Operating Instructions for Dimmer Reverse Phase Control

PS-AB-05-(LB)
Nr.: 12-07-0136

1 Introduction

The PS-AB-05-(LB) is a digital dimmer with reverse phase control, which on one hand can be driven in various ways, while on the other hand it can also regulate different loads:

- **Driven via potentiometer from the internal voltage source, by an external voltage source or also from a sink current source.**
- **Control of incandescent lamps and high-voltage halogen lamps, as well as lowvoltage halogen lamps with electronic transformer.**

An automatic or manual switch-off function extends the range of application. The AB-05 has a controlled (dimmable) output with an integrated on/off switching function.

1.1 Intended use

The reverse phase control dimmer should only be used for the control of light sources and in internal switchboards.

Caution!

The PS-AB-05-(LB) must not be used to drive low-voltage halogen lamps with magnetic transformer.

Note

The manufacturer (or supplier of the PS-AB-05-(LB)) disclaims all liability for any injury suffered by persons or damage to material owing to use other than for the intended purpose or failure to comply with the data in these operating instructions.

2 Safety regulations

2.1 Responsibilities

The equipment installer bears responsibility for the protection of persons and prevention of damage to material, in addition to the required information for the operator. He is also responsible for compliance with the general working safety regulations in effect and safety regulations for work on electrical medium-voltage installations.

2.2 Residual dangers

Risk of residual danger by contact with live medium-voltage connections (230 VAC). With use of the PS-AB-05-(LB) for the intended purpose, compliance is ensured with all effective standards and regulations for the prevention of injury to persons and damage to material. Residual dangers from live conductors cannot be entirely excluded however. The most important areas with risk of residual danger are shown in the adjoining figure.

2.3 Regulations for the specific unit

DANGER

The standard dimmer PS-AB-05-(LB) must only be installed and used when fully serviceable and in accordance with the operating instructions. The electrical connections (power supply and dimmer output, etc.) must only be connected and disconnected when not under voltage. Working on live connections can cause serious injury from electric shock.
There is no electrical isolation of the LD output when the dimmer is switched off. A separate automatic safety cut-out must be installed in the powerfeed.

3 Installation

The PS-AB-05-(LB) is mounted on a cap-rail by inserting it from above in the rail and then engaging with slight pressure at the bottom on the front.

Mounting position:	arbitrary	Horizontal spacing:	min. 8mm
Minimum vertical rail grid: (without cable duct)	115mm (90+25mm)	Recommended vertical rail grid: (with 40mm cable duct)	160mm

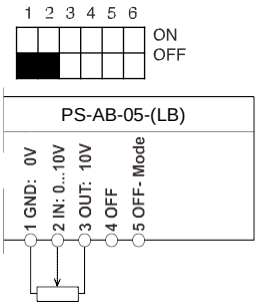
Every individual produces 15W dissipation power on rated load. If several dimmers are fitted in the switch cabinet, it must be ensured that the temperature of the individual control units does not exceed 70°C.

4 Control modes

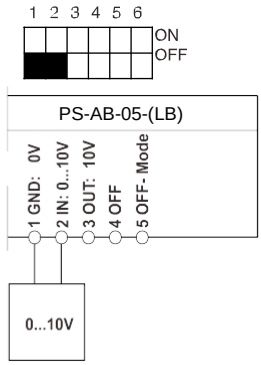
The PS-AB-05-(LB) can be driven via a standard potentiometer, a voltage source or by a sink current source. The following illustrations show the type of connection necessary.

4.1 Auto-OFF mode of operation

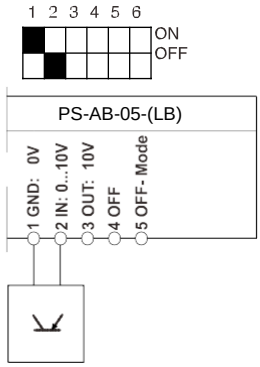
If DIP switch 2 is at the position shown, the **Auto-OFF** function is activated, i.e. with an input voltage < 0.6 V the output is disconnected. This function can be deactivated by changing over switch 2.



Drive with standard pot.



