

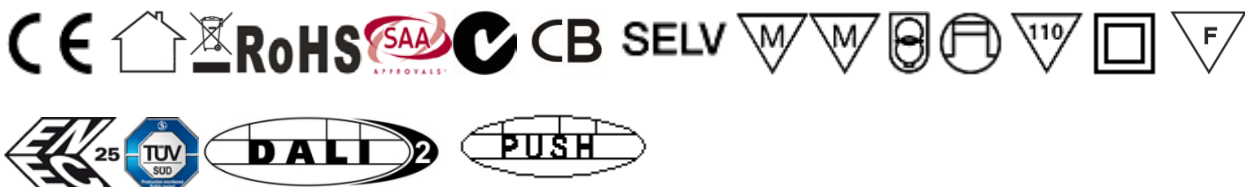
# LEDGEAR<sup>®</sup> Specification

|   |   |  |    |
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## GENERAL GUIDELINES

LEDGEAR<sup>®</sup> C6, a DALI-2 & Push-DIM independent ECG, design with through wiring and super large wiring space, saving a lot of time and effort on the actual wiring work on site. Big push-fit looping connectors are quick to connect cables with, supporting also various wire thicknesses. Wires are secured to the driver with click-on cable clamps, and strain relief cover clicks on effortlessly securing the connections without any need for screws.

The output current can be programmed by DALI or selected by DIP switches which allows you to adjust the constant output current to work with different power LED modules. It helps to reduce the inventory and faster to projects. These LED drivers provide Amplitude Modulation(AM, or CCR) current output, this LEDGEAR<sup>®</sup> C6 LED drivers is ideal for independent use with Class I, II and III luminaires, you can be sure to offer your customers high quality of light without visual flicker and stroboscopic effects to work in TV studios and security camera environments.



# LED Electronic Looping Control Gear

DALI-2, Push-dim Constant Current Output

With 14-42VDC 650mA-1100mA Adjustable Output Series

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## Product description

- Design DALI-2, Push-DIM, output 2in1 dimming
- DALI member, compatible with universal DALI application controllers(also called masters, DALI USB)
- IEC 62386 Part 101,102(DALI-2), 207 qualified and tested in DALI house
- Reliable, Class II, SELV according EN 61347
- ENEC, CE, CB approved by TUV SUD, SAA, Ctick qualified
- $\pm 5\%$  output current accuracy(under maximum load)
- Permissible AC cable 0.75-2.5mm<sup>2</sup> wire gauge, 8~10mm PVC jacket diameter
- Protection for output open load, short circuits, over voltage and over temperature
- Built-in with permanent memory for DALI and Push-DIM, 100,000 times memory
- 85°C Maximum case operation temperature(tc-point <sup>1</sup>)
- Operating temperature <sup>1</sup>: -25°C ~ +50°C, the humidity: 20% ~ 85%
- Over 60,000 hrs nominal lifespan at tc=70°C
- Five-year factory guarantee and lifetime technical support <sup>1</sup>

<sup>1</sup> "Detailed data please refer to the " PARAMETERS" table .

## Features & Benefits

### Flexibility & Optimized Inventory

- Both model covers wattages from 9.1W to 42W and differs in lifespan
- Wattage selectable by 4xDIP switches.
- Push-fit secondary terminals for LED module wires

### Human Centric Design

- Easy & Quick connection with push-fit terminals and clip-on end cap for strain relief, super large wiring space
- Loop in & loop out function, max.2.5mm<sup>2</sup> cross section L, L, N, N, DA, DA,DA,DA stranded wire or solid wire
- Loose wiring inspection don't need to open the transparent end cap

### Suitable for Emergency Lighting

- Suitable for Central Emergency System, CBS (central battery system)
- 50/60Hz and 0Hz(for emergency system)
- Suitable for emergency escape lighting systems according to EN 50172, LEDGEAR<sup>®</sup> can work with emergency DC voltage input, such as work with backup or emergency LED drivers(batteries).

## Housing Properties

- Casing: polycarbonate, white
- Type of protection IP20

## Typical applications

- For spot light and downlight in retail and hospitality applications
- For panel light and area light in office and education application

