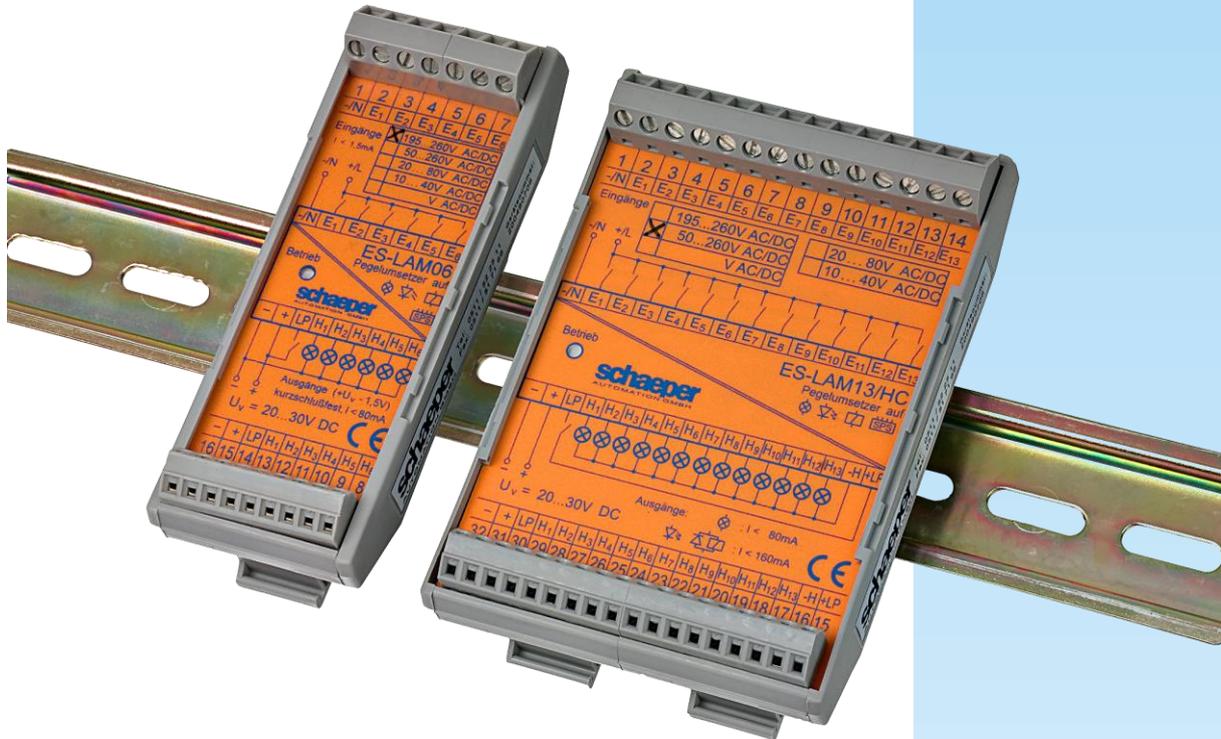


ES-LAM06 and ES-LAM13 Voltage Level Converter



Application

The lamp-/LED-drive modules *ES-LAM06* and *ES-LAM13* are supplied in various different designs, to enable signal voltages of 10 to 260V AC/DC to be converted to 24V DC in order to drive incandescent lamps ($I_N \leq 50\text{mA}$) or LEDs. The module requires a supply voltage of 24V DC.

Series resistors are no longer necessary, considerably reducing the power loss. Another important advantage is that it provides an electrical isolation between the signal voltage and lamp voltage. Current limitation of the outputs prevents the high starting current usual for incandescent lamps thus increasing their life-span. The shut-off for short-circuits occurs with a time delay, thus avoiding any problems associated with the low initial resistance of incandescent lamps.

In addition the device has an input for lamp-test (LP), i.e. an external diode wiring is not needed.

When using several modules, the lamp-test inputs can be connected in parallel to provide a common lamp-test. Similarly, the common poles for the signal voltage (-/N, terminal 1) can also be connected in parallel. Several modules can be operated each with a different signal voltage or voltage potential.

Features

- ☺ 6 inputs (ES-LAM06) or 13 inputs (ES-LAM13) for 10 to 260V AC/DC
- ☺ outputs: approx. 24V DC, for incandescent lamps with $I_N \leq 50\text{mA}$ (option: $I_N \leq 80\text{mA}$)
Current limitation to approx. 80 mA, shut-off for **short circuits**
- ☺ electrical isolation between inputs and outputs
- ☺ input for lamp-test
- ☺ protected against reverse poling
- ☺ space-saving

Signal voltage

The various versions cover a wide range of input voltages, from 10 to 260V AC/DC. This enables several modules to be used to convert different voltages or voltage potentials to provide a 24V DC lamp voltage. The connection example (page 3) shows how 230V AC signals and 60V DC signals can be combined. The inputs *LP* for the lamp test can always be connected in parallel to each other if a common lamp test is required.

If the various signal voltages have a common reference potential then the terminal 1 (-/N) of each of the modules can also be connected.



