

Operating Manual for 4-way Universal dimmer

SDK-U4-10-AD
Art. No. 215.0040.00

1 Introduction



The 4-way universal dimmer is suitable for use with all conventional dimmable types of lighting. There are 4 separate dimmer inputs and outputs, each with a load capacity of 570W. The control circuits automatically detect the connected load, and automatically change over from forward phase control to reverse phase control, and regulate the light output using a suitable control characteristic (Ueff).

- **Control of incandescent lamps, high-voltage halogen filament lamps and low voltage halogen lamps with magnetic and electronic transformers. Control of fluorescent lamps with VIP90.**

The 4-way universal dimmer can be controlled by various bus protocols:

- **Control via adaptolux® bus.**
- **Control via DMX bus.**
- **Control via RS485 standard.**

A emergency input allows all outputs to be set to 100%.

1.1 Intended use

The universal dimmer is intended only for the control of light sources, and is designed for indoor use in electrical control panels.

Note



The manufacturer (and/or supplier of the SDK-U4-10-AD) is not liable for any personal injury or property damage whatsoever, arising from use other than the intended use or from failure to comply with the information set out in this operating manual.

2 Safety Instructions

2.1 Responsibilities

The person installing the unit is responsible for ensuring protection against personal injury and property damage, and also for the provision of the necessary information to the installation owner. He is also responsible for ensuring compliance with the applicable general health and safety regulations and the specific safety regulations applying to work on medium-voltage electrical installations.

2.2 Residual hazards



Potential residual hazard from contact with medium-voltage (230 VAC) conductors.

When the SDK-U4-10-AD is used for its intended purpose, the equipment meets all relevant standards and regulations relating to the avoidance of personal injury and property damage. However, residual hazards arising from power-conductors cannot be completely eliminated. The key areas with a potential residual hazard are shown in the adjacent illustration.

2.3 Regulations specific to the equipment

DANGER!



The SDK-U4-10-AD universal dimmer must be installed and used only in a perfect condition and in accordance with the operating manual. The unit must be disconnected from the power supply before any electrical terminals (power supply and dimmer output, etc.) are connected or disconnected. Work carried out on live terminals can result in severe injury from electric shocks. Output LD is not disconnected from the power supply when the dimmer is switched off. A separate automatic safety cut-out must be installed in the power feed.

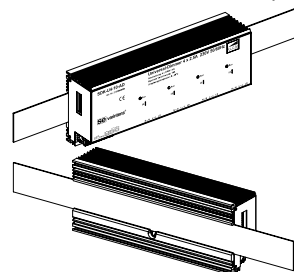
Attention!



Connection and disconnection of the load or parts of the load is not permitted during operation.

3 Installation

The SDK is mounted on a top-hat rail. It is clipped in to the rail from below. Gentle pressure is then applied to the top front to snap it in place.



Installation position:	Terminals horizontal
Horizontal spacing:	min. 1mm
Minimum vertical rail grid spacing:	115mm (90+25mm) (excluding conduit)
Recommended vertical rail grid spacing:	160mm (with 40mm conduit)

Each individual SDK generates 23W dissipation power under rated load. If a number of dimmers are installed in an electrical cabinet, measures must be taken to ensure that the temperature of the individual control units does not exceed 70°C.

4 Control Modes

The SDK can be controlled by an adaptolux bus, a DMX bus or the RS485 standard bus.

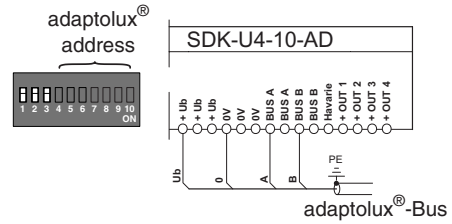
A emergency input allows all outputs to be set to 100% in an emergency.

The following illustrations show the connections used and the required settings.

4.1 adaptolux® mode

Before connecting up, set DIP switches 1 to 10 as follows:
 DIP switches 1 and 2 set to OFF select the adaptolux® mode.
 DIP switch 3 must be OFF.
 The remaining DIP switches, 4 to 10, are used to set the module address:

- 0000000 = address 0
- 0000001 = address 1
- 1111111 = address 127



DIP-switch settings:

Switch:	Function:	adaptolux®
DIP 1	bus protocol 1	OFF
DIP 2	bus protocol 2	OFF
DIP 3		OFF
DIP 4	address bit 7	module address bit 7 (highest bit in the address)
DIP 5	address bit 6	module address bit 6
DIP 6	address bit 5	module address bit 5
DIP 7	address bit 4	module address bit 4
DIP 8	address bit 3	module address bit 3
DIP 9	address bit 2	module address bit 2
DIP 10	address bit 1	module address bit 1 (lowest bit in the address)

