

# CC LINEAR



## PrimeLine NFC L-R1 DALI2

186852, 186853, 186854, 186855

### Typical Applications

Built-in in linear luminaires for

- Office lighting
- Industrial lighting



### PrimeLine NFC L-R1 DALI2

- **ADJUSTABLE OUTPUT CURRENT, CLO, DC LEVEL VIA NFC**
- **DIMMABLE: DALI (ED. 2) AND PUSH KEY**
- **VERY LOW RIPPLE CURRENT: < 1%**
- **LONG SERVICE LIFE: UP TO 100,000 HRS.**
- **PRODUCT GUARANTEE: 5 YEARS**



## PrimeLine NFC L-R1 DALI2

### Product features

- Linear casing shape

### Functions

- Programmable via NFC interface (contactless)
  - Selectable current output
  - Programmable CLO function
  - Adjustable DC level

### Electrical features

- Mains voltage: 220–240 V ±10%
- Mains frequency: 50–60 Hz
- DC operation: 198–264 V, 0 Hz
- Push-in terminals: 0.2–1.5 mm<sup>2</sup>
- Power factor at full load: > 0.97
- Max. working voltage (U<sub>OUT</sub>): 250 V
- Secondary side switching of LED modules is not allowed.

### Dimming

- Dimming range: 1 to 100%

### Safety features

- Protection against transient main peaks up to 1 kV (between L and N) and up to 2 kV (between L/N and PE)
- Electronic short-circuit protection
- Overload protection
- Overtemperature protection
- Protection against "no load" operation
- Degree of protection: IP00
- Protection class I

### Packaging units

Ref. No.	Packaging unit		
	Pieces per box	Boxes per pallet	Weight g
186852	30	64	190
186853	30	64	200
186854	30	64	195
186855	30	64	200

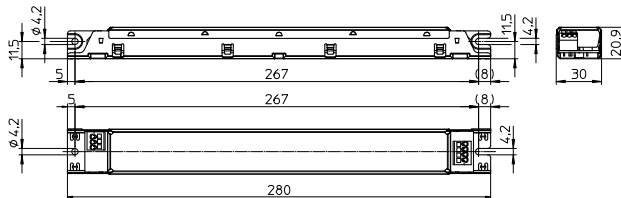


### Applied standards

- EN 60598-2-22
- EN 61347-1
- EN 61347-2-13
- EN 61547
- EN 61000-3-2
- EN 62384
- EN 62386 DALI Ed. 2 Part 101,102,207,251,252,253
- EN 50172
- EN 55015

### Dimensions

- Casing: M7.1
- Length: 280 mm
- Width: 30 mm
- Height: 21 mm



### Product guarantee

- 5 years
- The conditions for the Product Guarantee of the Vossloh-Schwabe Group shall apply as published on our homepage ([www.vossloh-schwabe.com](http://www.vossloh-schwabe.com)). We will be happy to send you these conditions upon request.



### Dimming

Analogue



### Current adjustment



The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.

## Electrical characteristics

Max. output W	Type	Ref. No.	Voltage 50–60 Hz V	Mains current mA	Inrush current A / $\mu$ s	Current output DC mA ( $\pm$ 5%)	Voltage output DC (V)	THD at full load % (230 V)	Efficiency at full load % (230 V)	Ripple 100 Hz %
40	ECXd 400.348	<b>186852</b>	220–240	205–190	6 / 800	100–400	30–120	< 9	> 90	< 1
40	ECXd 800.349	<b>186853</b>	220–240	210–200	7 / 990	400–800	30–70	< 12	> 89	< 1
85	ECXd 400.350	<b>186854</b>	220–240	410–380	7 / 640	100–400	100–225	< 8	> 94	< 1
85	ECXd 800.351	<b>186855</b>	220–240	425–385	7 / 990	400–800	30–130	< 7	> 93	< 1

## Maximum ratings

Exceeding the maximum ratings can lead to reduction of service life or destruction of the drivers.

