



Light  
is our passion

## 20W DALI-2 DT8 'Dim to Dark' LED Driver

### DUALdrive

DUALdrive is perfect for dynamic white lighting applications or for luminaires that combine task and ambient lighting. DUALdrive excels in configurability and low dimming - giving you every shade of white! Symbiosis ensures the LED driver works seamlessly together with LED modules, controls and intelligent luminaire elements.

### Product offering



#### DUALdrive 20M-E2Z0C

|                     |                                                                                                          |
|---------------------|----------------------------------------------------------------------------------------------------------|
| Part number P/N     | DL20M-E2Z0C2                                                                                             |
| Product description | DUALdrive, 20W, DALI-2 DT8, 2 control channels, constant current, 2x 40V output, long plastic, side feed |

### Features & benefits

|                      |                                                                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Natural dimming      | Dim to dark, smooth brightness changes, excellent flicker performance, adaptable dimming curves, configurable minimum dimming level                 |
| LightShape           | Tunable White: colour temperature and intensity control                                                                                             |
| Interoperability     | DALI-2 Device Type 8 certified for simplified commissioning of tunable white applications                                                           |
| LEDcode              | Configurable design to work with most constant current LED modules and arrays, while providing a connection point to integrated peripheral controls |
| Programmable         | Fine-tune your driver for any application                                                                                                           |
| Performance          | Low inrush current and total harmonic distortion (THD), high power factor and efficiency                                                            |
| Camera compatibility | Hybrid HydraDrive technology is proven to work in TV studios and security camera environments                                                       |

## Programming tools

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|                                     |                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------|
| Programming interface               | <a href="#">TOOLbox pro (TLU20504)</a>                                        |
| Programming cable set               | <a href="#">TOOLbox pro to LED driver, programming cable, 5pcs (TLC03051)</a> |
| Programming Hand-held, Touch-and-Go | <a href="#">PJ0035HH1</a>                                                     |
| Programming jig                     | PJ0202A1                                                                      |
| Programming software                | <a href="#">FluxTool</a>                                                      |

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## Warranty

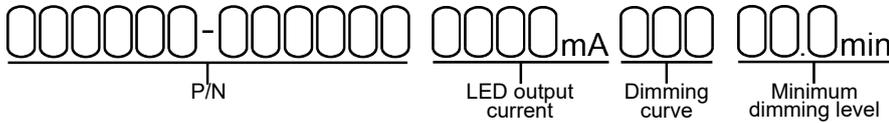
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|                 |                                              |
|-----------------|----------------------------------------------|
| Warranty period | <a href="#">General Terms and Conditions</a> |
|-----------------|----------------------------------------------|

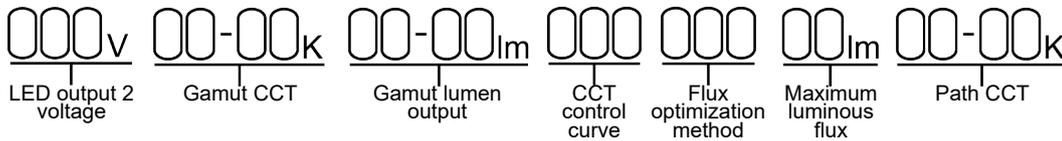
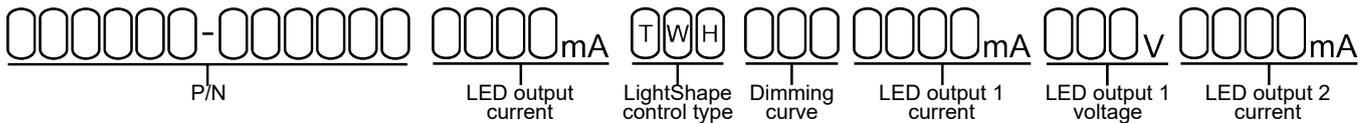
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Order number configurator