If the signals are from two or three phases L_1 , L_2 and L_3 , with a signal voltage of 150 ... 260V to the common N, only signals from one single phase should be connected to one module. At least one module, therefore, is needed per phase, whose terminals 1 are then connected to the common N.

If various phases are applied to one module the permissible voltage difference between two inputs will be exceeded. For those applications the type *ES-LAM8x2...* is to be used.

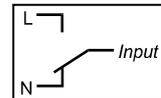
Note:

With modules with the wide input voltage ranges 50...260V, 20...80V or 10...40V a high alternating voltage in signal lines which are laid closely parallel to each other can lead to unwanted interference on „off“ state lines, resulting in unwanted signals.

If this should occur then, to avoid the interference, the lines should be connected to N with change-over contacts in the „off“ state.

Further preventative measures:

- Use of direct voltage signals
- Use of ES-LAM../230 with limited input voltage range 195 ... 260V AC/DC
- Use of the lowest permissible input voltage for modules with the voltage ranges 50...260V, 20...80V and 10...40V



Ordering references: (Other voltages on request)

Signal inputs	Device type	
195 ... 260V AC/DC	ES-LAM06/HC/230	ES-LAM13/HC/230
20 ... 80V AC/DC	ES-LAM06/HC/24	ES-LAM13/HC/24
10 ... 40V AC/DC	ES-LAM06/HC/12	ES-LAM13/HC/12
50 ... 260V AC/DC (see note above)	ES-LAM06/HC/W	ES-LAM13/HC/W
outputs	high current outputs	
shut-off with short circuit	2 x incand. lamp 28V/40mA or	
Switching back on: reapply the signal voltage	1 x incand. lamp 28V/40mA + 6 x LED 24/28V, 20mA or	
	8 x LED 24/28V, 20mA	

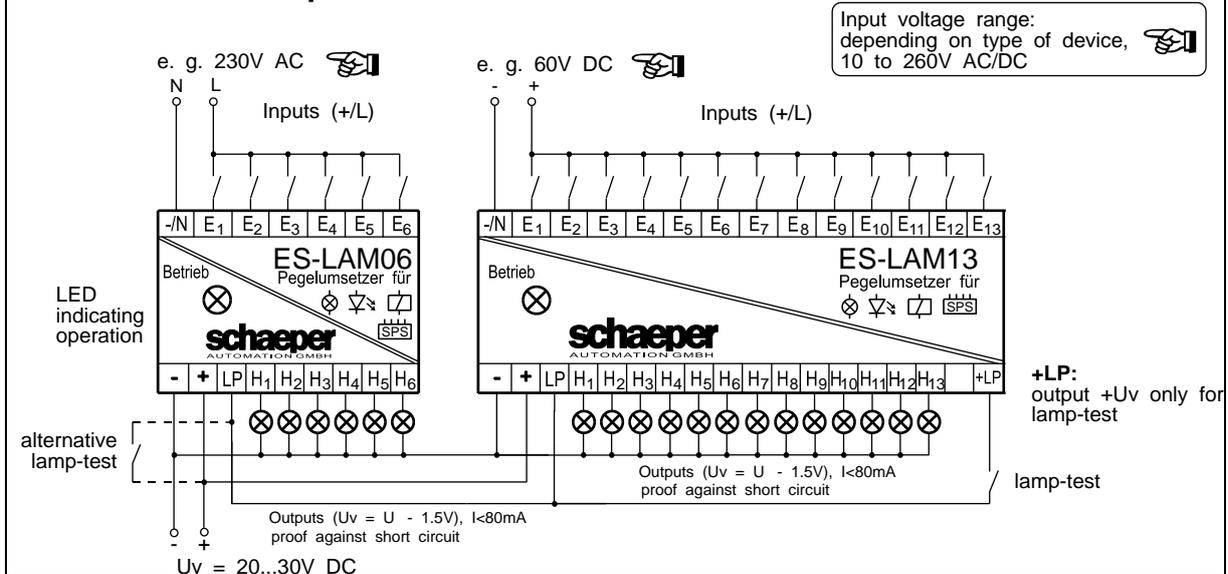
Lamp test

The inputs *LP* for lamp test (terminal 14 for *ES-LAM06*, or terminal 30 for *ES-LAM13*) must be driven with $+U_V$ (supply voltage). The inputs *LP* on several modules can be connected parallel if required.

The module *ES-LAM13* has an output $+LP$, which provides a voltage $+U_V$ for driving the lamp test. Up to 40 *LP* inputs from other modules can be connected to this output. The output should not be used for any other purpose, because the permissible current load is approx. 40 mA.

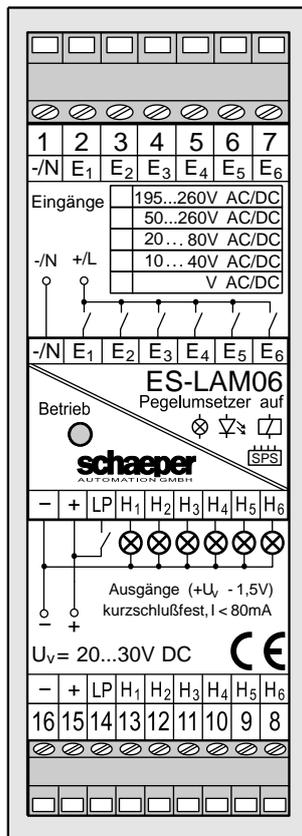
Care must be taken that all modules whose lamp test is driven from a common source also have a common $+$ -potential for the supply voltage, i.e. the terminal 15 (*ES-LAM06*) or the terminal 31 (*ES-LAM13*) of these modules must also be connected together.

