CC LINEAR DIP SWITCH

COMFORTLINE DIP SWITCH L-LV SHORT

186993, 186994

Typical Applications
Built-in in linear luminaires for
- Office lighting

ComfortLine DIP switch L-LV short

- **SELECTABLE OUTPUT CURRENT VIA DIP SWITCH**
- **VERY LOW RIPPLE CURRENT: < 3 %**
- **SUITABLE FOR EMERGENCY ESCAPE LIGHTING SYSTEMS ACC. TO EN 50172**
- **SELV**
- **LONG SERVICE LIFE: UP TO 100,000 HRS.**
- **PRODUCT GUARANTEE: 5 YEARS**

5 YEARS GUARANTEE

LIGHTING SOLUTIONS
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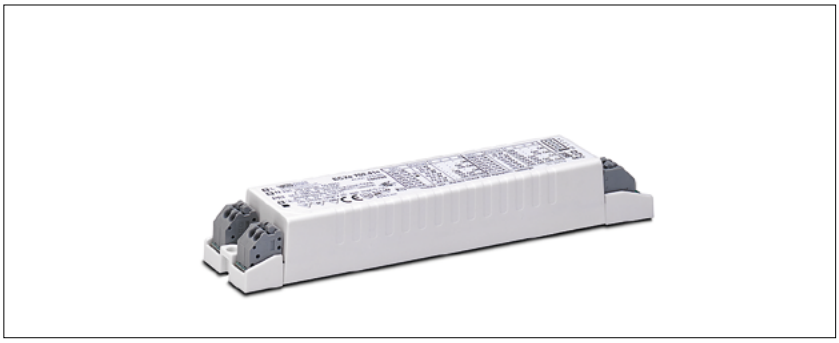
ComfortLine DIP switch L-LV short



Product features
- Linear casing shape

Functions
- Selectable output current via DIP switch
- Suitable for emergency escape lighting systems acc. to EN 50172

Electrical features
- Mains voltage: 220–240 V ±10%
- Mains frequency: 50–60 Hz
- DC operation: 176–274 V (186993) or 170–280 V (186994)
- Push-in terminals: 0.5–1.5 mm²
- Power factor at full load: 0.95
- Open circuit voltage ($U_{max.}$): 59 V
- Secondary side switching of LED modules is not allowed.

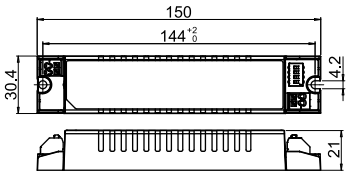
Safety features
- Protection against transient main peaks up to 1 kV (between L and N) and up to 2 kV (between L/N and PE) (186993), up to 3.75 kV (between L and N) and up to 4 kV (between L/N and PE) (186994)
- Electronic short-circuit protection
- Overload protection
- Overtemperature protection
- Protection against "no load" operation
- Degree of protection: IP20
- Protection class I
- SELV

Packaging units

Ref. No.	Packaging unit		
	Pieces per box	Boxes per pallet	Weight g
186993	70	75	110
186994	70	75	110

Applied standards
- EN 61347-1
- EN 61347-2-13
- EN 61547
- EN 61000-3-2
- EN 50172
- EN 55015

Dimensions
- Casing: K79
- Length: 150 mm
- Width: 30.4 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). We will be happy to send you these conditions upon request.

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Electrical characteristics

Max. output W	Type	**Ref. No.**	Voltage 50–60 Hz V	Mains current mA	Inrush current A / µs	Current output DC mA (± 5 %)	Voltage output DC (V)	THD at full load % (230 V)	Efficiency at full load % (230 V)	Ripple 100 Hz %
21	ECXe 1400.413	**186993**	220–240	160–140	5 / 50	700	5–30	< 15	> 88	< 3
23						750	5–30			
24						800	5–30			
25						850	5–30			
27						900	5–30			
28						950	5–30			
30						1000	5–30			
30						1050	5–28			
30						1100	5–27			
30						1150	5–26			
30						1200	5–25			
30						1250	5–24			
30						1300	5–23			
30						1350	5–22			
30						1400	5–21			
13	ECXe 700.414	**186994**	220–240	160–140	5 / 50	250	20–54	< 15	> 88	< 3
15						280	15–54			
16						310	10–54			
18						340	2–54			
20						370	2–54			
21						400	2–54			
23						430	2–54			
25						460	2–54			
26						490	2–54			
26						520	2–50			
27						550	2–50			
29						580	2–50			
30						610	2–50			
30						640	2–46			
30						670	2–45			
30						700	2–43			

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 p	Degree of protection
	°C min.	°C max.	% min.	% max.	°C min.	°C max.	% min.	% max.	°C	
186993	–25	+45	5	60	–40	+85	5	95	+80	IP20
186994	–25	+50							+85	

Expected service life time

at operation temperatures at t_c point

Operation current	Ref. No 186993		186994	
All	70 °C	80 °C	75 °C	85 °C
hrs.	100.000	50.000	100.000	50.000

