

## 12-24 V, **Dimmable constant voltage** Switch-Control LED driver extension

**5 A, 12-24 VDC**

- Switch-Control (DC) input, 0.1 %-100 % dimming range
- 1 kHz PWM dimming frequency
- Stand-by power < 0.1 W
- Class II device
- Suitable for Class I, II or III (SELV) luminaires and independent use
- Duplicated terminals for optional parallel connection
- Switch-Control input is double insulated from driving signal input and output



The LL1-CV-SC Switch-Control dimmable extension unit is designed to be used with the Helvar constant voltage LED drivers, creating controllable solutions for decorative lighting. It enables the use of Helvar Switch-Control, which is a protocol for controlling the light with a retractable switch, in constant voltage (12 - 24 V) lighting applications.

### Input Characteristics

Input signal	Constant voltage only
Switch-Control signal	Constant voltage only
Voltage range	10.8 - 26.4 VDC

### Insulation between circuits & driver case

Input - Output	Non-isolated
Input and output - Driver extension case	Double/reinforced insulation
Switch-Control signal - Input and output	Double/reinforced insulation

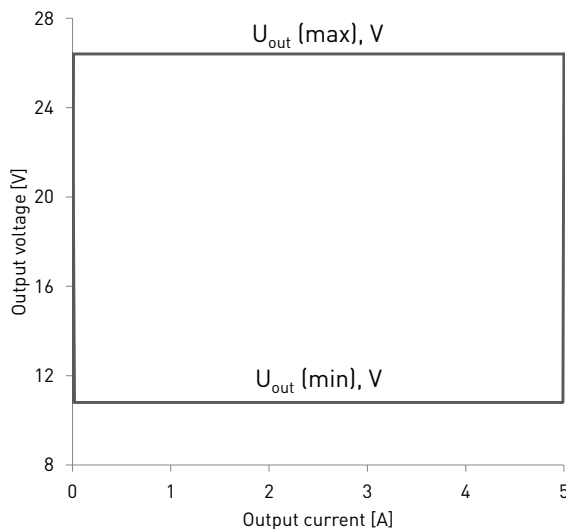
### Load Output

Output current (I-OUT)	Maximum 5 A*
Max output power	120 W
PWM frequency	1 kHz

	U-IN 12 V	24 V
P-OUT (max)	60 W	120 W
I-OUT (max)	5 A*	5 A*
U-OUT	12 V	24 V

\* LL1-CV-SC LED driver extension must be used with a constant voltage power supply with current limited to max 5A and proper short circuit protection.

## Operating window



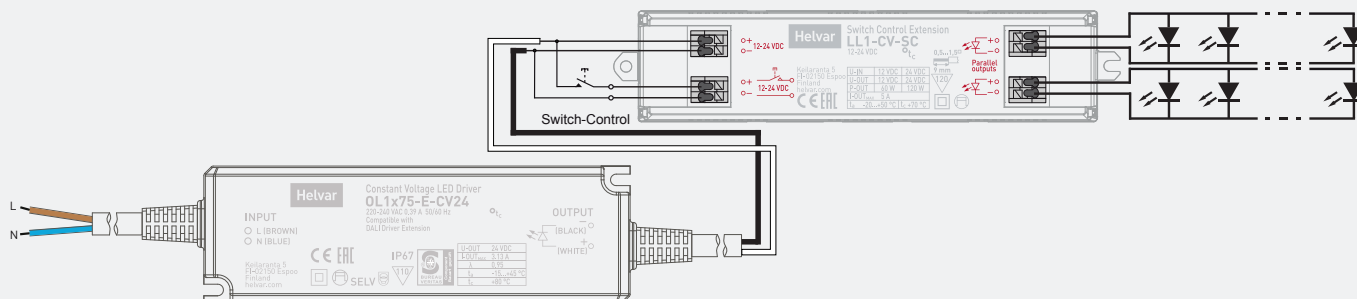
## Operating Conditions and Characteristics

Max. temperature at tc point	70 °C
Ambient temperature range	-20...+50 °C
Storage temperature range	-40...+80 °C
Maximum relative humidity	no condensation
Life time	50 000h, at TC max (90 % survival rate)

