

LED Electronic Control Gear

DALI-2, Push-dim,0-10V, 10V PWM and Resistance dimming Output
Constant Current With 14-42VDC Output Series

LEDGEAR[®] Specification

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GENERAL GUIDELINES

As a DALI member of DiiA, the launch of the fully functional LED electronics control gear(ECG)--LEDGEAR[®] one4all version, it combinations DALI-2, Push-DIM, 0-10V, 10V PWM and resistance functions, and corridor FUNCTION for options. They are positioned and designed to reduce your inventory and make it one for all applications, with adjustable current from 650mA to 1100mA/250mA-600mA.

LEDGEAR[®] one4all ECG supply constant current output. Operation from 220-240VAC and offers output voltage ranging between 14V and 42V.



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Product description

- One4all design DALI-2, Push-DIM, output 3in1 dimming(1-10V, 10V PWM and Resistance)
- 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)
- Independent ECG and with push-fit strain-relief.
- Permissible AC cable 0.5-1.5mm² wire gauge, 3.5~8mm PVC jacket diameter
- Flicker Free(less than 3% flicker percentage)
- Built-in active PFC and passive NTC
- 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
- Grow wire tested 650° for 30S and 850° for 5S
- 90°C Maximum case operation temperature(tc-point ¹)
- Operating temperature ¹: -20°C ~ +45°C, the humidity: 20% ~ 85%
- Over 60,000 hrs nominal lifespan at tc=60°C
- Five-year factory guarantee and lifetime technical support ¹

“1” Detailed data please refer to the " PARAMETERS" table .

Features & Benefits

Flexibility & Optimized Inventory

Two models cover wattages from 5W to 50W

- Wattage selectable by 3xDIP 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
- Large wiring space

Suitable for E 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[®] 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		C328-42600DB-F	C350-421100DB-F
Output	Output voltage	14-42V	14-42V
	Rated current	250-600mA (preselected 250mA)	650-1100mA (preselected 650mA)
	Maximum power	25.2W	46.2W
	Current tolerance	±5%	±5%
	Dimming Range	DALI, Push-DIM:1.5%-100%; 0-10V,10VPWM,Resistance:5%-100%	DALI, Push-DIM:1.5%-100%; 0-10V,10VPWM,Resistance:5%-100%
	Ripple voltage ²	100Vp-p	180mVp-p
	Ripple current	150mA _{p-p}	220mA _{p-p}
	Line regulation	±1%	±1%
	Load regulation	±3%	±3%
	Flicker percentage ³	<3%	<3%
	Starting time	<500mS	<500mS
	Turn off time	<2.0S	<2.0S
	Noise ⁴	<22dB	<22dB
1Input	Voltage	220-240V	220-240V
	Frequency	Rated:50-60Hz, 0Hz; Range:47-63Hz, 0Hz;	
	Power factor	≥0.9; (Rated voltage input, rated current output conditions)	
	I-THD ⁵	≤15%	<15%
	Efficiency ⁶	≥84%	≥86%
	AC current	180mA max.	300mA max.
	Inrush current ⁷	30A	35A
	Inrush current time	35uS	50uS
	Leakage current	<1mA	<1mA
	ON/OFF switches cycle	>100,000	>100,000
	Standby power	<0.5W	<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:3KVac I/P-FG:1.5KVac O/P-FG: 500Vdc	
	Isolation resistance	I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500Vdc/25°C/75%RH	
	EMC emission ⁸	EN55015B, EN55022 Class B, EN61000-3-2, EN61000-3-3	
	EMC immunity	EN61000-4-2, EN61547, EN55024, EN-61000-4-5 Surge immunity Line-Earth: 2KV, L Line- N Line:1KV;	
Environment	Ambient temperature range ⁹	-20°C ~ +45°C	-20°C ~ +45°C
	Max. case temperature(tc) ¹⁰	90°C	90°C
	Relative humidity range	20% ~ 85%RH	20% ~ 85%RH
	Storage temperature range	-40°C ~ +80°C	-40°C ~ +80°C