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## PARAMETERS

| MODEL        | C650-421100DB-F                         |  |
|--------------|---|--|
| Output       | Output voltage                          | 14-42V(Output current≤1000mA); 14-38V(Output current>1000mA);                                      |
|              | Rated current                           | 650 -1100mA<br>(preselected 650mA)   |
|              | Maximum power                           | 42W  |
|              | Current tolerance                       | ±5%  |
|              | Dimming Range                           | DALI-2: 2%-100%; Push-DIM: 3%-100%; AM dimming mode  |
|              | Ripple voltage <sup>2</sup>             | 200mVp-p   |
|              | Ripple current                          | 220mA <sub>p-p</sub>   |
|              | Line regulation                         | ±1%  |
|              | Load regulation                         | ±3%  |
|              | Flicker percentage <sup>3</sup>         | <3%  |
|              | Starting time                           | <500mS   |
|              | Turn off time                           | <2.0S  |
|              | Noise <sup>4</sup>                      | <22dB  |
| Input        | Voltage                                 | Rated:220-240V; Range:200-264V;  |
|              | Frequency                               | Rated:50-60Hz, 0Hz; Range:47-63Hz, 0Hz;  |
|              | Power factor                            | ≥0.9; (Output power ≥ 22W)   |
|              | I-THD <sup>5</sup>                      | ≤15%   |
|              | Efficiency <sup>6</sup>                 | ≥86%   |
|              | AC current                              | 300mA max.   |
|              | Inrush current <sup>7</sup>             | 30A  |
|              | Inrush current time                     | 50uS   |
|              | Leakage current                         | <1mA   |
|              | ON/OFF switches cycle                   | >100,000   |
|              | Standby power                           | <0.5W  |
| Protection   | Over current                            | Constant current limiting, recovers automatically after fault condition is removed                 |
|              | Over voltage                            | Shut down output voltage, with auto-recovery or re-power on to recovery                            |
|              | Over temperature                        | Shut down output voltage, recovers automatically after temperature goes down                       |
|              | Short circuit                           | Constant current limiting, recovers automatically after fault condition is removed                 |
| Safety & EMC | Safety standards                        | EN61347-2-13; Design refer to TUV EN60950-1, TUV EN61347-1   |
|              | Withstand voltage                       | I/P-O/P:3KV <sub>vac</sub> I/P-FG:1.5KV <sub>vac</sub> O/P-FG: 500V <sub>dc</sub>                  |
|              | Isolation resistance                    | I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500V <sub>dc</sub> /25°C/75%RH                                   |
|              | EMC emission <sup>8</sup>               | EN55015B, EN55022 Class B, EN61000-3-2, EN61000-3-3  |
|              | EMC immunity                            | EN61000-4-2, EN61547, EN55024, EN-61000-4-5<br>Surge immunity Line-Earth: 2KV, L Line- N Line:1KV; |
| Environment  | Ambient temperature range <sup>9</sup>  | -25°C ~ +50°C(Output power<40W); 25°C ~ +45°C(Output power≥40W);                                   |
|              | Max. case temperature(tc) <sup>10</sup> | 85°C   |
|              | Relative humidity range                 | 20% ~ 85%RH  |
|              | Storage temperature range               | -30°C ~ +75°C  |

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DALI-2, Push-dim Constant Current Output

With 14-42VDC 650mA-1100mA Adjustable Output Series

|  |                              |     |   |
|--|------------------------------|-----|---|
| max. No. of PSUS(Driver supply unit) on miniature circuit breaker(MCB)   | MCB TYPE A                   | 10A | 26pcs @ 36V,1100mA Output   |
|  |                              | 16A | 42pcs @ 36V,1100mA Output   |
|  |                              | 20A | 52pcs @ 36V,1100mA Output   |
|  | MCB TYPE B                   | 10A | 28pcs @ 36V,1100mA Output   |
|  |                              | 16A | 45pcs @ 36V,1100mA Output   |
|  |                              | 20A | 56pcs @ 36V,1100mA Output   |
|  | MCB TYPE C                   | 10A | 33pcs @ 36V,1100mA Output   |
|  |                              | 16A | 52pcs @ 36V,1100mA Output   |
|  |                              | 20A | 65pcs @ 36V,1100mA Output   |
| Others   | Dimming control mode         |     | DALI-2, Push dimming  |
|  | Memory function              |     | DALI and Push with memory function                                    |
|  | DALI Standard                |     | IEC 62386-101: 2014, IEC 62386-102: 2014, IEC 62386-207: 2009, DALI-2 |
|  | Lifetime(hrs)@tc=70°C        |     | >60,000H  |
|  | MTBF [MIL-HDBK-217F(ta=25 °C |     | 501K Hrs min  |
|  | Glow wire test               |     | 850°C for 5S; 650°C for 30S   |
|  | Dimension L x W x H          |     | 130.5 x 73 x 29.8mm   |
|  | Warranty years               |     | 5 years   |
| (*If demand other output voltage and output current, contact your sales consultant or contact us: <a href="http://www.kinglumi.com">www.kinglumi.com</a> ) |                              |     |   |

“2” Ripple voltage is measured at 20MHz of bandwidth by using a 12” twisted pair-wire terminated with a 100nF & 47uF parallel capacitor.

“3” The flicker for frequencies of 200 Hz or below, input voltage 230Vac , at 100% output current level and 20% output current level with dimmer attached, output current ripple is defined as  $[(I_{max} - I_{min}) / (I_{max} + I_{min})] * 100\%$ , (CEC-400-2016-018-FS, Title 24 part 6 JA8).

“4” The noise of LED driver is defined as test data when driver tested in noise room with 50~60dB environment, and been hang in 1ft (305mm) inside chamber.

“5” Rated voltage input, rated output current, maximum output current.