## Connections and Mechanical Data

Wire size	0.5 - 1.5 mm <sup>2</sup>
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598
Maximum driver to LED wire length	5 m
Weight	70 g
IP rating	IP20

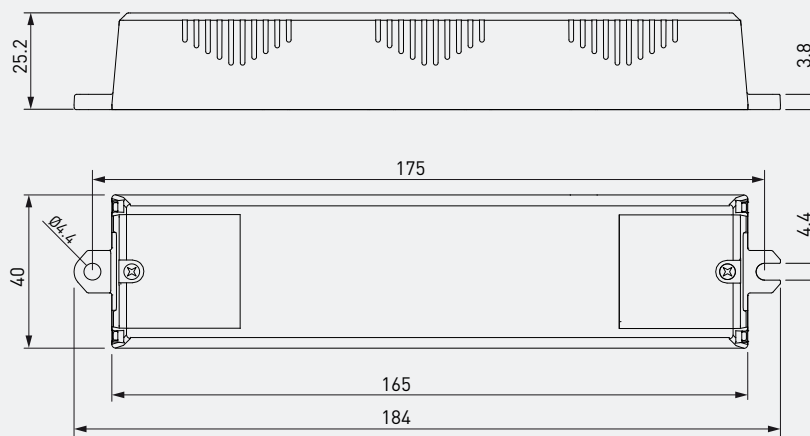
## Connections



**Attention: Connect only 12 VDC - 24 VDC signal to Switch-Control terminal, as illustrated above, controlled by a retractable switch.**

Note: Output voltage is PWM modulated and equal to CV driver output voltage

## Dimensions



LL1-CV-SC LED driver extension is suited for built-in usage in luminaires as well as independent use. In order to have safe and reliable LED driver operation, the LED luminaires will need to comply with the relevant standards and regulations (e.g. IEC/EN 60598-1). The LED luminaire shall be designed to adequately protect the LED driver from dust, moisture and pollution. The luminaire manufacturer is responsible for the correct choice and installation of the LED drivers according to the application and product datasheets. Operating conditions of the LED drivers may never exceed the specifications as per the product datasheet.

## Installation & operation

### Maximum ambient and $t_c$ temperature:

- The  $t_a$  ambient temperature range is a guideline given for the optimum operating environment. However, integrator must always ensure proper thermal management (i.e. mounting base of the driver extension, air flow etc.) so that the  $t_c$  point temperature does not exceed the  $t_c$  maximum limit in any circumstance.
- Reliable operation and lifetime is only guaranteed if the maximum  $t_c$  point temperature is not exceeded under the conditions of use.

### LED driver earthing

- LL1-CV-SC LED driver extension is a Class II device and the electrical protection relies on double/reinforced insulation. Do not earth LL1-CV-SC in any way.
- When using a SELV-rated CV LED driver, then the SELV driver output and the LL1-CV-DA output has to be insulated from the luminaire earth connection (ref. EN60598-1 luminaire standard).

### Installation considerations

- The LL1-CV-SC allows the use both inside the luminaire and outside the luminaire, with the use of the integrated strain relief. The strain relief provides reliable fastening method for the mains and LED output wiring.
- The general preferred installation position of LL1-CV-SC LED driver extension is to have the top cover facing upwards.

### Use of Switch-Control functionality

- Switch-Control terminal in LL1-CV-SC is not intended to be used with mains voltage AC signal, but 12 VDC - 24 VDC signal instead. Please take special attention in the connection (see the picture on page 2).
- Maximum numbers of control gear devices to be connected to one switch is 30.
- The maximum cabling length from the switch to the driver is 25 meters.
- More information in Switch-Control User Guide at [www.helvar.com](http://www.helvar.com).

## Conformity & standards

Particular requirements for miscellaneous electronic circuits used with luminaires	EN 61347-2-11
Particular safety requirements for DC or AC supplied electronic control gear for LED modules	EN 61347-2-13
Radio frequency interference	EN 55015
Immunity standard	EN 61547
Performance requirements	EN 62384
Compliant with relevant EU directives	
RoHS/REACH compliant	
CE marked	

## Label symbols



A general symbol for double insulated electrical appliances that are equipped with strain relief and can therefore be used as an independent device.



Symbol for independent control gear.