Standard



LightShape



|                                |                                                                                                                                                                                                                                                                                           |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P/N                            | LED driver part number                                                                                                                                                                                                                                                                    |
| LED output current, Standard   | Enter value in 1mA increments, e.g. "811" for 811mA                                                                                                                                                                                                                                       |
| LED output current, LightShape | Output current identical for all outputs? Enter value in 1mA increments, e.g. "811" for 811mA and leave the fields "LED output 1" and "LED output 2" blank. Output current different per output? Enter "MCUR" in LED output current and specify the differing currents in LED output 1/2. |
| LightShape control type        | "TWH" stands for Tunable White                                                                                                                                                                                                                                                            |
| Dimming curve                  | "LOG" for logarithmic (default)<br>"LIN" for linear                                                                                                                                                                                                                                       |
| Minimum dimming level          | Leave blank for default minimum dimming level of 0.1%. Specify in 0.1% increments, e.g. "10.5" for 10.5%.                                                                                                                                                                                 |
| Gamut CCT                      | LightShape-specific option. Enter the LEDs' CCT as "XX-YY" where XX is LED output 1 and YY is LED output 2. Available options per output: 18, 20, 22, 25, 27, 30, 35, 40, 50, 57 and 65. E.g. "18-50" for 1800K on LED output 1 and 5000K on LED output 2.                                |
| Gamut lumen output             | Enter the lumen output range for LED output 1 and 2 as "XX-YY" where XX is LED output 1 and YY is LED output 2. Available range per output: from "01" for 100lm to "99" for 9900lm. E.g. "10-12" for 1000lm on LED output 1 and 1200lm on LED output 2.                                   |
| CCT control curve              | Enter the required CCT control curve: "LOG" for logarithmic, "LIN" for linear                                                                                                                                                                                                             |

|                          |                                                                                                                                                                                                                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flux optimization method | Leave blank if a consistent luminous flux output over the full CCT range is required (default); enter "MAX" if the luminous flux must be limited to a maximum value for all outputs combined.                                                                                                        |
| Maximum luminous flux    | If Flux optimization method is set to "MAX", specify the required lumen output, e.g. "12" for 1200lm. If left blank it is constant (default).                                                                                                                                                        |
| Path CCT                 | Leave blank if Path CCT requires the same values as Gamut CCT. Or specify the Path CCT values as "XXYY" where XX is LED output 1 and YY is LED output 2. Available options per output: 18, 20, 22, 25, 27, 30, 35, 40, 50, 57, 65. E.g. "18-50" for 1800K on LED output 1 and 5000K on LED output 2. |

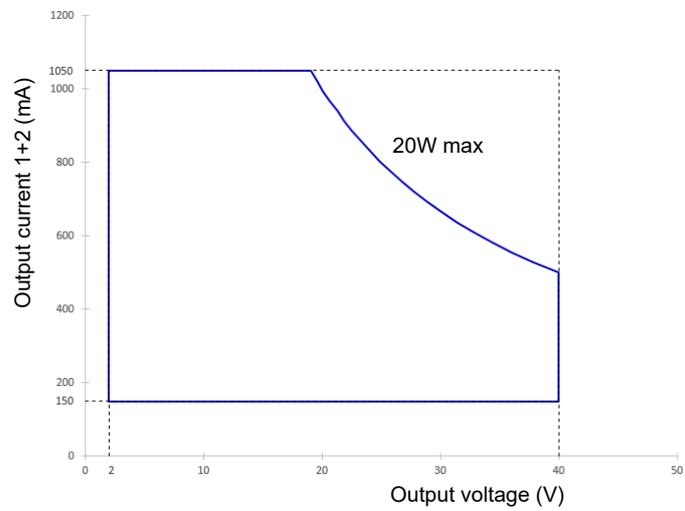
### Input characteristics

|                                 |                                                    |
|---------------------------------|----------------------------------------------------|
| Nominal input voltage range AC  | 220 - 240V (ENEC)                                  |
| Absolute input voltage range AC | 198 - 264V                                         |
| Nominal input voltage range DC  | 176 - 250V                                         |
| Maximum input current AC        | 0.15A @ 230V                                       |
| Input frequency range           | 50 - 60Hz                                          |
| Efficiency at full load         | 82%                                                |
| Power factor at full load       | > 0.9                                              |
| THD at full load                | < 20%                                              |
| Maximum inrush current AC       | < 200mA <sup>2</sup> s @ 230V                      |
| Surge protection                | 2kV differential mode (DM)<br>2kV common mode (CM) |
| Maximum standby power           | 0.5W                                               |