Ref. No.	Ambient temperature range		Operation humidity range		Storage temperature range		Storage humidity range		Max. operation temperature at $t_c$ point °C	Degree of protection
	°C min.	°C max.	% min.	% max.	°C min.	°C max.	% min.	% max.		
186852	-25	+50	5	60	-40	+85	5	95	+65	IP00
186853, 186854, 186855									+70	

## Expected service life time

at operation temperatures at  $t_c$  point

Operation current	Ref. No. 186852		Ref. No. 186853, 186854, 186855	
	All	55 °C	65 °C	60 °C
hrs.	100,000	50,000	100,000	50,000

## Product labels

- $\oplus$
- N
- L
- da
- da
- PUSH

**INPUT**  
**Un = 220...240 V**  
 IN = 205...190 mA  
 fN = 0/50...60 Hz  
 $\lambda$  = 0,5C - 0,97  
 Range of application DC 198...276 V

**VS LIGHTING SOLUTIONS**  
 Vossloh-Schwabe Deutschland GmbH  
 Stuttgarter Straße 61/1, 73614 Schorndorf •  $t_c$   
 Electronic converter for LED  
**Type ECXd 400.348**  
 Ref.-No. 186852  
 Made in Serbia (Europe)

EN 61347-1  
 EN 61347-2-13  
 EN 62384  
 EN 61547  
 EN 55015  
 EN 61000-3-2  
**Non isolated**

**DALI**  
**PUSH**

OUTPUT	
Irated (mA)	100...400
Urated (V)	30...120
Prated (W)	3...40
tc (°C)	65
ta (°C)	-25...+50
Uout (V)	<250

LED+ ■  
LED- ■

- $\oplus$
- N
- L
- da
- da
- PUSH

**INPUT**  
**Un = 220...240 V**  
 IN = 210...200 mA  
 fN = 0/50...60 Hz  
 $\lambda$  = 0,85C - 0,97  
 Range of application DC 198...276 V

**VS LIGHTING SOLUTIONS**  
 Vossloh-Schwabe Deutschland GmbH  
 Stuttgarter Straße 61/1, 73614 Schorndorf •  $t_c$   
 Electronic converter for LED  
**Type ECXd 800.349**  
 Ref.-No. 186853  
 Made in Serbia (Europe)

EN 61347-1  
 EN 61347-2-13  
 EN 62384  
 EN 61547  
 EN 55015  
 EN 61000-3-2  
**Non isolated**

**DALI**  
**PUSH**

OUTPUT	
Irated (mA)	400...800
Urated (V)	30...70
Prated (W)	12...40
tc (°C)	70
ta (°C)	-25...+50
Uout (V)	<250

LED+ ■  
LED- ■

- $\oplus$
- N
- L
- da
- da
- PUSH

**INPUT**  
**Un = 220...240 V**  
 IN = 410...380 mA  
 fN = 0/50...60 Hz  
 $\lambda$  = 0,8C - 0,97  
 Range of application DC 198...276 V

**VS LIGHTING SOLUTIONS**  
 Vossloh-Schwabe Deutschland GmbH  
 Stuttgarter Straße 61/1, 73614 Schorndorf •  $t_c$   
 Electronic converter for LED  
**Type ECXd 400.350**  
 Ref.-No. 186854  
 Made in Serbia (Europe)

EN 61347-1  
 EN 61347-2-13  
 EN 62384  
 EN 61547  
 EN 55015  
 EN 61000-3-2  
**Non isolated**

**DALI**  
**PUSH**

OUTPUT	
Irated (mA)	100...400
Urated (V)	100...225
Prated (W)	10...85
tc (°C)	70
ta (°C)	-25...+50
Uout (V)	<250

LED+ ■  
LED- ■

- $\oplus$
- N
- L
- da
- da
- PUSH

**INPUT**  
**Un = 220...240 V**  
 IN = 425...385 mA  
 fN = 0/50...60 Hz  
 $\lambda$  = 0,85C - 0,97  
 Range of application DC 198...276 V

