Electrical values

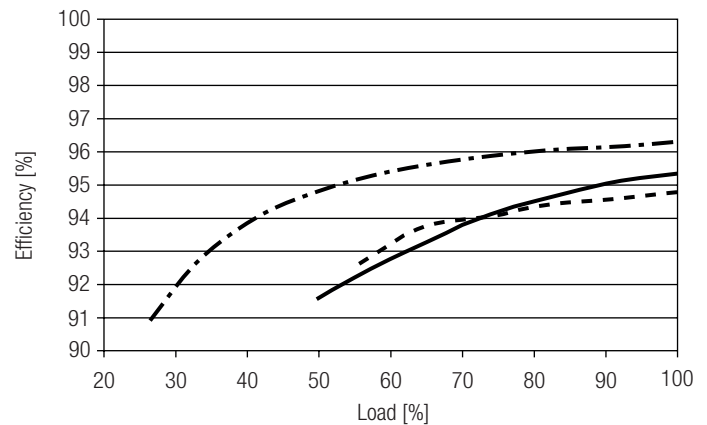
4.1 Operating window



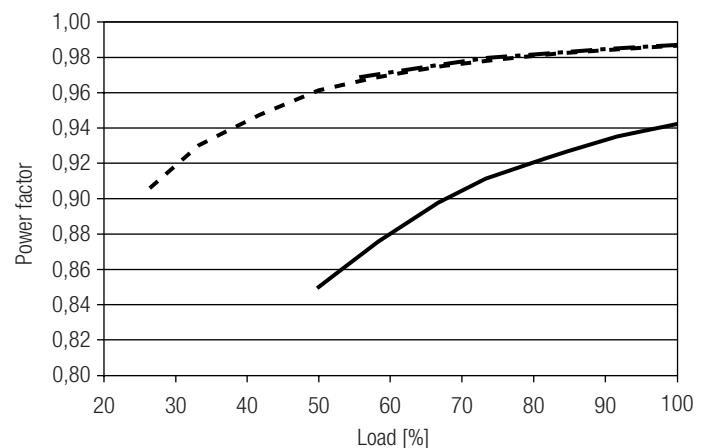
Make sure that the LED Driver is operated within the given window under all operating conditions. Special attention needs to be paid at dimming and DC emergency operation as the forward voltage of the connected LED modules varies with the dimming level, due to the implemented amplitude dimming technology.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

See chapter "6.7 DC emergency operation" for more information.

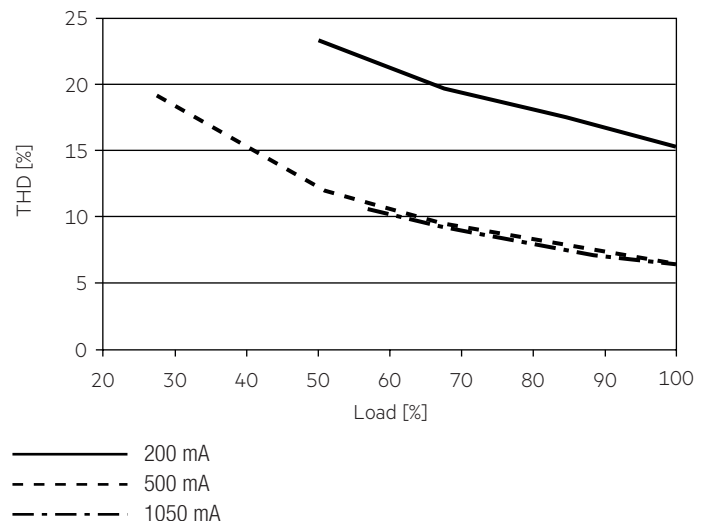
4.2 Efficiency vs load



4.3 Power factor vs load



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



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 in relation to inrush current

| 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 |

This are max. values calculated out of inrush current! Please consider not to exceed the maximum rated continuous current of the circuit breaker.
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.

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 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.

6.4 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.

6.5 Overload protection

If the maximum load is exceeded by a defined internal limit, 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.

6.6 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 above $t_{c\ max}$. The activation temperature differs depending on the LED load. On DC operation this function is deactivated to fulfill emergency requirements.

6.7 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)

6.8 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 LED 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 Insulation 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 insulation 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 insulation 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 (ta) before they can be operated.

The LED Driver is declared as inbuilt LED controlgear, meaning it is intended to be used within a luminaire enclosure.

If the product is used outside a luminaire, the installation must provide suitable protection for people and environment (e.g. in illuminated ceilings).

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

Lifetime declarations are informative and represent no warranty claim. No warranty if device was opened.