“6” The typical efficiency is test data of output current at input @230Vac with 36V output voltage, maximum output current.

“7” The inrush current is test data of 230Vac input, cold start, measured at input current peak.

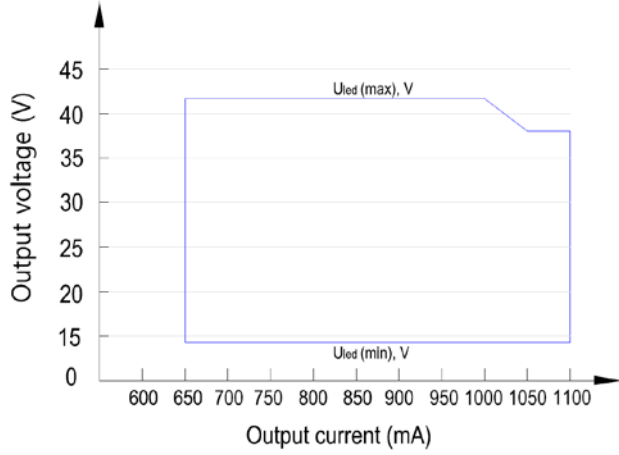
“8” The driver is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC directive on the complete installation again.

“9” For other than independent use, higher ta of the control gear possible as long as highest allowed tc point temperature is not exceeded.

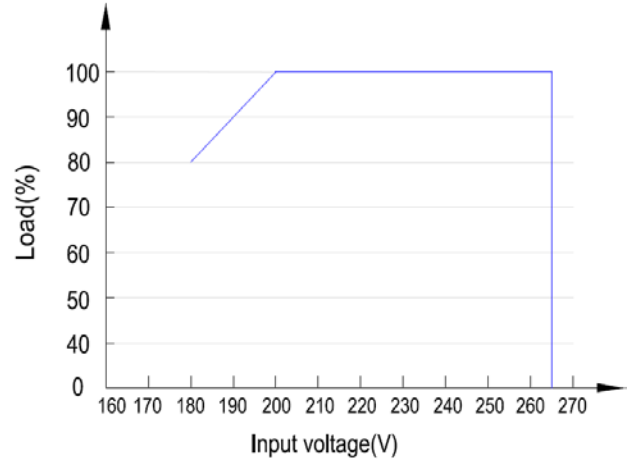
“10” The tc is defined as the highest permissible temperature which may occur on the outer surface of the power under normal operating conditions and at the rated voltage/current/power or the maximum of the rated voltage/current/power range, refer to “output power vs temperature” section.