**VS LIGHTING SOLUTIONS**  
 Vossloh-Schwabe Deutschland GmbH  
 Stuttgarter Straße 61/1, 73614 Schorndorf •  $t_c$   
 Electronic converter for LED  
**Type ECXd 800.351**  
 Ref.-No. 186855  
 Made in Serbia (Europe)

EN 61347-1  
 EN 61347-2-13  
 EN 62384  
 EN 61547  
 EN 55015  
 EN 61000-3-2  
**Non isolated**

**DALI**  
**PUSH**

OUTPUT	
Irated (mA)	400...800
Urated (V)	30...130
Prated (W)	12...85
tc (°C)	70
ta (°C)	-25...+50
Uout (V)	<250

LED+ ■  
LED- ■

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**VS LIGHTING SOLUTIONS**

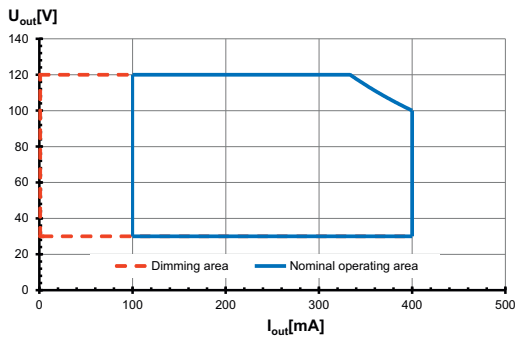
Vossloh-Schwabe Deutschland GmbH · Hohe Steiner 8 · 58509 Lüdenscheid · Germany · Phone +49 23 51/10 10 · Fax +49 23 51/10 12 17 · www.vossloh-schwabe.com

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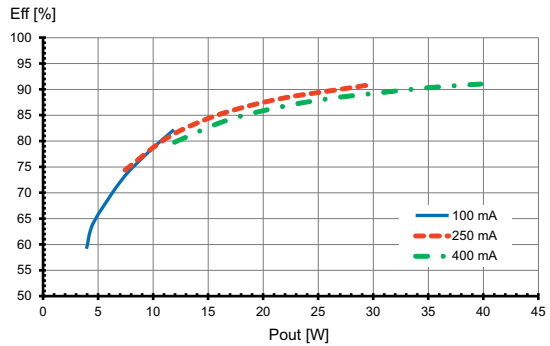
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## Typ. performance graphs for 186852 / Type ECXd 400.348