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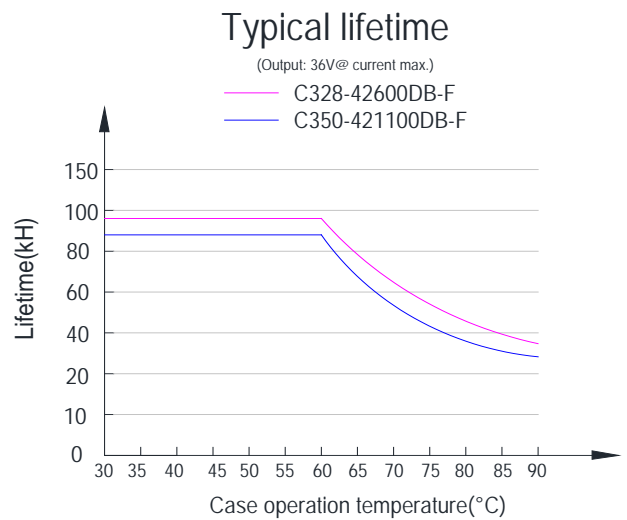
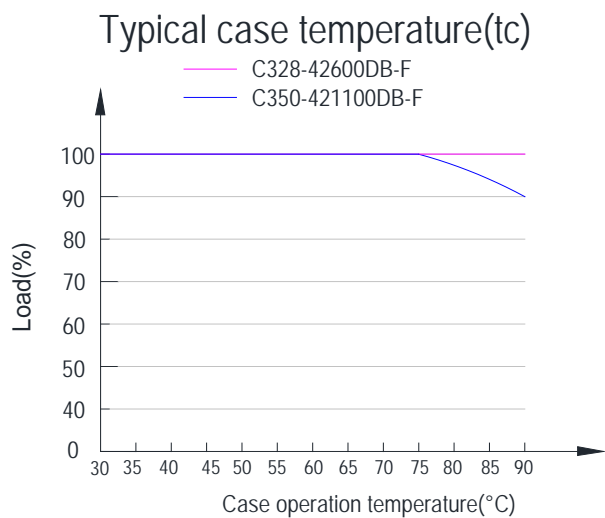
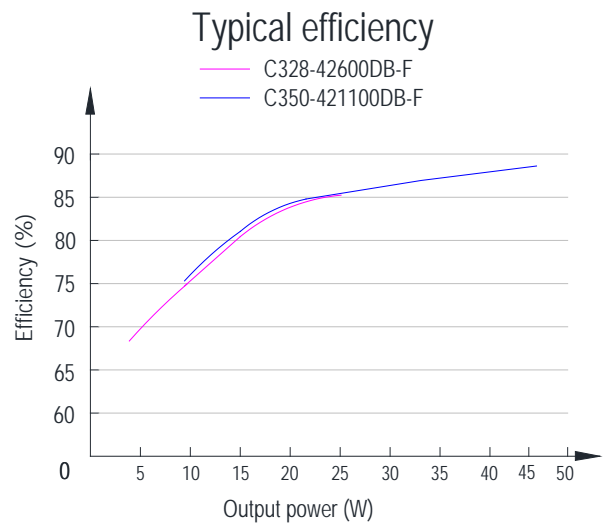
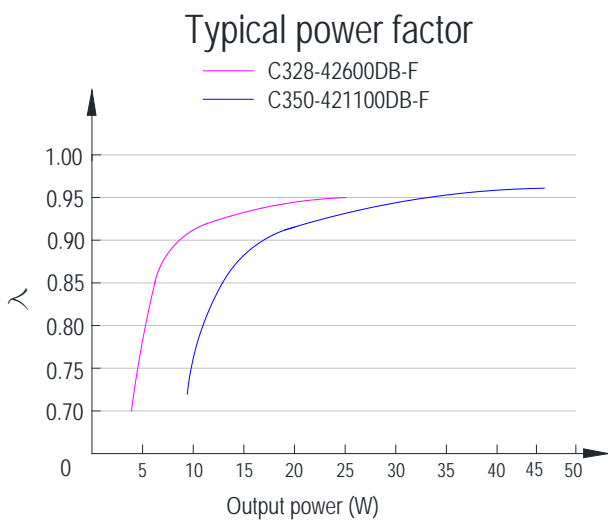
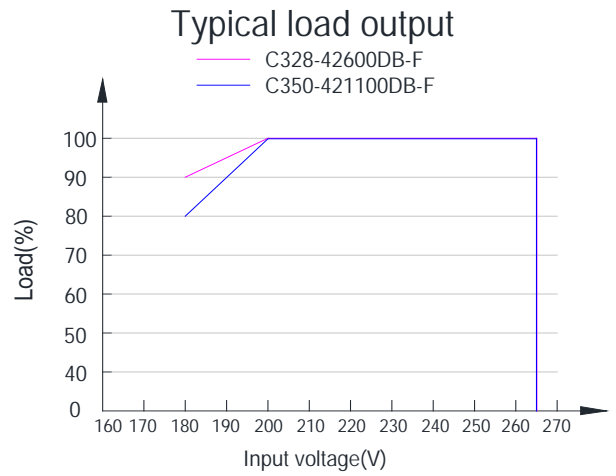
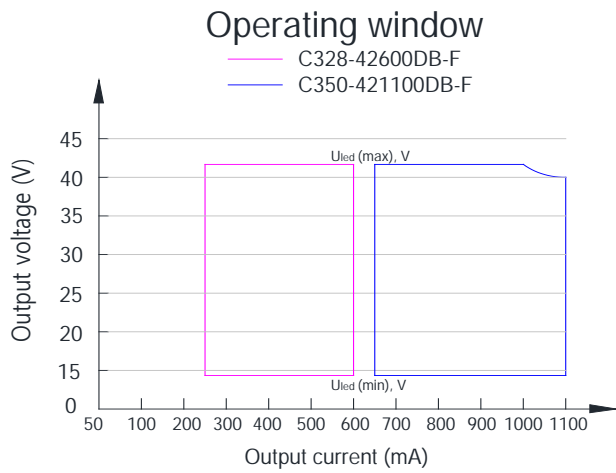
max. No. of PSUS(Driver supply unit) on miniature circuit breaker(MCB)	MCB TYPE A	10A	27pcs @ full load	16pcs @ full load
		16A	45pcs @ full load	26pcs @ full load
		20A	55pcs @ full load	34pcs @ full load
	MCB TYPE B	10A	30pcs @ full load	18pcs @ full load
		16A	48pcs @ full load	28pcs @ full load
		20A	72pcs @ full load	42pcs @ full load
	MCB TYPE C	10A	35pcs @ full load	21pcs @ full load
		16A	55pcs @ full load	34pcs @ full load
		20A	56pcs @ full load	45pcs @ full load
Others	Dimming control mode		DALI-2, Push-DIM, 0-10V,10V PWM or Resistance dimming	DALI-2, Push-DIM, 0-10V,10V PWM or Resistance dimming
	Memory function		DALI and PUSH with memory function	DALI and PUSH with memory function
	DALI Standard		IEC 62386-101: 2014, IEC 62386-102: 2014, IEC 62386-207: 2009, DALI-2	IEC 62386-101: 2014, IEC 62386-102: 2014, IEC 62386-207: 2009, DALI-2
	Lifetime(hrs)@tc=60°C		>70,000H	>60,000H
	MTBF [MIL-HDBK-217F(ta=25 °C)]		492K Hrs min	502.8K Hrs min
	Glow wire test		850°C for 5S; 650°C for 30S	850°C for 5S; 650°C for 30S
	Dimension L x W x H		125 x 76 x 30mm	125 x 76 x 30mm
	Warranty years		5 years	5 years