**Output characteristics**

|                                       |                                                               |
|---------------------------------------|---------------------------------------------------------------|
| Maximum LED output power              | 20W                                                           |
| Number of LED outputs                 | 2                                                             |
| Programmable LED output current range | 150 - 1050mA                                                  |
| LED output type                       | Programmable in 1mA increments within specified current range |
| LED output current tolerance          | +/- 5% at programmed LED output current                       |
| LED output voltage range              | 2 - 40V                                                       |

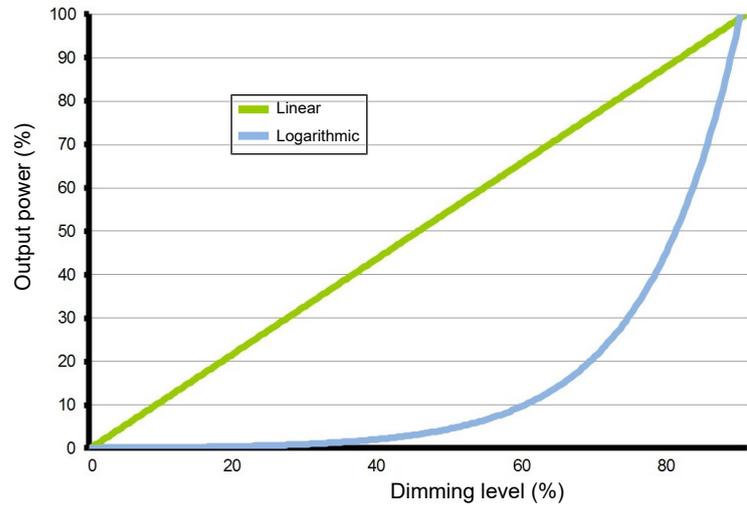
Operating window



### Control characteristics

|                       |                                      |
|-----------------------|--------------------------------------|
| Control channels      | 2                                    |
| Control protocol      | LEDcode<br>DALI-2 Device type 8 (Tc) |
| Dimming range         | 100% - 0.1%                          |
| Dimming curve options | Logarithmic (default)<br>Linear      |
| LightShape            | Tunable White, 2x pc-white           |
| Dimming method        | Hybrid HydraDrive                    |
| Time delay to standby | < 30s                                |

### Dimming curves

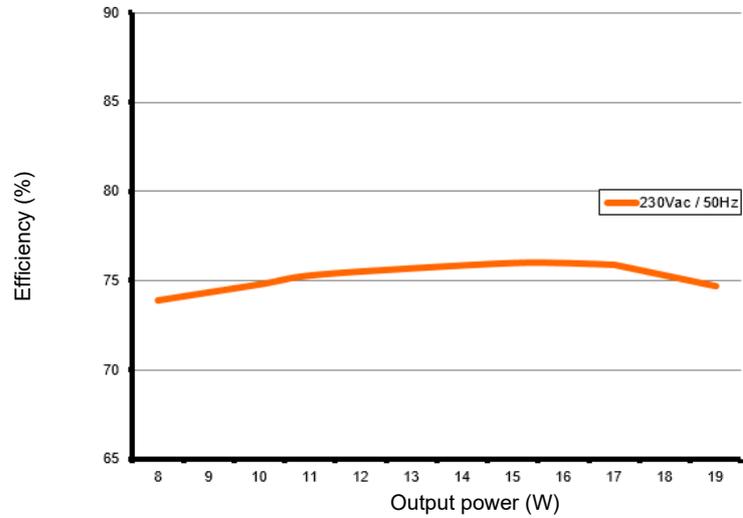


## Performance

### Typical efficiency vs load

Tested with a load on each LED output of 3 LEDs in series, programmed for 1050mA and at 25 °C ambient temperature. The measurements below 20W were performed by dimming the light output.