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DIP switch settings

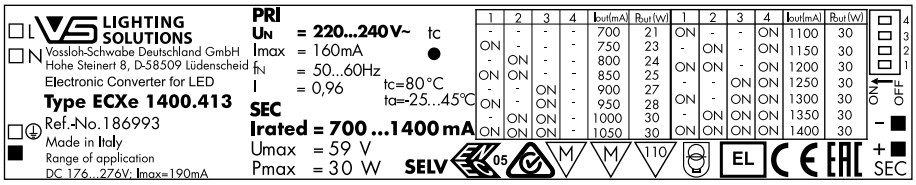
Pin 1	Pin 2	Pin 3	Pin 4	Current (mA) 186993
–	–	–	–	700
ON	–	–	–	750
–	ON	–	–	800
ON	ON	–	–	850
–	–	ON	–	900
ON	–	ON	–	950
–	ON	ON	–	1000
ON	ON	ON	–	1050

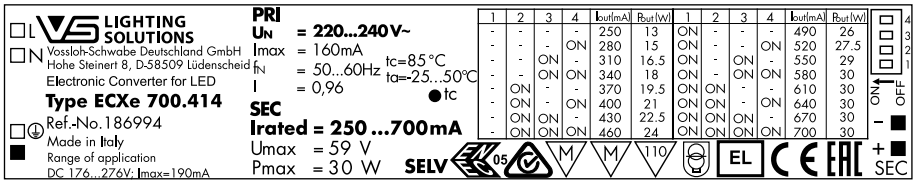
Pin 1	Pin 2	Pin 3	Pin 4	Current (mA) 186993
ON	–	–	ON	1100
–	ON	–	ON	1150
ON	ON	–	ON	1200
–	–	ON	ON	1250
ON	–	ON	ON	1300
–	ON	ON	ON	1350
ON	ON	ON	ON	1400

Pin 1	Pin 2	Pin 3	Pin 4	Current (mA) 186994
–	–	–	–	250
–	–	–	ON	280
–	–	ON	–	310
–	–	ON	ON	340
–	ON	–	–	370
–	ON	–	ON	400
–	ON	ON	–	430
–	ON	ON	ON	460

Pin 1	Pin 2	Pin 3	Pin 4	Current (mA) 186994
ON	–	–	–	490
ON	–	–	ON	520
ON	–	ON	–	550
ON	–	ON	ON	580
ON	ON	–	–	610
ON	ON	–	ON	640
ON	ON	ON	–	670
ON	ON	ON	ON	700

Product labels





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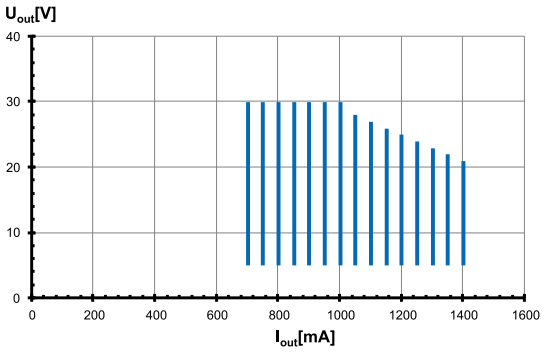
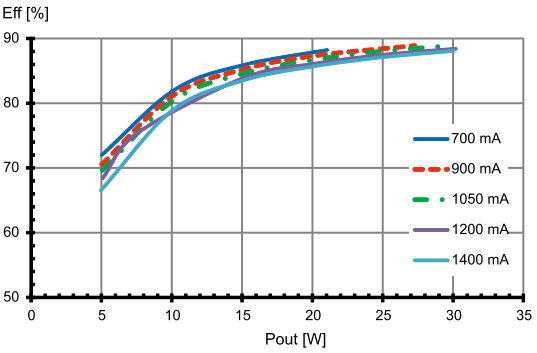
Typ. performance graphs for 186993 / Type ECXe 1400.413