## DRIVER PERFORMANCE CURVE

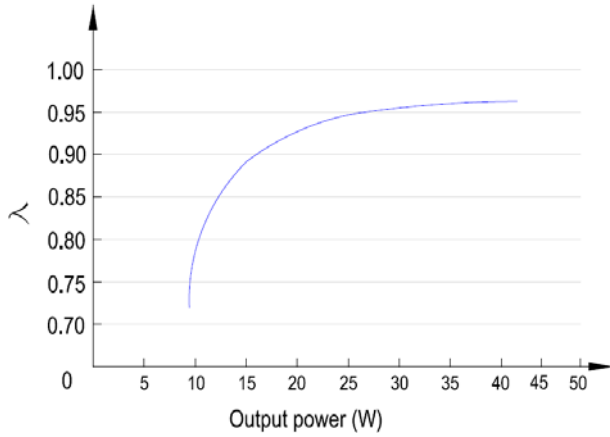
Operating window



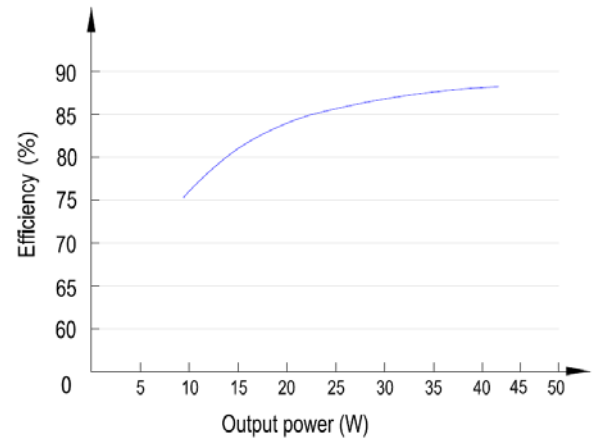
Typical load output



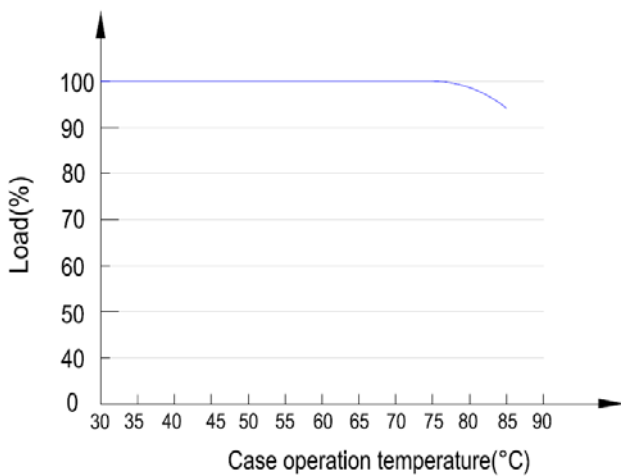
Typical power factor



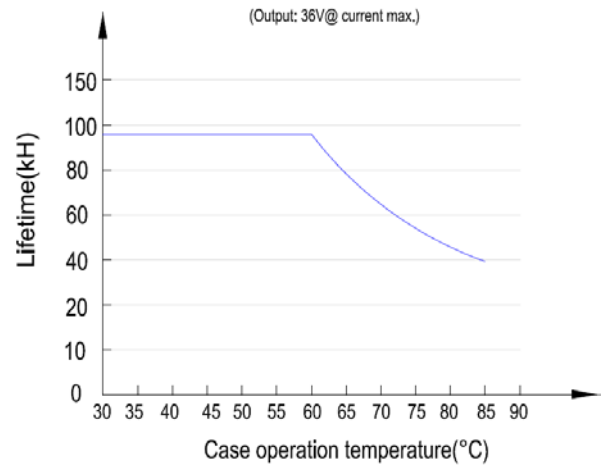
Typical efficiency



Typical case temperature(tc)



Typical lifetime



# LED Electronic Looping Control Gear

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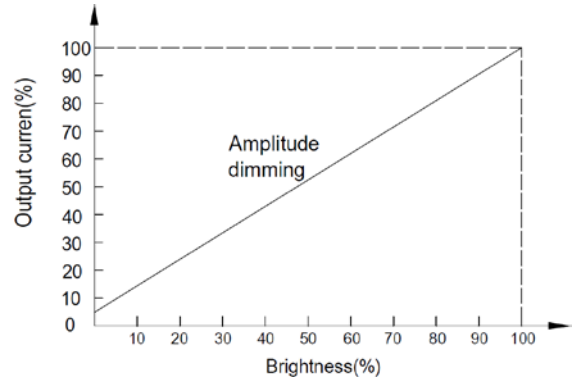
With 14-42VDC 650mA-1100mA Adjustable Output Series

## DIMMING OPERATION

### Dimming type

Amplitude Modulation, short as "AM", also known as Constant Current Reduction(CCR) or Analog Dimming. The AM dimming is completely invisible when camera recording but on the other hand a possible LED colour shifting could occur at low level dimming, together with a possible LED light instability due to physical differences between LEDs.

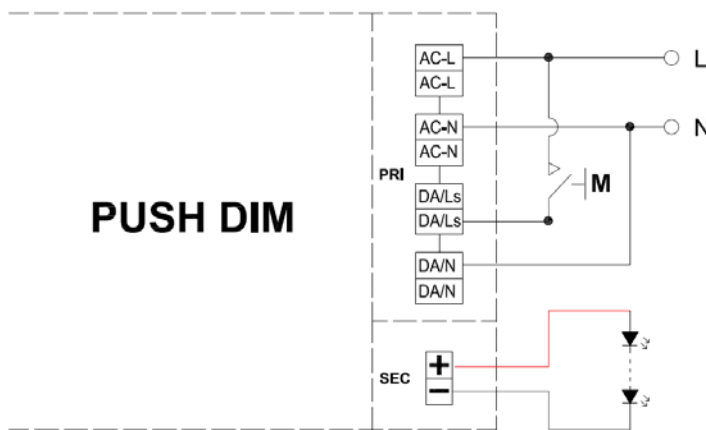
Kinglumi® ENHANCED amplitude dimming technology is realized by adjusting the reference voltage supplied to the LED Module. It has the advantage of no surge current and high efficiency. DIM-TO-WARM LED modules are compatible with AM dimming.



### PUSH Dimming

PUSH-DIM, also known as Switch-Dim or Touch-Dim. To be able to make simple light management systems, the C6 driver also integrated PUSH-DIM Function. This makes it possible to dim and switch them directly with mains AC voltage using the PUSH control terminals (PUSH-DIM interface). Only one commercial push-button is required; the controller takes over the drivers. PUSH-DIM may never be used at the same time as a DALI control system.

#### Circuit diagram



#### Wiring and cable compensation

- Do not use more than 20pcs C6 driver in a single PUSH-DIM application (up to 20 C6 Driver can be controlled by one push-button). The greater the number of C6 series driver controlled imultaneously, the greater the risk of asynchronisms.
- The cable length between the push-button and the farthest C6 series driver may not be longer than 105 meters. Compensation measures must be applied for line lengths required to be more than 105 meters long (bell transformer, resistance).
- The push button can only be connected to the AC/L and PUSH terminals of the driver. It results in the short circuit if the Push Button is connected to the AC/N terminal.