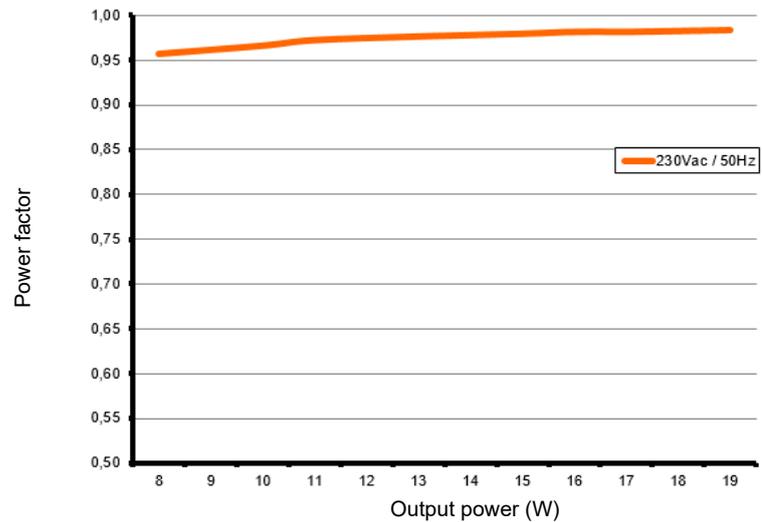
When LightShape is enabled: changing the CCT value has limited impact on the test data.



### Typical power factor vs load

Tested with a load on each LED output of 3 LEDs in series, programmed for 1050mA and at 25 °C ambient temperature. The measurements below 20W were performed by dimming the light output.

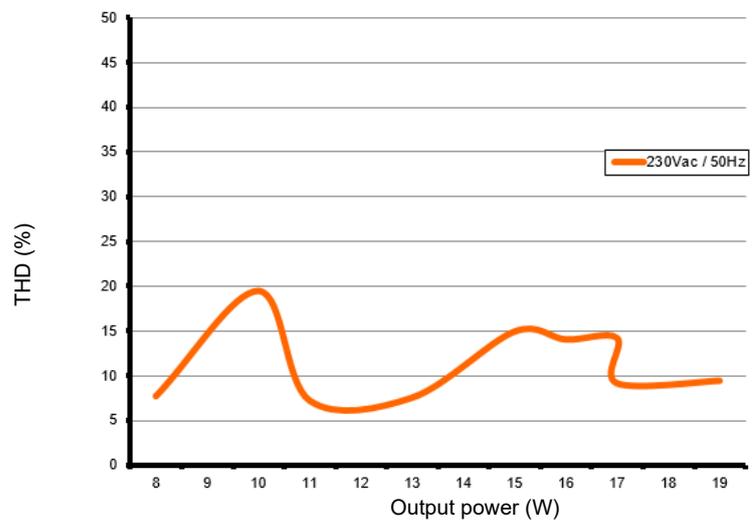
When LightShape is enabled: changing the CCT value has limited impact on the test data.



### Typical THD vs load

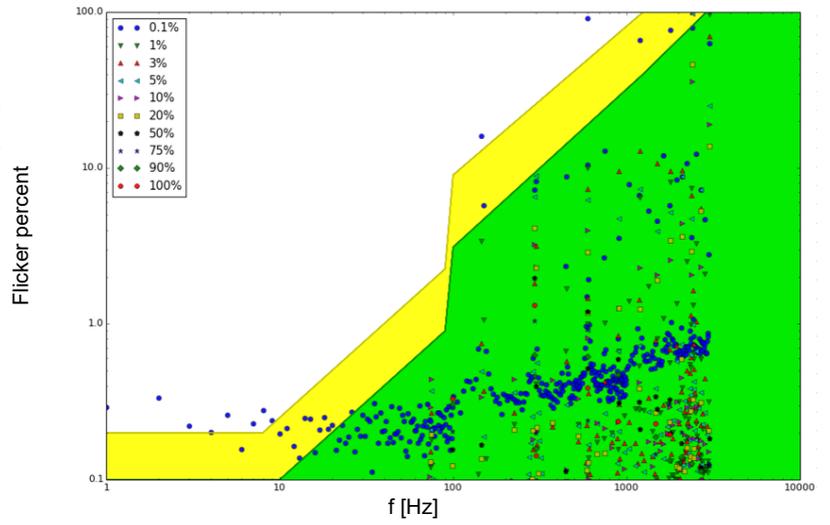
Tested with a load on each LED output of 3 LEDs in series, programmed for 1050mA and at 25 °C ambient temperature. The measurements below 20W were performed by dimming the light output.