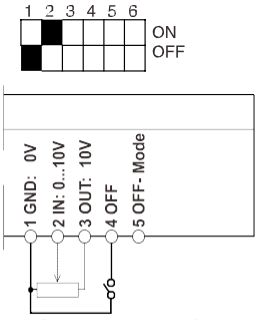
Drive with external voltage source



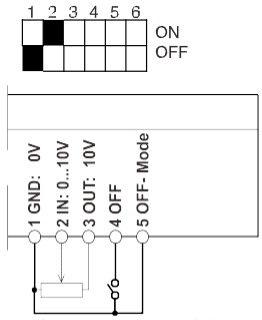
Drive with sink current source (e.g. EIB)

4.2 Switching on and off by N/O contact

The PS-AB-05-(LB) has an overriding ON/OFF function, with which it can be switched off independently of the control voltage applied. The output is switched off when control input 4 (OFF) is connected to GND by a N/O contact. If control input 5 is also connected to GND, the function of the N/O contact is inverted (output is switched on).



Contact open = ON
Contact closed = OFF

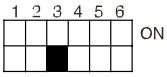


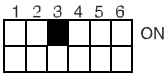
Contact open = OFF
Contact closed = ON

The ON/OFF function described naturally applies to all types of drive (pot., voltage source, sink current source) with DIP switch 2 at ON in each case.

4.3 Dimming Method

- Smooth dimming, smooth filtering of 0~10V input signal for one minute to reduce light flicker caused by 0~10V input jitter.
- Direct dimming, without any processing on the input 0~10V signal, dimming directly according to the amplitude of the input signal.



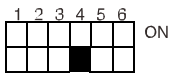


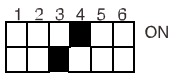
4.4 Slope OFF

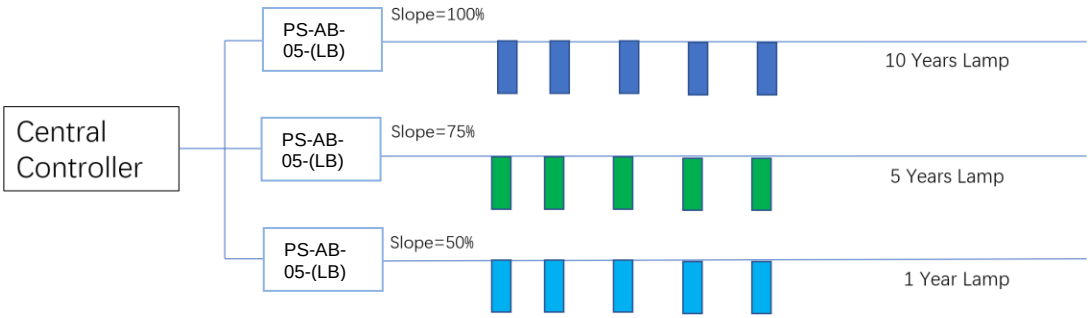
- Slope OFF, dimming according to the input signal of 0~10V.
- Slope ON, according to the input signal of 0~10V, combined with the blue potentiometer to adjust the brightness of the light, namely Brightness=$V_{0\sim10V}$+Slope BluePotentionmeter.

The Slope adjustment range is between 50% and 100%.

Remarks: Slope ON function must be used with Smooth at the same time, namely Smooth (DIP Switch 3 is OFF) dial code is OFF, Slope OFF (DIP Switch 4 is ON) dial code is ON.