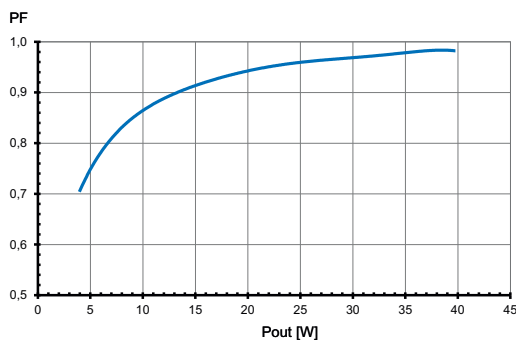
### Working area



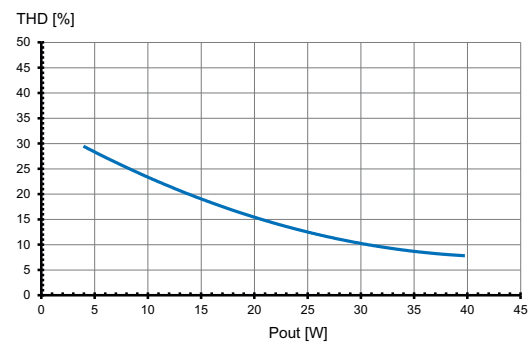
### Efficiency



### Power factor

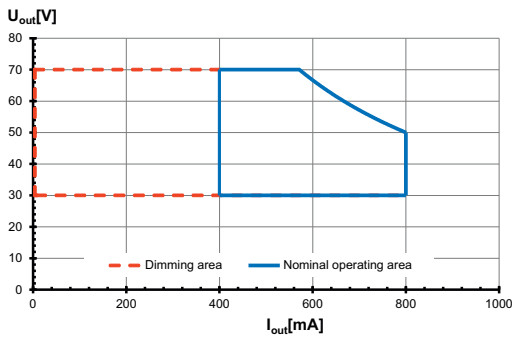


### Total harmonic factor (THD)

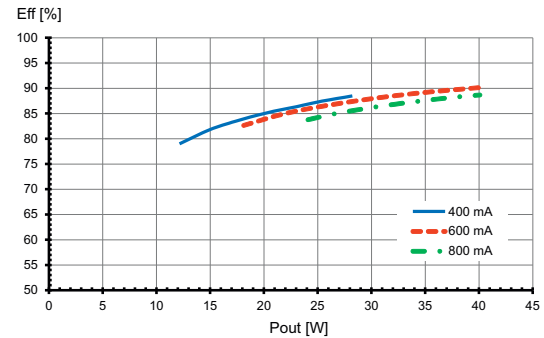


## Typ. performance graphs for 186853 / Type ECXd 800.349

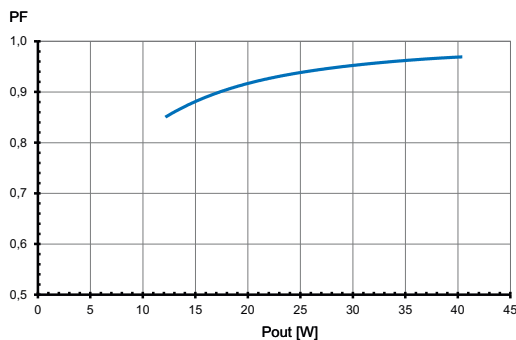
### Working area



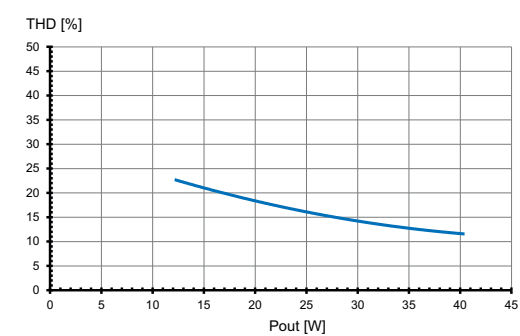
### Efficiency



### Power factor



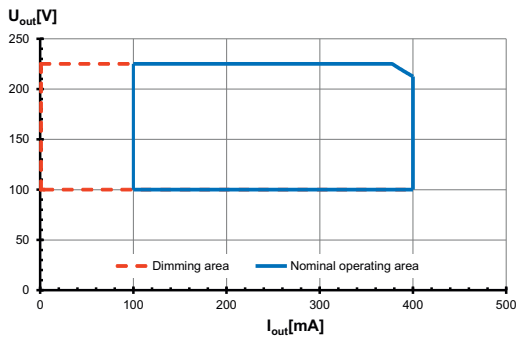
### Total harmonic factor (THD)



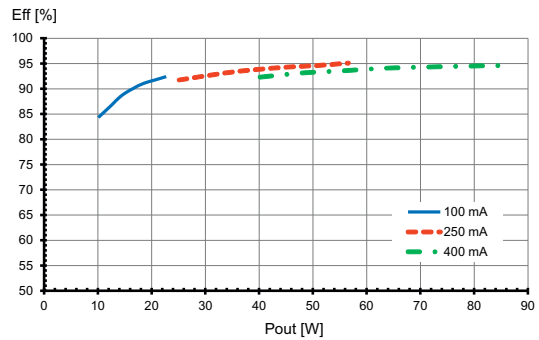
The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.