When LightShape is enabled: changing the CCT value has limited impact on the test data.



Typical flicker performance

Typical flicker percent as a function of frequency, measured across the dimming range. The results are overlaid with the low-risk (yellow) and no observable effect (green) levels as defined in IEEE P1789.



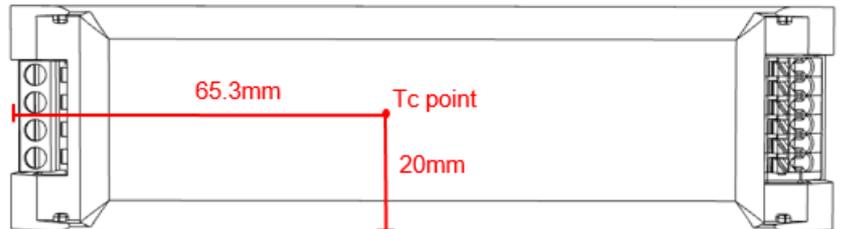
Environmental conditions

Operating ambient temperature ( $T_a$ ) range      -20 °C to +50 °C

Maximum operating case temperature ( $T_c$  max)      77 °C

Lifetime      50,000 hours at a maximum case temperature ( $T_c$ ) of 77 °C

TC point location



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## LED driver protection

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|                          |                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thermal                  | The LED output current is decreased whenever the internal LED driver temperature exceeds factory preset temperature. The LED output current is increased again once the internal LED driver temperature drops below this internal temperature threshold. If the internal LED driver temperature continues to increase, despite a decrease in output current, the LED driver will shut down. |
| LED output short circuit | The LED output current is cut off whenever the LED driver detects a short-circuit. The LED driver will attempt a restart every 400ms after a short-circuit is detected.                                                                                                                                                                                                                     |
| LED output overload      | The LED driver decreases the LED output current sequentially, until it reaches its maximum rated power, whenever a load that exceeds the LED driver's maximum rated power is connected to the LED output.                                                                                                                                                                                   |
| Reverse polarity         | The LED driver will not yield any current if the polarity of the load on the LED output is reversed. This situation will not damage the LED driver but may damage the LED load.                                                                                                                                                                                                             |

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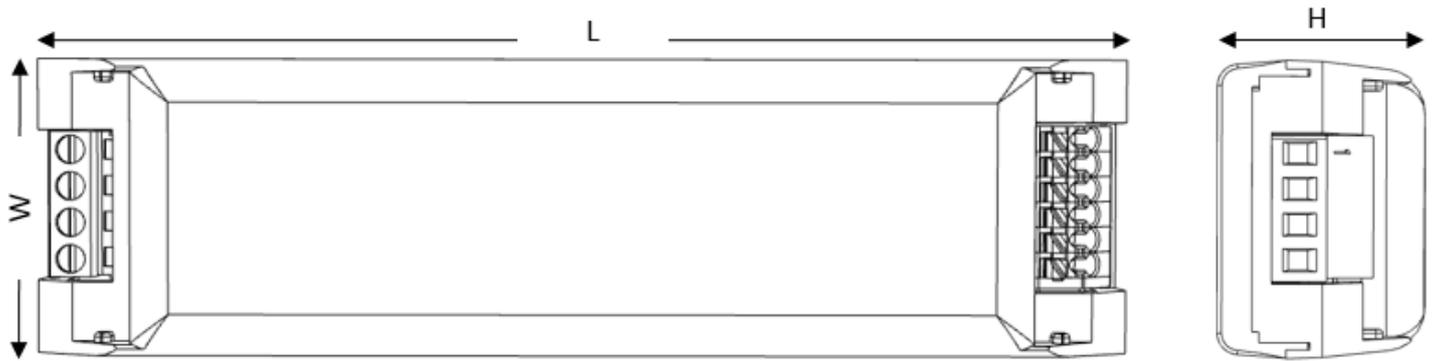
## LED protection