- “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.

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DRIVER PERFORMANCE CURVE



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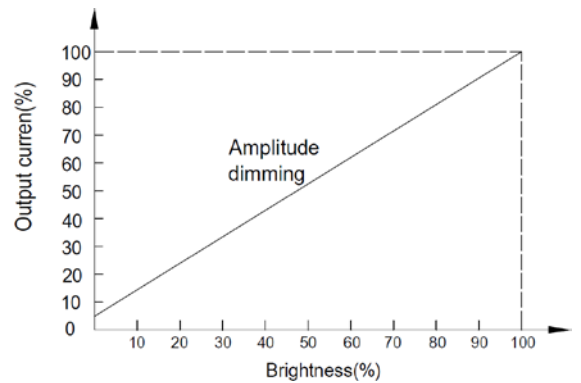
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DIMMING OPERATION

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.

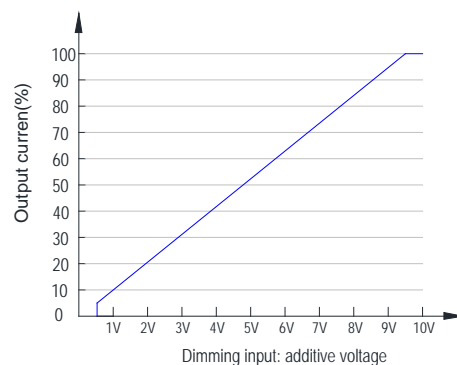
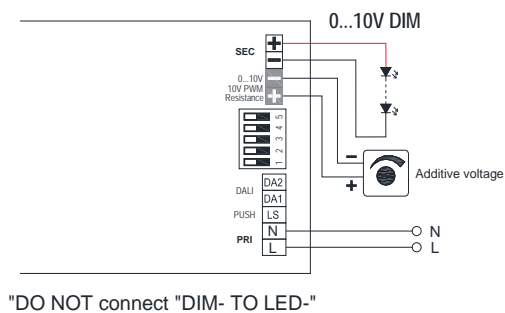
The enhanced amplitude dimming technology is realized by adjusting the reference voltage supplied to the LED Module. It has the advantage of no surge current and high efficiency. DIM-TO-WARM LED modules are compatible with AM dimming.



One4all dimming function

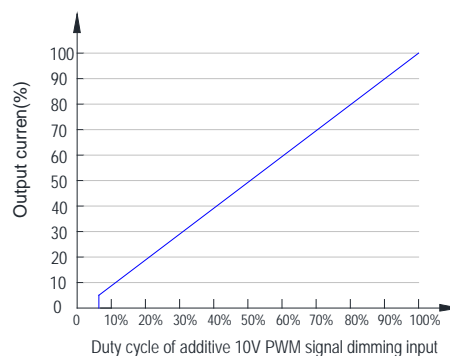
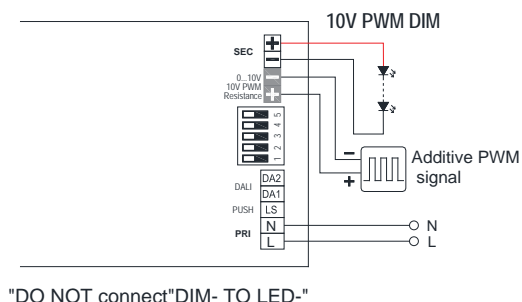
- Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM- : 0-10VDC, or 10V PWM signal or additive resistance.
- Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.
- Dimming source current from power supply: 100uA(Typ.)
- The maximum permissible length of the control line is 100 meters.