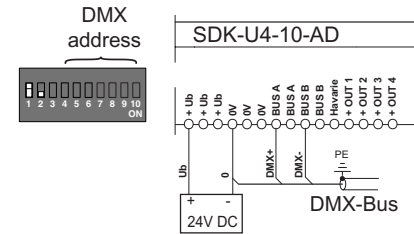
4.2 DMX mode

Before connecting up, set DIP switches 1 to 10 as follows:
 DIP switch 1 set to OFF and DIP switch 2 to ON select DMX mode.
 DIP switch 3 determines the switch-on point for the heating relay and the dimmer output.
 The remaining DIP switches, 4 to 10, are used to set the DMX address.
 The configured address, multiplied by 4, is the first of 4 consecutive DMX addresses:

- address 0, 0000000 = DMX 1, 2, 3 and 4
- address 1, 0000001 = DMX 5, 6, 7 and 8
- address 127, 1111111 = DMX 509, 510, 511 and 512

DIP-switch settings:

Switch:	Function:	DMX
DIP 1	bus protocol 1	OFF
DIP 2	bus protocol 2	ON
DIP 3	heating relays	OFF = Dimming value > 0: heating relays and dimmer outputs are switched on immediately. Dimming value = 0: dimmer outputs are switched off immediately, heating relays after a delay. ON = When the control panel is switched on, the heating relays are switched on immediately and the dimmer outputs after a delay. When the control panel is switched off, the dimmer outputs are switched off immediately, and the heating relays after a delay.
DIP 4	address bit 7	module address bit 7 (highest bit in the address)
DIP 5	address bit 6	module address bit 6
DIP 6	address bit 5	module address bit 5
DIP 7	address bit 4	module address bit 4
DIP 8	address bit 3	module address bit 3
DIP 9	address bit 2	module address bit 2
DIP 10	address bit 1	module address bit 1 (lowest bit in the address)



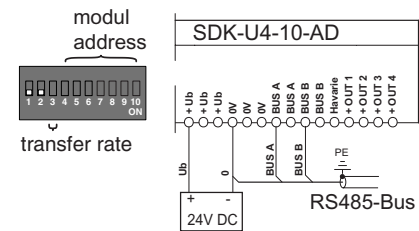
4.3 RS485 standard mode

Before connecting up, set DIP switches 1 to 10 as follows:
 DIP switches 1 and 2 set to ON select RS485 standard mode.
 DIP switch 3 determines the transfer rate.
 The remaining DIP switches, 4 to 10, are used to set the module address:

- 0000000 = address 0
- 0000001 = address 1
- 1111111 = address 127.

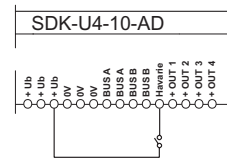
DIP-switch settings:

Switch:	Function:	RS485 Standard
DIP 1	bus protocol 1	ON
DIP 2	bus protocol 2	ON
DIP 3	transfer rate	ON = 38400 Baud OFF = 9600 Baud
DIP 4	address bit 7	module address bit 7 (highest bit in the address)
DIP 5	address bit 6	module address bit 6
DIP 6	address bit 5	module address bit 5
DIP 7	address bit 4	module address bit 4
DIP 8	address bit 3	module address bit 3
DIP 9	address bit 2	module address bit 2
DIP 10	address bit 1	module address bit 1 (lowest bit in the address)