## Typ. performance graphs for 186854 / Type ECXd 400.350

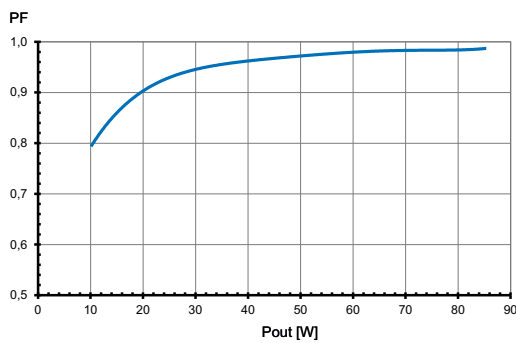
### Working area



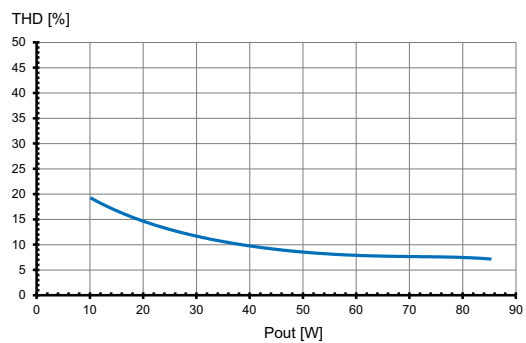
### Efficiency



### Power factor

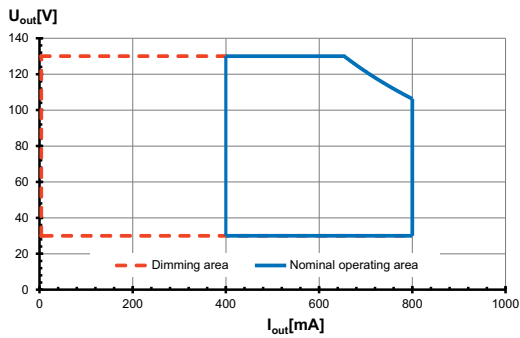


### Total harmonic factor (THD)

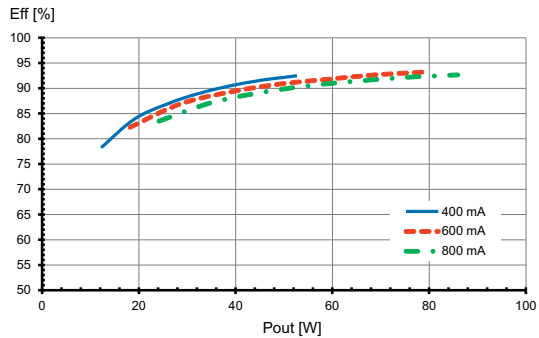


## Typ. performance graphs for 186855 / Type ECXd 800.351

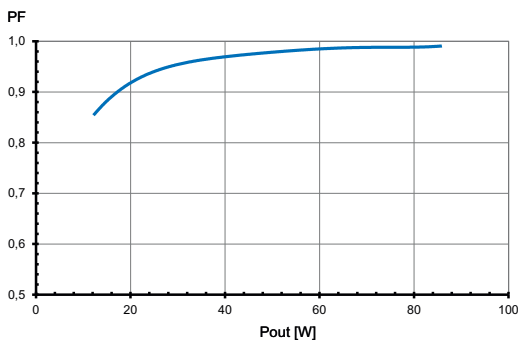
### Working area



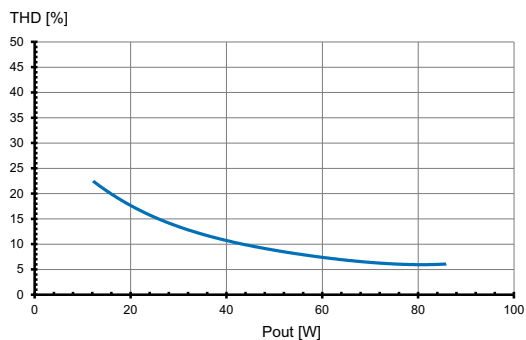
### Efficiency



### Power factor



### Total harmonic factor (THD)



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## Safety functions

- Transient mains peaks protection:  
Values are in compliance with EN 61547 (interference immunity).  
Surges between L–N: up to 1 kV  
Surges between L/N–PE: up to 2 kV
- Short-circuit protection: The control gear is protected against permanent short-circuit with automatic restart function.
- Overload protection: The control gear only works in range of rated output power and voltage problemfree. Please check before switch-on mains power supply that the selected LED load is suitable (see Electrical Characteristics on data sheet).
- Overheating: The control gear has overheating protection acc. to EN 61347-1 C 5e. In case of overheating the control gear will reduce the output power.
- No load operation: The control gear is protected against no load operation (open load).
- If any of the above mentioned safety functions will be triggered, disconnect the control gear from the power supply then find and eliminate the cause of the problem.