Applying additive 0-10VDC



Applying additive 10V PWM signal

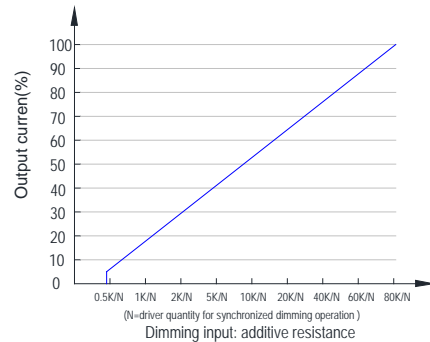
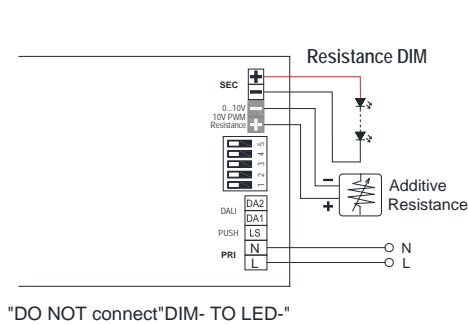
Frequency range 200Hz~2KHz(type:1KHz)



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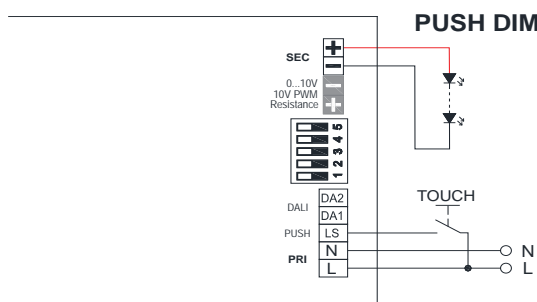
Applying additive resistance



PUSH Dimming

PUSH-DIM, also known as Switch-Dim or Touch-Dim. To be able to make simple light management systems, the one4all also integrated PUSH-DIM Function. This makes it possible to dim and switch them directly with mains AC voltage using the PUSHI 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 one4all ECGs in a single PUSH-DIM application (up to 20 ECGs can be controlled by one push-button). The greater the number of one4all ECGs controlled imultaneously, the greater the risk of asynchronisms.
- The cable length between the push-button and the farthest one4all ECGs 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.

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	>5.0 sec	Won't cause any action

Note:

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- 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.

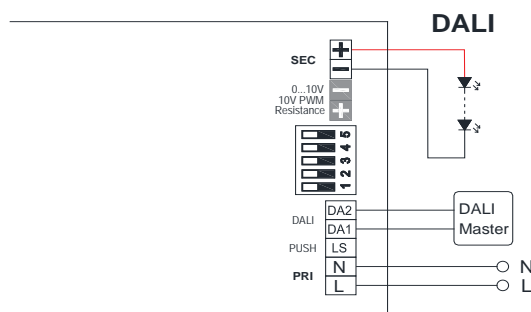
Asynchronism

As a matter of principle, asynchronisms can occur with push-button operation in systems with more than one ECGs. The higher the number of ECGs 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 ECGs(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® one4all ECG is DALI-compliant to any DALI master or application controller if they bear the DALI logo.

Circuit diagram



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.

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- f) Wiring in groups not necessary
- g) Signal voltage requirement.

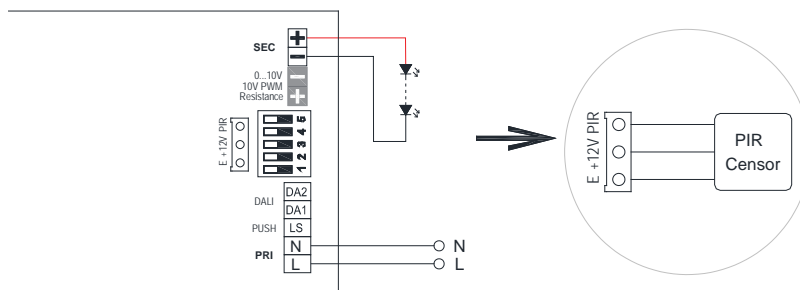
If the ECGs are not reacting to the command of the control unit. Please inspect the wiring; approx. 16 V DC must be applied to the DALI terminal of the ECG.

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

Corridor Function

This function is an option, not in the standard mode. Please inquire the sales for quote and technical requirement.