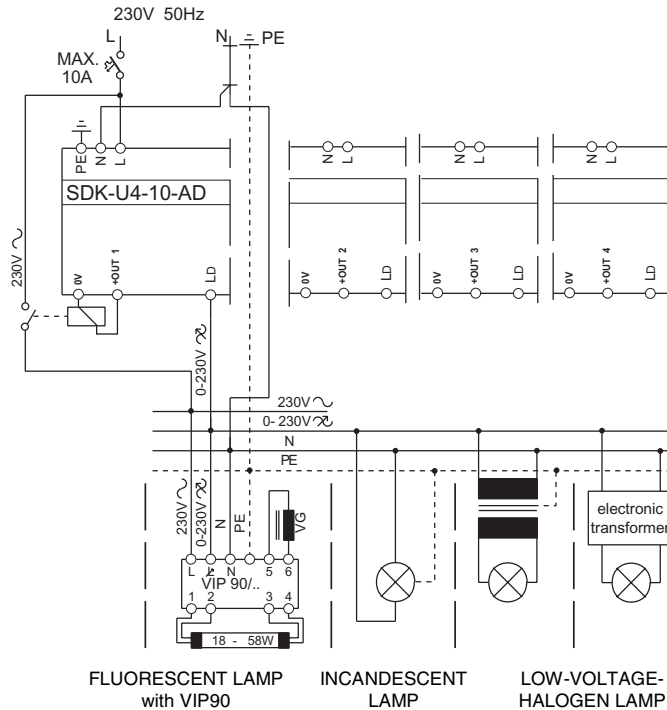


4.4 Emergency switching

If the emergency input is applied to +Ub, all outputs are instantly switched to 100%, and the heating circuit outputs, OUT 1 to OUT 4, are switched on. The values supplied by the bus are ignored. When the emergency input is disconnected from +Ub, the outputs revert to control by the bus data.



5 Load Circuit



The 4-way universal dimmer is capable of controlling 230V incandescent lamps, low voltage halogen lamps **with electronic or magnetic transformers** or fluorescent lamps with VIP90 up to a maximum current of 2.5 A (570 W). The dimmed voltage is present at output "LD". The universal dimmer uses transistor circuitry to control the output voltage.

To control fluorescent lamps with VIP90, the heating circuit (230V at terminal L of the VIP90) is switched on by a 24V relay, which is switched by output +OUT 1.

Test function:

Each circuit can be individually tested by pressing the relevant I/O key on the power section. One press of the key switches the circuit on. A second, long press activates dimming, while a third press reverses the dimming into brightening. To switch off, it is necessary to interrupt the power supply (safety cut-out). The test function is inoperative when the interface card is sending control signals..

5.1 Parallel power connection

To increase the power, two dimming circuits (1+2 and 3+4) can be software-connected in parallel (2 x 570W = 1140W).

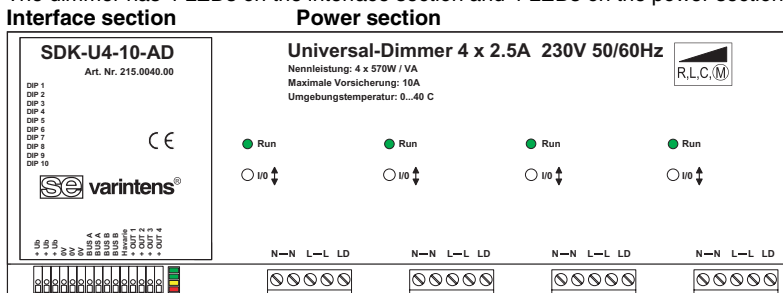
- The circuits connected together must be in the same phase.
- On the power section, the contacts of the common dimming circuits must be connected together (L with L, N with N and LD with LD).
- The parallel connection must be software-programmed.

5.2 Heating circuit outputs

The heating circuit outputs +OUT 1 to +OUT 4 are switched off, when the corresponding dimmer value is 0. For every dimmer value >0, the corresponding output is switched on. If the emergency input is activated, all 4 heating circuit outputs are switched on, irrespective of the dimmer value being sent over the bus. The heating circuit outputs are used to control the VIP-90, in order to heat the filaments of the fluorescent lamps via a relay.

6 LED Indicators on the Dimmer

The dimmer has 4 LEDs on the interface section and 4 LEDs on the power section:



Interface section:

		Adaptolux	DMX	RS485 Standard
Red LED	ON OFF	Power ON Power OFF	Power ON Power OFF	Power ON Power OFF
Yellow LED	ON OFF FLASHING	Bus detected, but no communication with selected address Bus not detected BUS connection active (valid data being received)	Break detected but no communication with selected DMX channel number DMX Bus not detected All 4 channels signalled by bus	No communication with module via bus BUS connection active (valid data being received)
Green LED 1	ON	Lighting value of a channel greater than "0"	Lighting value of a channel greater than "0"	Lighting value of a channel greater than "0"