## LED Electronic Looping Control Gear

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### Instructions

| Operation                    | Action duration | Action                                       |
|------------------------------|-----------------|--|
| Ultra Short Press            | <0.04 sec       | Won't cause any action                       |
| Briefly Press                | 0.04-0.5 sec    | Light ON/OFF                                 |
| Press and hold at ON status  | 0.50-5.0sec     | Brightness Dimming down to 2%, or up to 100% |
| Press and hold at OFF status | 0.50-5.0sec     | Brightness Dimming From 2% up to 100%        |
| Long Press                   | >10.0 sec       | Reset to factory settings(up to 50%)         |

Note:

- a) Factory defaults 100% brightness, dimming level down to 2%.
- b) Built-in with permanent memory:  
Light returns to the previous dimming level when switched off and on again, even at power failure.
- c) Synchronization of switching state and dimming direction:  
For physical reasons, a PUSH-DIM system can work asynchronously; in other words, the switching state and dimming direction of the individual luminaires are different. The following steps are used to synchronize a PUSH-DIM system:
  1. Step: Press and hold (> 0,5 s) → All luminaires switch on
  2. Step: Press briefly (< 0,5 s) → All luminaires switch off
  3. Step: Press and hold (> 0,5 s) → All luminaires switch on and dim
- d) The PUSH-DIM wiring and the operator button must be rated for mains voltage (240 V).
- e) Warning: Make sure the conduct core connected to PUSH terminal is not exposed, as it connected to the live wire.

### Asynchronism

As a matter of principle, asynchronisms can occur with push-button operation in systems with more than one C6 driver. The higher the number of C6 Driver and the longer the control line length, the greater the chance of asynchronisms. In order to avoid lighting installations running asynchronously in practice, the permissible number of C6 series (20) and the total line length of 25 meters must be adhered to.

### DALI 2 Dimming

The DALI logo, is only allowed to use for members of the DiiA. The LEDGEAR® C6 series is DALI-compliant to any DALI master or application controller if they bear the DALI logo.

### Instructions

- a) Compatible with both DALI-2 application controller or DALI-I master, please make sure they also qualified and listed in the DiiA website.
- b) Connect the DALI signal to the DA1 and DA2 terminals (polarity-free)
- c) Addressing possible:
  - Individually (max. 64 IP addresses)
  - In groups (max. 16)
  - All together
- d) The least dimming depth of DALI is of 3% \* Iout.
- e) Built-in with permanent memory: light returns to the previous dimming level when switched off and on again, even at power failure.
- f) Supports star, tree, serial, parallel wiring ,but not supports ring wiring
- g) If the C6 series are not reacting to the command of the control unit. Please inspect the wiring; approx.

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16 V DC must be applied to the DALI terminal of the C6 series.

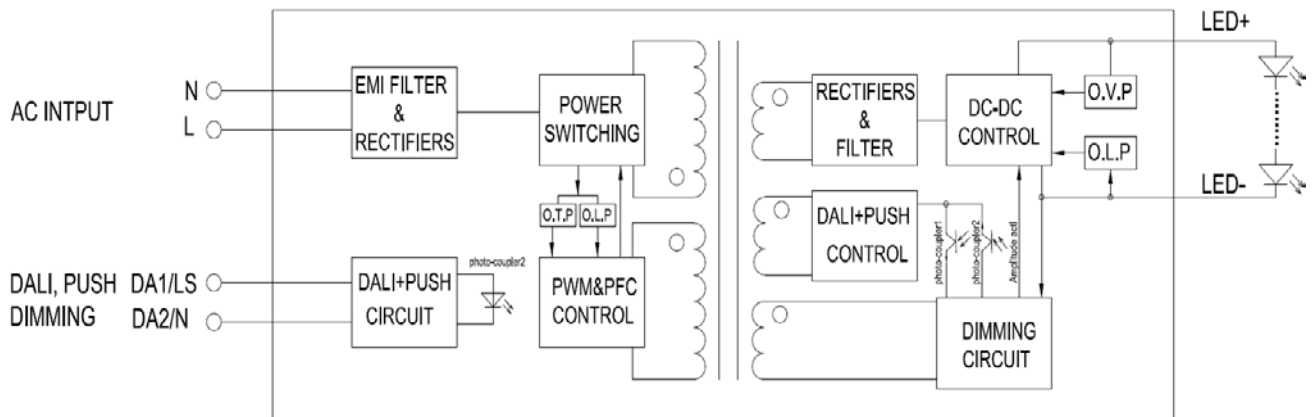
| DALI INPUT | MIN   | TYP | MAX   |
|------------|-------|-----|-------|
| High level | 9.5V  | 16V | 22.5V |
| Low level  | -6.5V | 0   | 6.5V  |

h) DALI bus communication length and input wire diameter

| Wire Diameter        | DALI Bus Communication length |
|----------------------|-------------------------------|
| 0.5 <sup>2</sup> mm  | 100m Max.                     |
| 0.75 <sup>2</sup> mm | 150m Max.                     |
| 1.0 <sup>2</sup> mm  | 200m Max.                     |
| ≥1.5 <sup>2</sup> mm | 300m Max.                     |