Circuit diagram

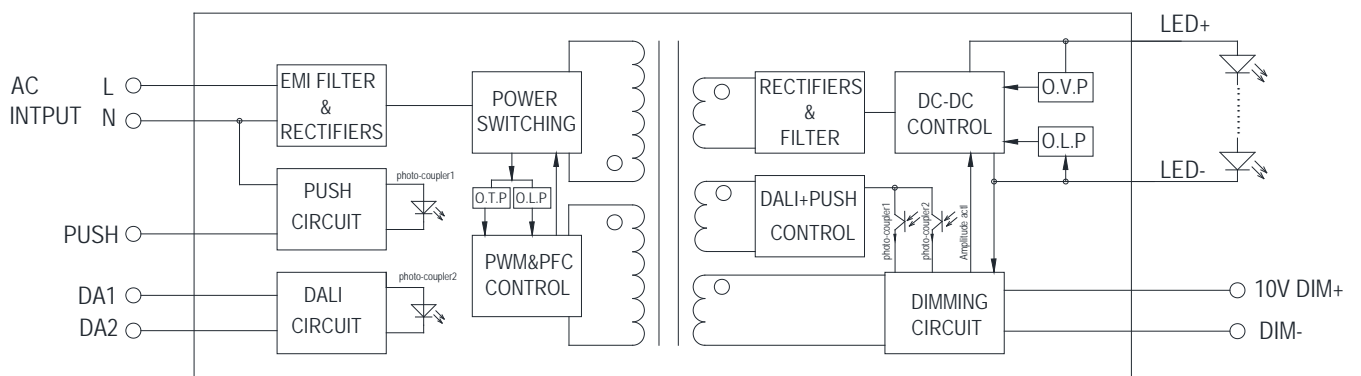


- a) Connect the PIR motion sensor following the above diagram, then the LED module(s) activates the occupation function as following details.

Hold on time	DIP Switch # 5
*Sec, to be confirm according to your request	—
*Sec, to be confirm according to your request	ON

DIAGRAM&INSTALLATION MANUAL

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



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Insulation between circuits

Electric Insulation	Input	Output	Housing	DALI	PUSH	0-10V
Input	X	Reinforced	Reinforced	Basic	Non	Reinforced
Output	Reinforced	X	Reinforced	Reinforced	Reinforced	Non
Housing	Reinforced	Reinforced	X	Reinforced	Reinforced	Reinforced
DALI	Basic	Reinforced	Reinforced	X	Basic	Reinforced
PUSH	Non	Reinforced	Reinforced	Basic	X	Reinforced
0-10V	Reinforced	Non	Reinforced	Reinforced	Reinforced	X

DIP Switch Table

LEDGEAR® one4all ECG is a multiple-stage constant current driver, selection of output current through DIP switch is exhibited below

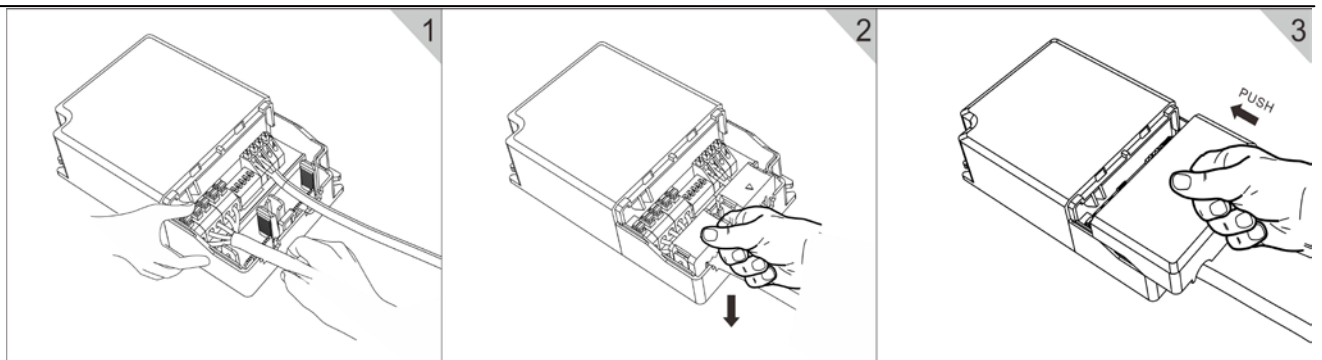
		C328-42600DB-F							C350-421100DBF				
DIP S.W.		1	2	3	4	5	DIP S.W.		1	2	3	4	5
lout							lout						
250mA		-	-	-	-	-	650mA		-	-	-	-	-
300mA		ON	-	-	-	-	700mA		ON	-	-	-	-
350mA		-	ON		-	-	750mA		-	ON		-	-
400mA		ON	ON	-	-	-	800mA		-	-	ON	-	-
450mA		-	-	ON	-	-	850mA		ON	-	ON	-	-
500mA		ON	-	ON	-	-	900mA		-	ON	ON	-	-
550mA		-	ON	ON	-	-	950mA		-	-	ON	ON	-
600mA		ON	ON	ON	-	-	1000mA		ON	-	ON	ON	-
							1050mA		-	ON	ON	ON	-
							1100mA		ON	ON	ON	ON	-