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|                        |                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thermal protection LED | An external NTC thermistor, which is placed on a PCB near the LEDs, can be connected to the driver via the LEDcode/NTC terminals. The output current to the LEDs is then decreased by 75% whenever the NTC exceeds a maximum allowable temperature, which is specified by the user in the FluxTool software. The default NTC temperature limit is set to 70 °C. |
| Thermistor value       | 47kΩ                                                                                                                                                                                                                                                                                                                                                            |
| Suitable thermistors   | Leaded: Vishay, P/N 238164063473<br>Screw: Vishay, P/N NTCASCWE3473J                                                                                                                                                                                                                                                                                            |

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**LED driver mechanical details**



|            |                                                           |
|------------|-----------------------------------------------------------|
| Length (L) | typical: 149.6 mm / 5.9 in<br>maximum: 150.4 mm / 5.93 in |
|------------|-----------------------------------------------------------|

|           |                                                           |
|-----------|-----------------------------------------------------------|
| Width (W) | typical: 41.3 mm / 1.63 in<br>maximum: 42.06 mm / 1.66 in |
|-----------|-----------------------------------------------------------|

|            |                                                         |
|------------|---------------------------------------------------------|
| Height (H) | typical: 30 mm / 1.18 in<br>maximum: 30.76 mm / 1.21 in |
|------------|---------------------------------------------------------|

|                                        |             |
|----------------------------------------|-------------|
| 3D files available on product web page | IGS<br>STEP |
|----------------------------------------|-------------|

|        |          |
|--------|----------|
| Weight | 117.24 g |
|--------|----------|

|                 |                     |
|-----------------|---------------------|
| Mounting torque | Not to exceed 0.5Nm |
|-----------------|---------------------|

**Packaging**

|                         |                                            |
|-------------------------|--------------------------------------------|
| Length x Width x Height | 579 x 237 x 202 mm / 22.8 x 9.33 x 7.95 in |
|-------------------------|--------------------------------------------|

|                             |         |
|-----------------------------|---------|
| Weight (including products) | 10.5 kg |
|-----------------------------|---------|

|                  |        |
|------------------|--------|
| Products per box | 50 pcs |
|------------------|--------|

**Connector layout**



**Input wiring specifications**

|                                 |                                       |
|---------------------------------|---------------------------------------|
| Connector type                  | screw terminals                       |
| Connector supplier and series   | TE-Connectivity 2-796683              |
| Wire type                       | solid or stranded copper              |
| Wire core cross section         | 0.5 - 3mm <sup>2</sup> / AWG 20 – 12  |
| Wire core cross section for RCM | 0.75 - 3mm <sup>2</sup> / AWG 18 – 12 |
| Wire strip length               | 9.0mm / 11/32"                        |

**Output wiring specifications**

|                                              |                                                                                                                                                                                                                                                    |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connector type                               | push-in terminals                                                                                                                                                                                                                                  |
| Connector supplier and series                | Wago 250 series                                                                                                                                                                                                                                    |
| Wire type                                    | solid or stranded copper                                                                                                                                                                                                                           |
| Wire core cross section                      | 0.5 - 1.5mm <sup>2</sup> / AWG 20 – 16                                                                                                                                                                                                             |
| Wire strip length                            | 9.0mm / 11/32"                                                                                                                                                                                                                                     |
| Maximum remote mounting distance of LED load | AWG 20 (0.52 mm <sup>2</sup> ) - 14 m / 46 ft<br>AWG 19 (0.65 mm <sup>2</sup> ) - 18 m / 59 ft<br>AWG 18 (0.82 mm <sup>2</sup> ) - 22 m / 72 ft<br>AWG 17 (1.04 mm <sup>2</sup> ) - 28 m / 92 ft<br>AWG 16 (1.31 mm <sup>2</sup> ) - 36 m / 118 ft |