## DIAGRAM&INSTALLATION MANUAL

### Isolated circuit (Fly-back CV + DC-DC control)



### Insulation between circuits

| Electric Insulation | Input      | Output     | Housing    | DALI       | PUSH       |
|---------------------|------------|------------|------------|------------|------------|
| Input               | X          | Reinforced | Reinforced | Basic      | Non        |
| Output              | Reinforced | X          | Basic      | Reinforced | Reinforced |
| Housing             | Reinforced | Basic      | X          | Reinforced | Reinforced |
| DALI                | Basic      | Reinforced | Reinforced | X          | Basic      |
| PUSH                | Non        | Reinforced | Reinforced | Basic      | X          |



# LED Electronic Looping Control Gear

DALI-2, Push-dim Constant Current Output

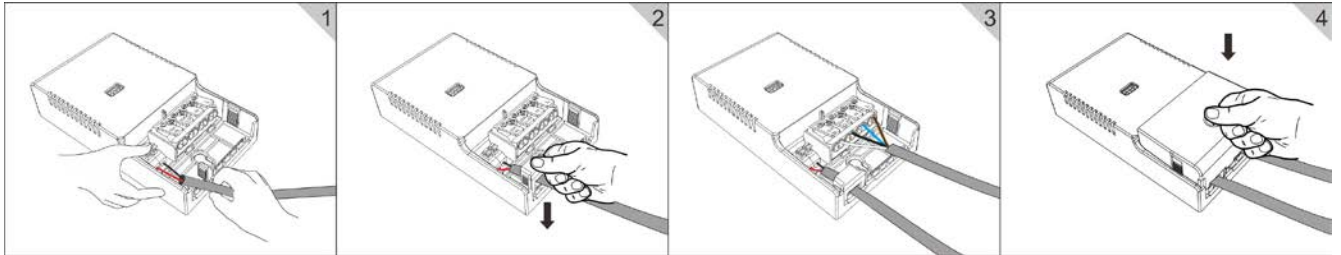
With 14-42VDC 650mA-1100mA Adjustable Output Series



KINGLUMI CO.,LTD.