## PUSH function

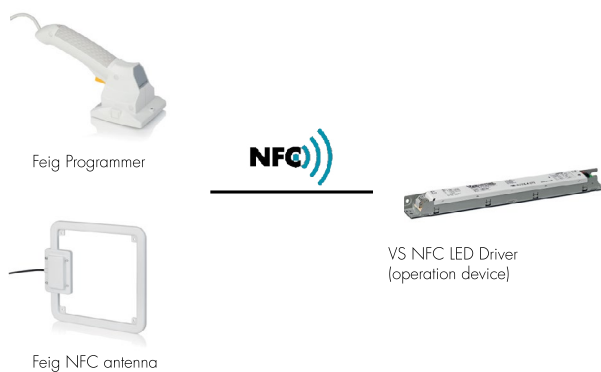
- Just one key for dimming and ON/OFF
- Polarity- and phase-independent control
- Control input with large working voltage range
- Fully DC-compatible – no functional restrictions during DC operation (precondition: DC level is deactivated)
- After disconnection from the primary voltage the ballast will reproduce the last stored lighting level
- Soft start
- Automatic recognition of DALI and PUSH signals
- PUSH operating voltage ranges:
  - AC: 220–240 V  $\pm 10\%$
  - DC: 198–264 V
  - Failing to observe these working voltage ranges can lead to non-recognition of the signals; exceeding the maximum voltages can lead to the destruction of the data inputs.
- PUSH control signals (key activation):
  - Short push (80 ms  $< t < 460$  ms): Is used to switch between ON/OFF lighting states. After the device is switched on, the last selected lighting level is restored and the next dimming direction will be upwards.
  - Long push (460 ms  $< t < 10$  s): Is used to dim upwards or downwards; a long push will change the dimming direction. Thus, a long push will reverse the dimming direction until the upper or lower limit is reached. If the light was off, a long push will switch it on and the dimmer will start at the lowest light intensity.
  - Push to synchronise ( $t > 10$  s): Light is dimmed to the preset factory level and the next dimming direction will be upwards.
  - Synchronisation: Any 1-key dimmer that does not feature a central control module (as each ballast will have its own controls) can develop asynchronous behaviour (e.g. children might play with the key). The system will then be out of sync, i.e. some lamps will be on, others off or the dimming direction will differ from lamp to lamp. Two methods of synchronisation can be used:
    - Push the key for more than 10 seconds, after which the light will be dimmed to a preset level and the next dimming direction will be upwards.
    - Start with a long push of the key so that all lamps are switched on. Follow with a short push to turn the system off. The system will now be resynchronised.

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## Parametrization via NFC

- DC and emergency lighting operation
  - The control gears are suitable for direct voltage operation (DC).  
Reliable DC operation is guaranteed if the specified working area of LED driver is maintained.
  - DC range: 198–264 V
  - Reducing to 176 V: With reduced service life time possible
  - Light level at DC operation (EOF1): 15% (adjustable)
  - DC level range: 0/1–100% (programmable via NFC)
  - DC operation: acc. to EN 60598-2-22 the LED current reduction at high temperature is limited to 50% to nominal current.
- Constant lumen output (CLO)
  - In the most cases the CLO function is used to reduce system performance over the life of an LED system.
  - The luminous flux of LED modules decreases in a step-wise manner up to the end of the modules' service life. To guarantee constant luminous flux, the output of the control gear must be gradually increased over its service life.
  - Defining the CLO function its needed to program the start, provisional and end value, respectively the LED lifetime via the NFC programmer.
- Current adjustment (mA)
  - Factory setting: minimum current
  - Programmable output current
- DALI-Configuration
  - Programming of Short address, Groups, Fade times and Scenes
  - Programming of Lightlevel for Power On, System Failure, Min and Max
- DALI Memorybank 1
  - Store Luminaire information data according EN 62386-251
- Diagnostics and Maintenance
  - Set configurable values described in EN 62386-253, -254
  - Read counters described in EN 62386-252, -253, -254 (Refresh rate is 1 hours of control gear operating time.)