**Automatic circuit breakers (MCB)**

|                 |                       |     |     |     |     |     |     |
|-----------------|-----------------------|-----|-----|-----|-----|-----|-----|
| Maximum loading | MCB type              | B10 | B13 | B16 | C10 | C13 | C16 |
|                 | Number of LED drivers | 66  | 86  | 106 | 66  | 86  | 106 |

**Standards and compliance**

|                                     |                                                                                                  |
|-------------------------------------|--------------------------------------------------------------------------------------------------|
| ENEC safety                         | EN 61347-1<br>EN 61347-2-13 (Emergency lighting)                                                 |
| ENEC performance                    | EN 62384                                                                                         |
| Conducted emissions                 | EN 55015, Class B                                                                                |
| Radiated emissions                  | EN 55015, Class B                                                                                |
| Radio disturbance characteristics   | EN 55022                                                                                         |
| Harmonic current emissions          | EN 61000-3-2                                                                                     |
| Electrostatic discharge             | EN 61000-4-2                                                                                     |
| RFE field susceptibility            | EN 61000-4-3                                                                                     |
| Electrical fast transient           | EN 61000-4-4                                                                                     |
| Conducted radio frequency           | EN 61000-4-6                                                                                     |
| Voltage dips                        | EN 61000-4-11                                                                                    |
| Electromagnetic immunity            | EN 61547                                                                                         |
| DALI-2                              | IEC 62386-101 Edition 2.0, IEC 62386-102 Edition 2.0, IEC 62386-207 Edition 1                    |
| Surge protection                    | IEC 61000-4-5 level 3: 2kV DM, 2kV CM @ 2 Ohm                                                    |
| Surge protection                    | ANSI 62.41 1991 category B1: 2.5kV DM, 2.5kV CM @ 30 Ohm<br>DALI input: 0.5 kV DM, 1 kV CM surge |
| RCM                                 | AS/NZS 61347.1, AS/NZS 61347.2.13                                                                |
| Restriction of hazardous substances | RoHS3 (Directives 2011/65/EU-2015/863/EU)                                                        |
| SVHC-list substances                | REACH Art.33                                                                                     |

**Certifications**



**RCM independent control gear classification**

| Clearance type                             | Description                                                                               | Distance |
|--------------------------------------------|-------------------------------------------------------------------------------------------|----------|
| Height clearance to building element (HCB) | Minimum distance between the top of the control gear and any building element above it    | 50 mm    |
| Minimum insulation clearance (MIC)         | Minimum distance between the top of the control gear and the building insulation above it | 50 mm    |
| Side clearance to building element (SCB)   | Minimum distance between the side of the control gear and any building element            | 50 mm    |
| Side clearance to insulation (SCI)         | Minimum distance between the side of the control gear and any building insulation         | 50 mm    |

**Safety**

|                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | FELV control terminals marked “Risk of electric shock” are not safe to touch. Dimming connected to FELV control terminal shall be insulated for Low Voltage supply of the control gear. Any terminals connected to the FELV circuit shall be protected against accidental contact.                                                                                                                   |
|  | Risk of electrical shock. May result in serious injury or death. Disconnect power before servicing or installing.                                                                                                                                                                                                                                                                                    |
|  | The LED driver may only be connected and installed by a qualified electrician. All applicable regulations, legislation, and building codes must be observed. Incorrect installation of the LED driver can cause irreparable damage to the LED driver and the connected LEDs.<br><br>Pay attention when connecting the LEDs: polarity reversal results in no light output and often damages the LEDs. |
|  | LED drivers are designed and intended to operate LED loads only. Powering non-LED loads may push the LED driver outside its specified design limits and is, therefore, not covered by any warranty.                                                                                                                                                                                                  |
|  | eldoLED products are designed to meet the performance specifications as outlined at certain operating conditions in the data sheet. It is the responsibility of the fixture manufacturer to test and validate the design and operation of the system under expected and potential use cases, including faults.                                                                                       |
|  | Please observe voltage drop over long cable lengths. Longer cable lengths increase EMI susceptibility.                                                                                                                                                                                                                                                                                               |
|  | Product renderings and dimensional drawings are generic for the housing type. Product label, connector type and quantity may vary.                                                                                                                                                                                                                                                                   |

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**Europe, Rest of World**

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