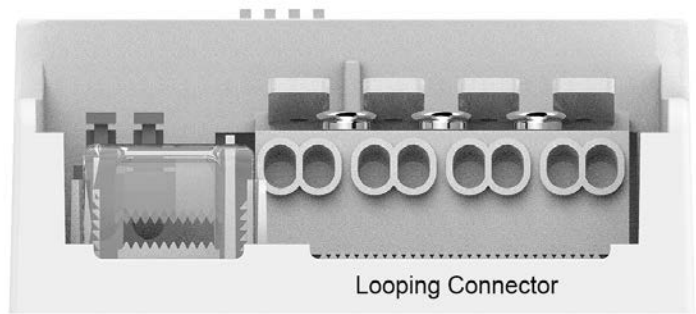
## Release of the wiring

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

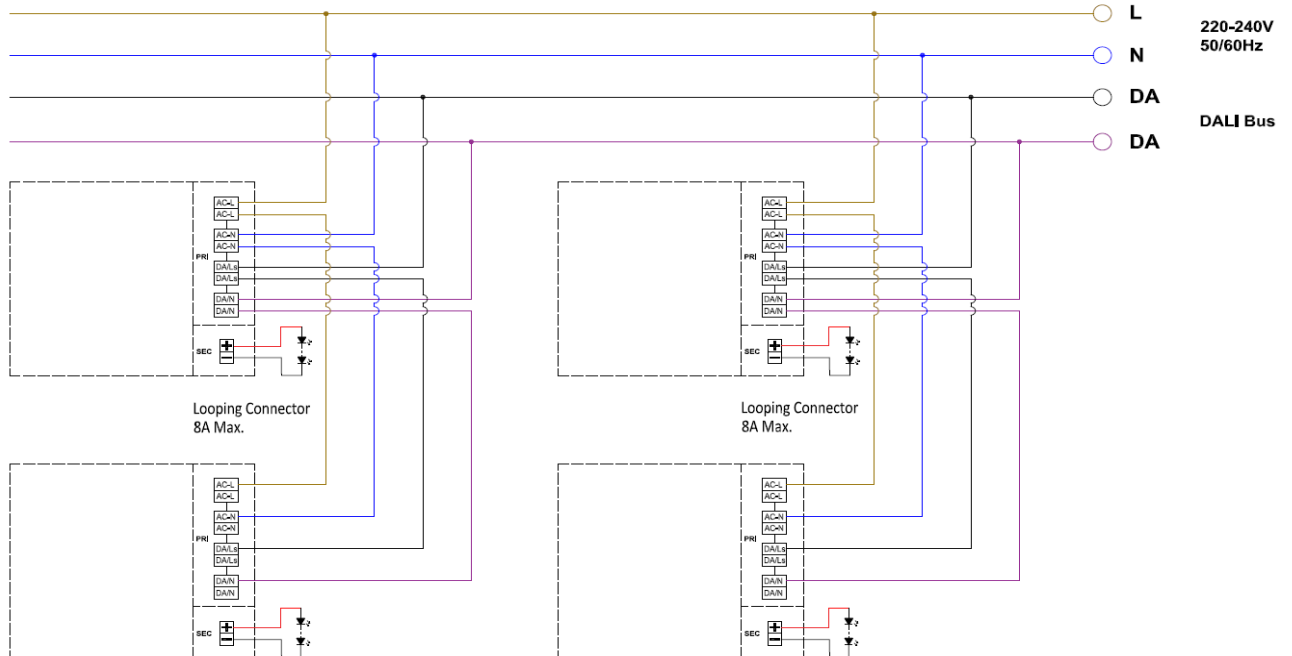


## Looping Circuit diagram

These LEDGEAR® drivers provides "through wiring functions" at primary for the L,N input and DALI1,DALI2, which allows quick looping from driver to driver and save the installation labour.



Looping Connector



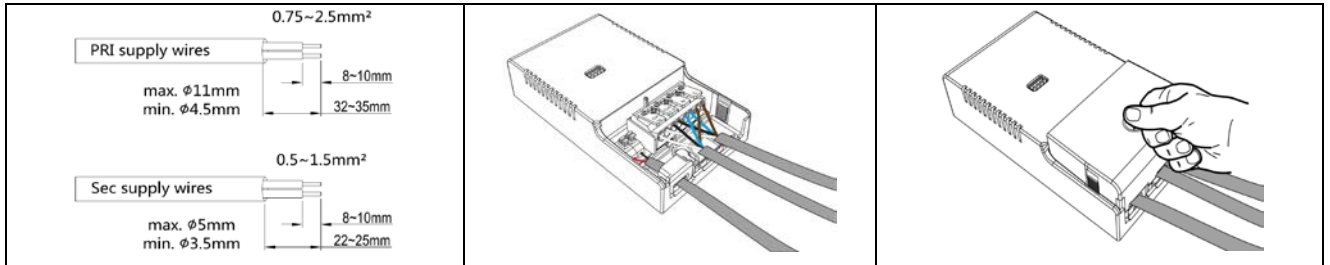
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## Wiring type and cross section

The wiring can be in stranded wires with ferrules or solid with a cross section of 0.75–2.5 mm<sup>2</sup>. Strip 8-10mm of insulation from the cables to ensure perfect operation of the push-wire terminals. Use one wire for each terminal connector only



## Wiring guidelines

- All connections must be kept as short as possible to ensure good EMI behavior.
- Mains leads should be kept apart from LED Driver and other leads (ideally 10 – 30 cm distance).
- Incorrect wiring can damage LED modules.
- The wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc).

## Miniature circuit breaker application

Total continuous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker(MCB).

Quantity of drivers(36V @1100mA Output) per miniature circuit breaker 16 A Type C

| Based on inrush current<br>$I_{peak}$ | Typ. peak inrush current<br>$I_{peak}$ | 1/2 value time,<br>$\Delta t$ | Calculated energy,<br>$I_{peak}^2 \Delta t$   |
|---------------------------------------|--|-------------------------------|---|
| 52pcs                                 | 30A                                    | 87uS                          | 0.079A <sup>2</sup> s   |
|                                       |  |                               | <p><b>Example</b> calculation of total drivers amount limited by continuous current: <math>n(I_{cont}) = (16 A (I_{nom}, t_a) / \text{"nominal mains current with full load"}) \times 0.65</math>. This calculation is an example according to recommended precautions due to multiple adjacent circuit breakers (&gt; 9 MCBs) and installation environment (<math>t_a=30^\circ C</math>); variables may vary according to the use case. Both inrush current and continuous current calculations are based on "Schneider Acti9" series circuit breakers. More specific information in "Schneider Acti9" series circuit breaker documentation.</p> |

NOTE ! Type B or C MCB's are strongly recommended to use with the LED driver.