The driver can be programmed via NFC at the earliest 15 seconds after the mains voltage has been switched off.



## System architecture – NFC configuration

- With a Feig Programmer or the Feig NFC antenna, contactless programming of NFC LED drivers is possible.
  - The LED driver is programmed via NFC in a de-energised state.
  - The use of the NFC programmer is flexible in the production or already in the pre-assembly process. A complex commissioning is not required. The operation and parameterization is done in the simplest way. All operating parameters can be individually programmed and updated.
- The exact description of the programming can be found in the operation manual of the NFC programmer.

## Output voltage (U<sub>OUT</sub>)

According to EN 61347-1, U<sub>OUT</sub> indicates which voltage can occur at the output terminals directly or between the output terminals and the PE terminal of the LED driver. This value is given for non-insulated drivers. The used LED module must have an insulation voltage that is at least as high as the specified U<sub>OUT</sub> voltage of the driver.

## Leakage current

Leakage currents are present in all electronic converters or luminaires with PE connection and must be observed especially when using non-insulated LED drivers.

The PCB surfaces of LED modules form a capacitance with grounded LED aluminum circuit boards, heat sinks or mounting plates. This leads to capacitive leakage currents between the connection poles of the LED (+ and –) and the PE terminal. These capacitances should be kept as small as possible, since they are responsible for a possible glowing or flickering of the LEDs in standby mode. In extreme cases, the maximum permissible leakage current of the luminaire according to EN 60598 paragraph 10.3 may be exceeded. The leakage current is also relevant when using RCD circuit breakers.

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## Assembly and Safety Information

Installation must be carried out under observation of the relevant regulations and standards. Installation must be carried out in a voltage-free state (i.e. disconnection from the mains). The following advices must be observed; non-observance can result in the destruction of the LED drivers, fire and/or other hazards.

### Mandatory regulations

- DIN VDE 0100
- EN 60598-1

### Mechanical mounting

- Mounting position: Any position inside a luminaire is allowed. LED drivers are not allowed to use for independent applications.
- Mounting location: LED drivers are designed for integration into luminaires or comparable devices. Installation in outdoor luminaires: degree of protection for luminaire with water protection rate  $\geq 4$  (e.g. IP54 required).
- Degree of protection: IP00
- Clearance: Min. 0.10 m from walls, ceilings and insulation
- Surface: Solid and plane surface for optimum heat dissipation required.
- Heat transfer: If the driver is destined for installation in a luminaire, sufficient heat transfer must be ensured between the driver and the luminaire casing. LED drivers should be mounted with the greatest possible clearance to heat sources. During operation, the temperature measure at the driver's  $t_c$  point must not exceed the specified maximum value.
- Fastening: Using M4 screws in the designated holes
- Tightening torque: 0.2 Nm

### DALI

- DALI function:

The DALI interface (Digital Addressable Lighting Interface) is a digital interface for communication between the control gear and the DALI control system. The DALI control system enables, for example, the dimming of the LED module. The respective triggers (e.g. by sensors) for dimming or parameter queries depend on the respective DALI control system. In addition, the control gear can be configured via the DALI interface. This requires an additional programming unit, e.g. commercially available DALI programming units. The DALI control system is connected via the terminal pair da<sub>1</sub>/da<sub>2</sub>.