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.)

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Release of the wiring

Press down the “push button” and remove the cable from front.

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(C350-421100DB-F) per miniature circuit breaker 16 A Type C

Based on inrush current I_{peak}	Typ. peak inrush current I_{peak}	1/2 value time, Δt	Calculated energy, $I_{peak}^2 \Delta t$
34pcs	35A	85uS	0.011A ² s
		<p>Example calculation of total drivers amount limited by continuous current: $n(I_{cont}) = (16 \text{ A} (I_{nom}, t_a) / \text{“nominal mains current with full load”}) \times 0.65$. This calculation is an example according to recommended precautions due to multiple adjacent circuit breakers (> 9 MCBs) and installation environment ($t_a=30^\circ\text{C}$); 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>	

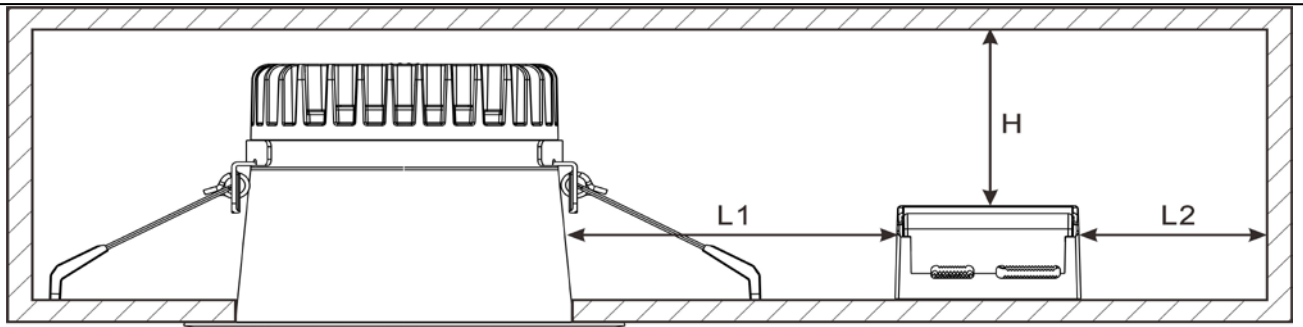
NOTE ! Type B or C MCB’s are strongly recommended to use with the LED driver.