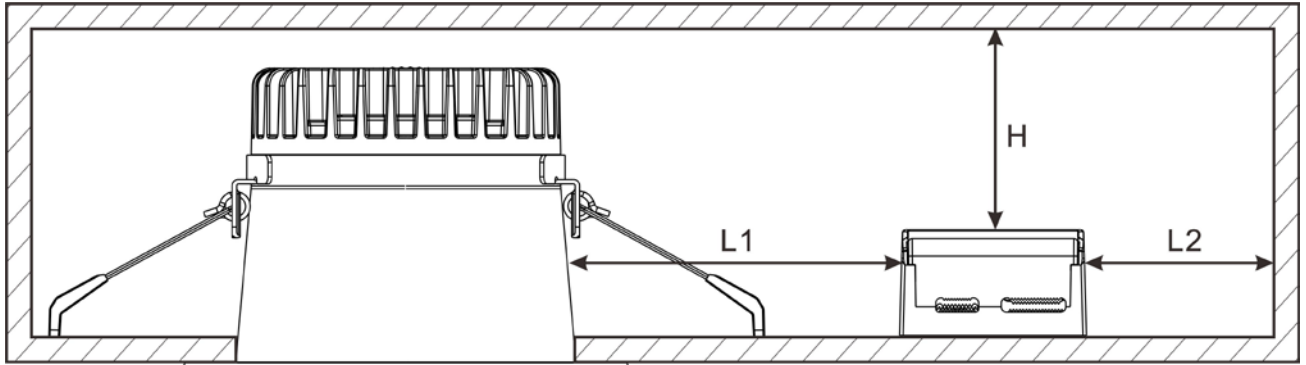
# LED Electronic Looping Control Gear

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## Fixing conditions

Dry, acid-free, oil-free, fat-free. It is not allowed to exceed the maximum ambient temperature (ta) stated on the device. Minimum distances stated below are recommendations and depend on the actual luminaire. Is not suitable for fixing in corner.

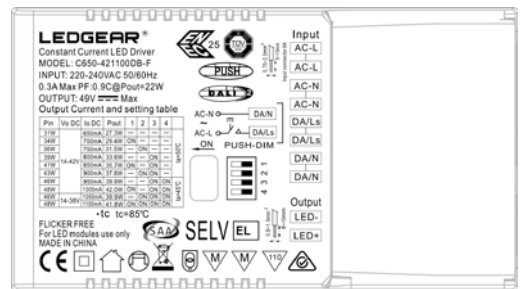


| Model \ Size    | L1(min.) | L2(min.) | H(min.) |
|-----------------|----------|----------|---------|
| C650-421100DB-F | 100mm    | 20mm     | 30mm    |

## DIP Switch Table

LEDGEAR® C6 series is a multiple-stage constant current driver, selection of output current through DIP switch is exhibited below

| Output  |         |       | DIP Switch |    |    |    |
|---------|---------|-------|------------|----|----|----|
| Voltage | Current | Power | 1          | 2  | 3  | 4  |
| 14-42V  | 650mA   | 27.3W | -          | -  | -  | -  |
|         | 700mA   | 29.4W | ON         | -  | -  | -  |
|         | 750mA   | 31.5W | -          | ON | -  | -  |
|         | 800mA   | 33.6W | -          | -  | ON | -  |
|         | 850mA   | 35.7W | ON         | -  | ON | -  |
|         | 900mA   | 37.8W | -          | ON | ON | -  |
|         | 950mA   | 39.9W | -          | -  | ON | ON |
|         | 1000mA  | 42.0W | ON         | -  | ON | ON |
| 14-38V  | 1050mA  | 39.9W | -          | ON | ON | ON |
|         | 1100mA  | 41.8W | ON         | ON | ON | ON |



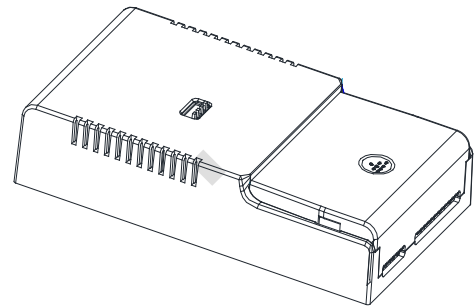
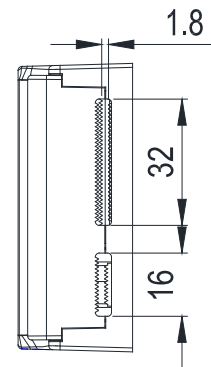
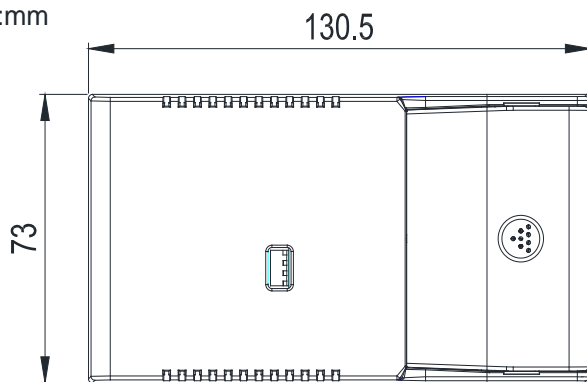
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### MECHANICAL

Unit:mm



### PACKAGING

| Part Number     | Dimension     | Gross Weight | Net Weight | Qty/Carton |
|-----------------|---------------|--------------|------------|------------|
| C650-421100DB-F | 510x330x205mm | 12kg         | 10kg       | 50pcs      |

## LED Electronic Looping Control Gear

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VERSION #

| #  | MODIFICATIONS | Date.     |
|----|---------------|-----------|
| 1  | Version 1     | 2020.8.20 |
| 2  |               |           |
| 3  |               |           |
| 4  |               |           |
| 5  |               |           |
| 6  |               |           |
| 7  |               |           |
| 8  |               |           |
| 9  |               |           |
| 10 |               |           |
| 11 |               |           |
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