Connection Example

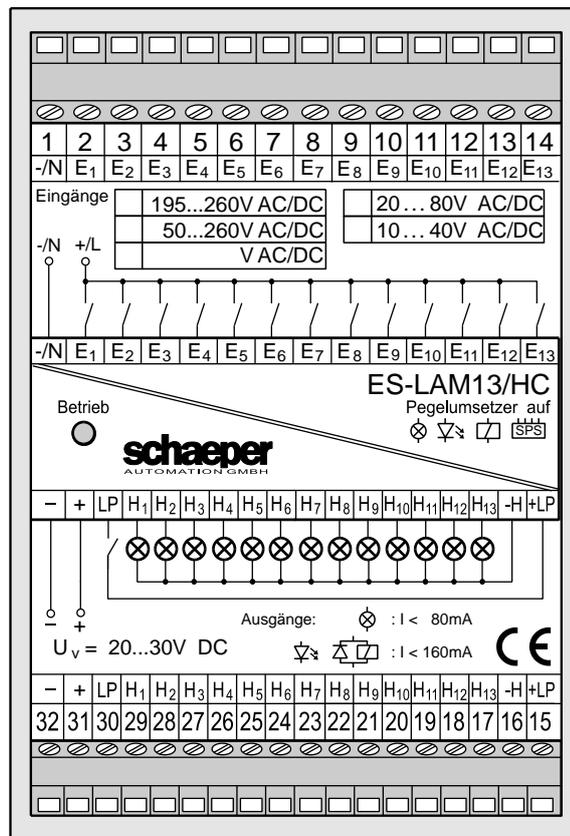


Frontal View (approx. original size)

ES-LAM06



ES-LAM13



Technical Data

Signal inputs E:

Terminals (1) to (14)

unit type ES-LAM...	/230	/24	/12	/W
input voltage [V AC/DC]	195 - 260	20 - 80	10 - 40	50 - 260
V_{OFF} [V AC]	<120	<10	<5	<15
V_{ON} [V AC]	>195	>20	>10	>50
V_{MAX} [V AC/DC]	260	80	40	260

 V_{OFF} : Voltage at signal input E for certainly switched off output H V_{ON} : Voltage at signal input E for certainly switched on output H

input current max. 6mA (other voltages on request)

Supply voltage:

Terminals +(31) and -(32)

 $U_V = 20 \dots 30V$ DC (reverse polarity proof)

Ripple <5%

Power loss approx. 0.3W (no output active, $U_V = 30V$ DC)
 approx. 1.2W (6 outputs active, $U_V = 30V$ DC)
 approx. 2.3W (13 outputs active, $U_V = 30V$ DC)

Outputs H:

Terminals (17) to (29)

(s. table p. 2)

 $U \approx U_V - 1.5V$

each output (values in brackets for high current outputs):

- current limited to approx. 80 mA (210mA)
 - when connected to incand. lamps: $I_N \leq 50$ mA (80mA)
 - shut-off with short circuit > approx. 60 ms (14ms)
- restart: reapply the signal voltage

Input LP:

Terminal (30)

 $U > 0.7U_V$: lamp-test on, < 1.5 mA $U < 0.3U_V$: lamp-test off, < 1.5 mA

Output +LP:

terminal (15)

(only ES-LAM13)

only for driving lamp-test,

can be connected with max. 40 inputs LP (approx. 40 mA)

short-circuit-proof

Isolation voltage:

3.75 kV AC (between signal inputs and outputs /supply voltage)

Ambient temperature:

0 ... +50 °C, no condensation (operation)

-20 ... +85 °C (storage)

EMC-Directive:

*Emission:* According to EN 50081-1, 1993

(Residential, commercial) and EN 55022

Immunity: According to EN 50082-2, 1995

(Industrial environment) and EN 61000-4-2, -3, -4, -6

Low Voltage Directive:

Safety: According to DIN VDE 0106, Teil1, 1982 and VBG 4, 1979

Operating conditions: Level of pollution 1 or 2

according to DIN VDE 0110, Teil 1, 1989

Housing:

ES-LAM06: L = 40 mm, W = 111 mm, H = 35 mm**ES-LAM13:** L = 75 mm, W = 111 mm, H = 35 mmwith snap-on fastening for DIN EN-mounting rails  and 

Connecting terminals:

Screw terminals

Inputs: 1 x 1.5 mm² single- and fine-wire**Outputs:** 1 x 1.5 mm² single-wire1 x 1.0 mm² fine-wire

Behaviour in fire:

Housing and terminals according to UL94: V-2

barely flammable and self-extinguishing according to VDE

Weight:

ES-LAM06: approx. 60g**ES-LAM13:** approx. 120g