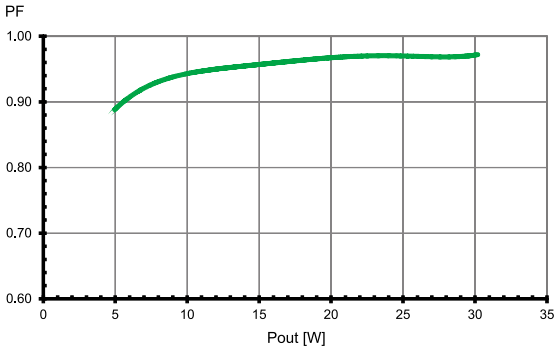
Working area



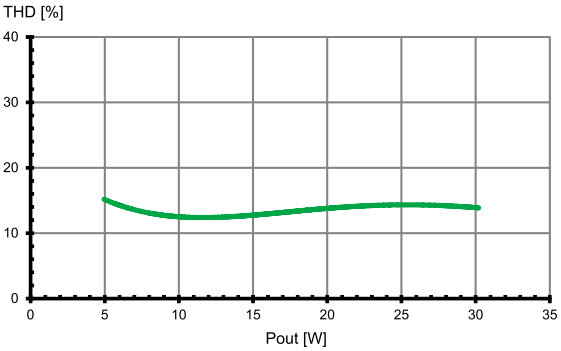
Efficiency



Power factor

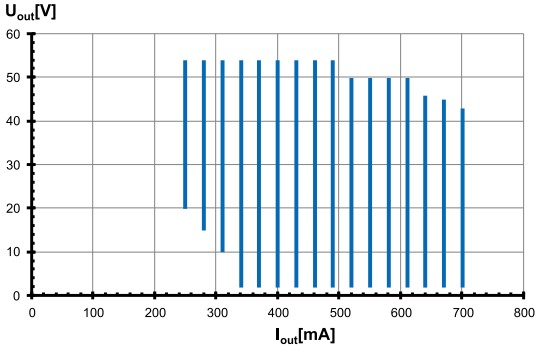


Total harmonic factor (THD)

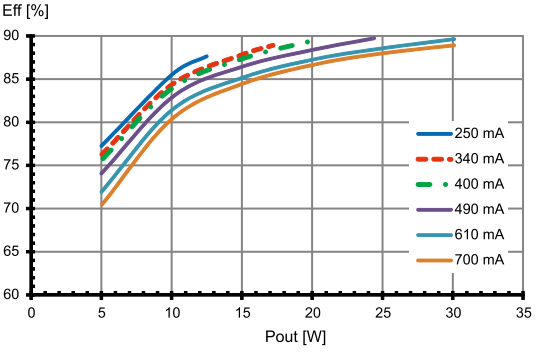


Typ. performance graphs for 186994 / Type ECXe 700.414

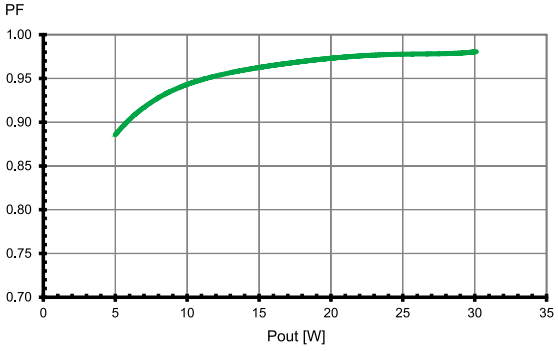
Working area



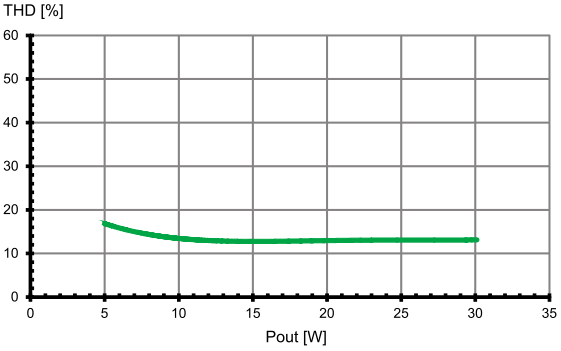
Efficiency



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 (186993)
  Surges between L–N: up to 3.75 kV
  Surges between L/N–PE:
  up to 4 kV (186994)
- 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 IEC 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.

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: 176–274 V (186993)
  DC range: 170–280 V (186994)
- Light level at DC operation (EOFi): 100%
- DC operation: acc. to EN 60598 the LED current reduction at high temperature is limited to 50% to nominal current.

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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

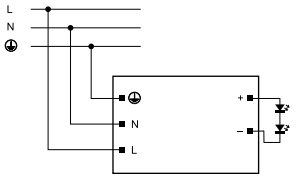
Mechanical mounting

- Mounting position: Built-in: Any position inside a luminaire is allowed
  Independent application: 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 ≥ 4 (e.g. IP54 required).
- Degree of protection: IP20
- 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 uminaire. 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 tc point must not exceed the specified maximum value.
- Fastening: Using M4 screws in the designated holes
- Tightening torque: 0.2 Nm

Electrical installation

- Connection terminals: Push-in terminals for rigid or flexible conductors with a section of 0.5–1.5 mm², AWG15
- Stripped length: 8–9 mm
- Wiring: 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.
- 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
  High transient currents occur when an LED driver is switched onbecause the capacitors have to load. Ignition of LED modules occurs almost simultaneously. This also causes a simultaneous high-demand for power. These high currents when the system is switched on put a strain on the automatic conductor cut-outs. which must be selected and dimensioned to suit.
- 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 mm²] 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.					
Automatic cut-out type		B 10 A	B 13 A	B 16 A	C 10 A	C 13 A	C 16 A
ECXe 1400.413	**186993**	32	40	50	52	67	83
ECXe 700.414	**186994**	32	40	50	52	67	83

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

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