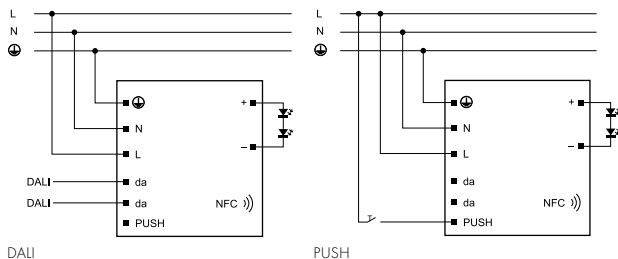
- DALI bus:

If the DALI bus is connected, the device starts with the preset PowerOnLevel 100%. If no DALI bus is connected, the device also starts with 100% light level in system failure mode.

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## Electrical installation

- Connection terminals: Push-in terminals for rigid or flexible conductors with a section of 0.2–1.5 mm<sup>2</sup> AWG24-16
- Stripped length: 8.5–9.5 mm
- Wiring: DALI or PUSH  
The mains conductor within the luminaire must be kept short (to reduce the induction of interference).  
Mains and lamp conductors must be kept separate and if possible should not be laid in parallel to one another.  
Optimum performance of the LED driver is ensured by observing the correct mains polarity as shown in the wiring diagram.
- PUSH wiring: Several LED drivers can be connected to a single PUSH button. Furthermore, several buttons can also be operated with a single PUSH system as long as the phase assignments (e.g. L1) are identical.  
In installations with PUSH function, an asynchronous dimming behaviour can occur. To minimize the risk, VS recommends the max. limit number of 4 LED drivers with one or more PUSH buttons.  
The lead length from the push button (n) to the LED driver (n) should not exceed 100 m. If more than 4 LED drivers are connected to the system, care must be taken to comply with the limitation of cable lengths. In addition, the max. number of LED drivers per circuit breaker should not be exceeded.
- Polarity: Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- Through-wiring: Is not allowed.
- Secondary load: The sum of forward voltages of LED loads has to be within the tolerances which are mentioned in the table "Electrical Characteristics" in this data sheet.
- Wiring diagram:



## Selection of automatic cut-outs for VS LED drivers

- Dimensioning automatic cut-outs  
When the LED drivers are switched on, high short-term current pulses are generated by charging capacitors. These are taken into account in addition to the rated operating current in the table "Max. number of VS-LED- drivers" table.
- Release reaction  
The release reaction of the automatic conductor cut-outs comply with VDE 0641, part 11, for B, C characteristics. The values shown in the following tables are for guidance purposes only and are subject to system-dependent change.
- No. of LED drivers  
The maximum number of VS LED drivers applies to cases where the devices are switched on simultaneously. Specifications apply to single-pole fuses. The number of permissible drivers must be reduced by 20% for multi-pole fuses. The considered circuit impedance equals 400 mΩ (approx. 20 m [2.5 mm<sup>2</sup>] of conductor from the power supply to the distributor and a further 15 m to the luminaire).

Type	Ref. No.	Automatic cut-out type and possible no. of VS drivers pcs.		
<b>Automatic cut-out type B</b>				
		B 10 A	B 13 A	B 16 A
ECXd 400.348	<b>186852</b>	15	20	25
ECXd 800.349	<b>186853</b>	10	13	17
ECXd 400.350	<b>186854</b>	17	22	27
ECXd 800.351	<b>186855</b>	10	13	17
<b>Automatic cut-out type C</b>				
		C 10 A	C 13 A	C 16 A
ECXd 400.348	<b>186852</b>	26	34	41
ECXd 800.349	<b>186853</b>	17	23	28
ECXd 400.350	<b>186854</b>	21	27	34
ECXd 800.351	<b>186855</b>	17	23	28

- To limit capacitive inrush currents the current carrying capacity of each circuit breaker (fuse) can be increased by a factor of 2.5 with the help of our ESB (Ref. No.: 149820, 149821, 149822) inrush current limiters.

## EU compliance information

Hereby, Vossloh-Schwabe Deutschland GmbH declares that the radio equipment type PrimeLine NFC L-R1 DALI2 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: [www.vossloh-schwabe.com](http://www.vossloh-schwabe.com).

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