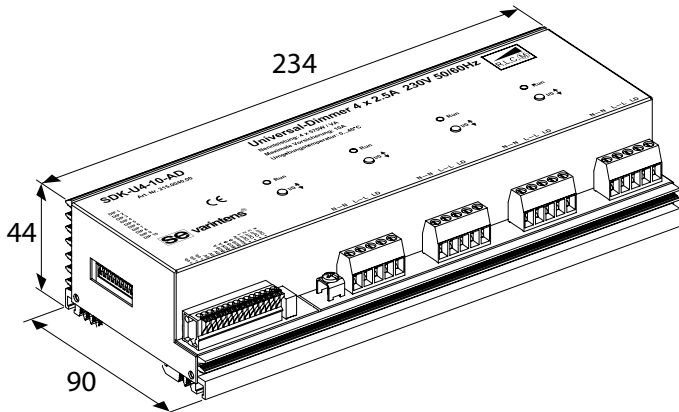
		Adaptolux	DMX	RS485 Standard
Green LED 1	OFF	Lighting value of all 4 ch. "0"	Lighting value of all 4 channels "0"	Lighting value of all 4 channels "0"
Green LED 2	ON OFF FLASHES 1x FLASHES 2x FLASHES 4x FLASHES 5x	Emergency op. input active Emergency op. input inactive Over-current from excess load Overheating Incorrect load Parameter data incorrect	Emergency op. input active Emergency op. input inactive Over-current from excess load Overheating Incorrect load -	Emergency operation input active Emergency operation input inactive Over-current resulting from excess load Overheating Incorrect load Parameter data incorrect
Power section:				
Green LED 1-4	FLASHING FLICKERS	Dimmer running, but receiving no data from the interface card. Data being received.		

7 Fault Finding and Elimination

Fault	Remedy
Lamp does not brighten.	The relevant lighting circuit can be dimmed or brightened by pressing one of the keys on the power section. If the circuits do not respond, check the load circuit wiring. Check the bus voltage on the SDK (red LED must come on). Set DIP switches 1 and 2 in accordance with the appropriate bus protocol. 0V possibly not connected. If the yellow LED flashes at a fast rate, one of the dimmer circuits is not powered or the dimmer is faulty.
Lamp does not dim.	Crash input active
Green LED 2	<ul style="list-style-type: none"> • FLASHES 1x Dimmer overloaded. Reduce load. • FLASHES 2x Dimmer overheating. Improve cooling. • FLASHES 4x Dimmer has not recognised type of load. Check load. Reset: (Mains OFF/ON). • FLASHES 5x Parameter data not correct. Check parameter data.

8 Technical Data

Dimensions:



Type	SDK-U4-10-AD
Article number	215.0040.00
Mechanical data:	
Case:	Steel sheet with aluminium cooler
Dimensions:	Width: 234 mm Height: 90 mm Depth: 44 mm (from top-hat pr.)
Weight:	850 g
Installation:	On DIN top-hat profile rails 35 mm
Mains power connection:	4 screw terminals max. 2.5 mm ²
Load connection:	1 screw terminal max. 2.5 mm ²
Control connections:	15 pin connectors max. 0.8 mm ²
Ambient conditions:	
Ambient temperature:	ta 0-40 °C max. Do not block airflow at cooler.
Storage temperature:	70 °C max.
Air humidity:	10%...80% relative air humidity, non-condensing
Case temperature:	tc 70 °C max.
IP protection:	IP20

Electrical data: per channel

Mains voltage:	230 V ±10%
Mains frequency:	50 / 60 Hz
Preliminary fuse:	10 A max.
Dimming output technology:	Transistor-driven forward phase control / reverse phase control
Maximum load, dimming output:	570 W / VA (2.5A) resistive / inductive / capacitive
Minimum load, dimming output:	5 W resistive
Leakage power at rated load:	5.7 W at rated load
Leakage power on standby:	1.4 W
Cooling:	Natural air circulation
No-load voltage:	Approx. 55 V _{rms}
Short-circuit protection:	Electronic fast cut-off
Overload protection:	Temperature monitoring. (trigger value approx. 85°C) Not measurable
Symmetry errors:	
Impulse switching flank:	100µs, rated load with inc.-lamp
Operational and fault indicator:	Green "Run" LED per channel
Keys (integrated single-key control):	On / brighter / dimmer. (for test purposes at initial start-up)
Insulation:	2500 V betw. interface / dimmer
Switch-on delay:	approx. 1s (mains switch-on)

Control:	
Operational voltage:	24VDC (10V...35V)
Current consumption:	max. 40mA
Outputs +OUT 1 to 4:	24V, max. 500mA per output
Bus input:	Over-voltage protection up to 30V
Bus protocol:	adaptolux® or DMX
crash input:	24VDC (12V...35V)
CE mark:	as per 89/336/EWG and 73/23/EWG

EN 60669-2-1	Safety requirements
EN 55015	Interference transmission
EN 55014-2 (VDE 0875)	Radio interference
EN 61000-3-2	Harmonics

Would you like more «varintens» information? Visit our web site!
www.se-ag.ch
e-mail: info@se-ag.ch

se Lightmanagement AG
Güterstrasse 11, CH-8957 Spreitenbach,
Switzerland
Tel. +41 56 418 76 11, Fax +41 56 401 49 86