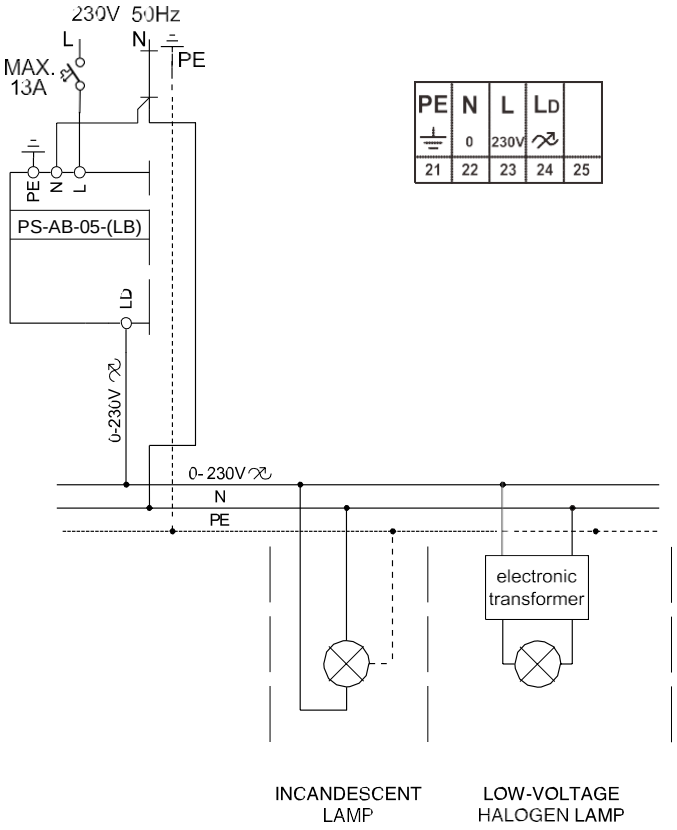






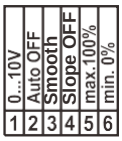
As the service life of the lamp is different, the output of the lamp will have light decay. Through the BluePotentionmeter, the brightness of different PS-AB-05-(LS) lights under the same central controller can be adjusted to ensure that the brightness of the farm is consistent and uniform.

5 Load circuit



6 DIP switch settings

The functions shown on the unit refer to the "OFF" position of the DIP switch.



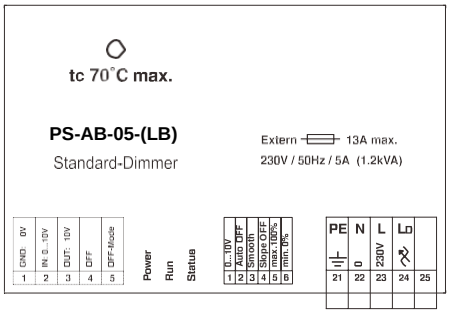
Switch:	Function:	**"OFF"** position:	**"ON"** position:
1	Control mode	Control via control voltage or potentiometer	Control via sink current source
2	Auto-OFF	Dimmer switches off with control voltage < 0.6 V	No on/off switching threshold at 0.6 V
3	Smooth	Perform a one-minute smoothing filter on the 0~10V input signal to reduce the light flicker caused by the 0~10V input jitter.	Without any processing on the input 0~10V signal, dimming directly according to the amplitude of the input signal.
4	Slope OFF	Slope OFF	Slope ON, Brightness=$V_{0\sim10V}$*Slope BluePotentionmeter, Slope Min 50%,Max 100%
5	Max. light value	100%	90%
6	Min. light value	0%	30%

To Switch 1: The various control modes are shown in section 4.
To Switch 2: The use of the Auto-OFF function is shown in section
To Switch 3: 4. TO switch 3 function description see 4.3
To Switch 4: TO switch 3 function description see 4.4
To Switch 5: This switch is used to reduce the maximum output value of the dimmer from 100% to 90%. This value is obtained with a pot. position of 100% or an input voltage of 10V. Reduction of the maximum light value to 90% prolongs the life of lamps.
To Switch 6: This switch is used to increase the minimum output value of the dimmer from 0% to 30%. This value is obtained with a pot. position of 0% or an input voltage of 0V. The desired basic illumination can be ensured by increasing the minimum light value.

Caution!

If the minimum light value is set to 30%, the output voltage can rise to a dangerous value even without input voltage (pot. at zero position). The safety cut-out, mains-side of the dimmer, must be switched off before changing the lamp.

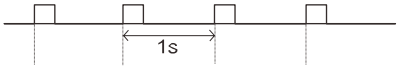
7 LED indication on the unit



The dimmer has three light-emitting diodes:
- Red LED Power supply 230V (Power)
- Yellow LED Dimmer running (Run)
- Green LED Status indication (Status)

The red LED indicates that the supply voltage is present.
When the yellow LED flashes every second, the dimmer is operating correctly.

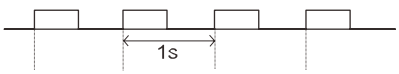
When the dimmer is switched on, the green LED is lit. It is off when the dimmer is off. At the same time the green LED indicates excess temperature inside the AMB-PS-AB-05-(LB). At a temperature of approx. 70°C the over-temperature indication is given (flashing of green LED). The dimmer phase control is automatically reduced to 50%. If the temperature continues to rise, the load is switched off entirely.