Fixing conditions

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

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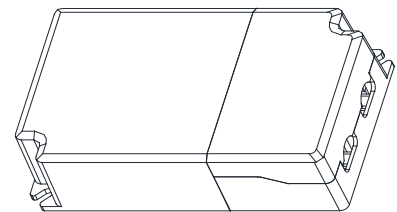
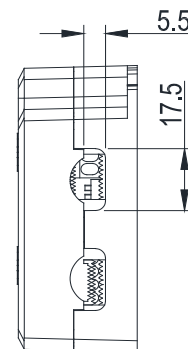
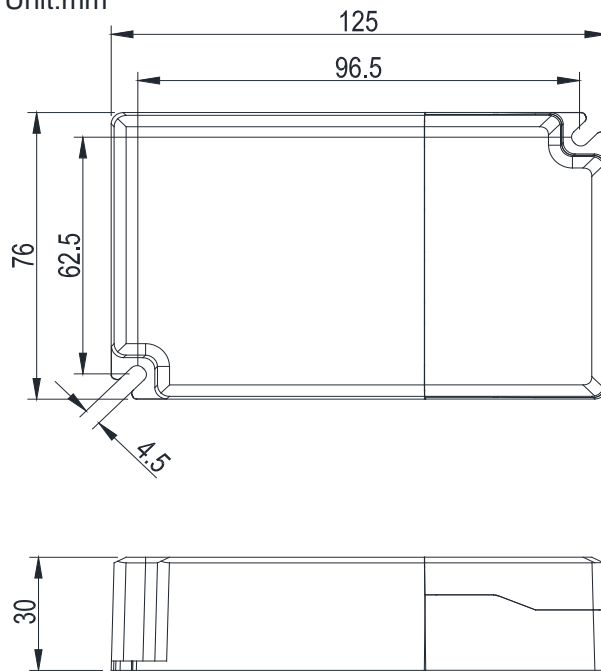
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Model	Size	L1(min.)	L2(min.)	H(min.)
C328-42600DB-F		60mm	20mm	20mm
C350-421100DB-F		100mm	20mm	30mm

MECHANICAL

Unit:mm



PACKAGING

Part Number	Dimension	Gross Weight	Net Weight	Qty/Carton
C328-42600DB-F C350-421100DB-F	455 x 400 x 180mm	11.5kg	9.5kg	50pcs

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ACCESSORIES

Extension Cable



Order Code	One End	Another End	Length(mm)	Color
1.05.06.0412	DC5521 Female with lock	DC5521 Male with lock	500	Black
1.05.06.0413	DC5521 Female with lock	DC5521 Male with lock	500	White
1.05.06.0414	DC5521 Female with lock	DC5521 Male with lock	1000	Black
1.05.06.0415	DC5521 Female with lock	DC5521 Male with lock	1000	White

Ways Splitter



Order Code	One End	Another End	Length(mm)	Color
1.05.06.0417	DC5521 Male with lock	2way DC5521 Male with lock	575	White
1.05.06.0418	DC5521 Male with lock	3way DC5521 Male with lock	575	White
1.05.06.0406	DC5521 Male with lock	4way DC5521 Male with lock	100	White

LED Electronic Control Gear

DALI-2, Push-dim,0-10V, 10V PWM and Resistance dimming Output
Constant Current With 14-42VDC Output Series

Cable Adapters Convert



Order Code	One End	Another End	Length(mm)	Color
1.05.06.0303	DC5521 Male with lock	FL4.14 Male	30	Black
1.05.06.0416	DC5521 Male with lock	FL4.14 Male	30	White

Strip DC 5521 Female Connector



Order Code	One End	Another End	Length(mm)	Color
1.05.06.0420	Strip 8mm of cord, and 30mm of the cables jacket	DC5521 Female with lock	225	Black
1.05.06.0419	Strip 8mm of cord, and 30mm of the cables jacket	DC5521 Female with lock	225	White

PIR Motion Sensor

PIR motion sensor for the CorridorFUNCTION, under developing. To be updated.

LED Electronic Control Gear

DALI-2, Push-dim,0-10V, 10V PWM and Resistance dimming Output
Constant Current With 14-42VDC Output Series

VERSION

#	MODIFICATIONS	Date.
1	Version 1	2018.08.17
2	Add functions descriptions	2018.08.29
3	Modify the dimensions	2018.11.27
4	Add 250mA-600mA version and update the ENEC certificate	2019.01.15
5	Modify the working temperature according to ENEC reports	2019.04.18
6	Add more performance data	2020.04.20
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9		
10		
11		
12		