Indication of green LED (Status) with excess temperature.

With overload or short-circuit the electronic current limiting is activated. The green LED flashes at second intervals. The dimmer no longer receives any voltage. If the overload or
short-circuit lasts more than 4 s at the dimmer, it switches off and can no longer be switched on.

Following a short-circuit disconnection, the dimmer must be disconnected from the mains in order to remove this switch-on inhibit. This feature prevents voltage being applied to output "LD" following elimination of a short-circuit.



Indication of green LED (Status) on overload or short-circuit.

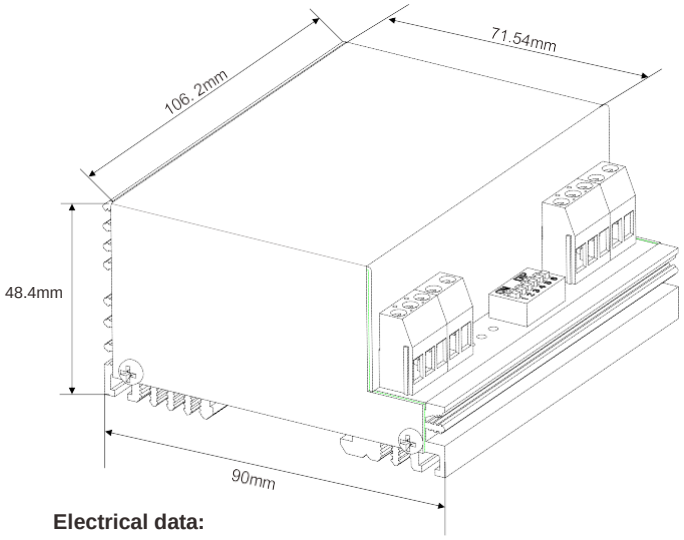
8 Troubleshooting

Fault	Elimination
Lamp remains dark.	• Check mains voltage to PS-AB-05-(LB) (red LED must light) • Check control voltage. • 0V possibly not wired.
Lamps cannot be fully turned off.	• Minimum light value not 0% (DIP switch 6 is ON)
Dimmer cannot be set to 100%.	• Maximum light value not 100% (DIP switch 5 is ON) Dip 4 is on working in slope mode(DIP switch 4 is on)
Lamp flashes at 10-60 s cycles (light is reduced or switches off). Green LED flashes on PS-AB-05-(LB).	• Dimmer overloaded. Reduce load, possibly cool dimmer better.
Lamp cannot be switched on. Green LED flashes regularly on PS-AB-05-(LB).	• Dimmer overloaded or "LD" short-circuited. Eliminate fault and disconnect dimmer briefly from mains to remove switch-on inhibit.
Lamps flicker in the entire control range and can only be brightened to approx. half.	• Change relevant PS-AB-05-(LB) (a transistor has failed, i.e. cannot be controlled)

Lamps flicker in the entire control range and can only be brightened to approx. half.

9 Technical data

Dimension drawing:



Electrical data:

Mains voltage:	230 V ±10%
Mains frequency:	50 Hz (option 60Hz)
Dimmer output technology:	Reverse phase control with transistors
Maximum load dimmer output:	5 A (1.2kW)
Minimum load dimmer output:	10 W incandescent lamps
Dissipation power at rated load:	15 W
Dissipation power at standby:	2 W
Cooling:	Natural circulating air
No load voltage:	<50 Vrms
Short-circuit protection:	Electronic current limiting (Status-LED flashes)
Overload protection:	By reduction of output voltage with over temperature (Status LED flashes)
Switch-on delay:	ca. 400 ms (mains switch-on)
Current reduction time:	80 µs, with lamp rated load
Noise:	40 dB(A), at 1 m distance
Operating and fault indication:	3 LEDs (Power, Run, Status)

Type	**PS-AB-05-(LB)**
Mechanical data:	
Case:	Sheet steel with aluminium cooler
Dimensions:	Width: 106 mm Height: 90 mm Depth: 48.5 mm (from cap section)
Weight:	295 g
Installation:	On DIN cap-section rails 35 mm
Mains connection:	Screw terminals max. 2.5 mm²
Load connection:	Screw terminals max. 2.5 mm²
Control connection:	Screw terminals max. 1.5 mm²
Ambient conditions:	
Ambient temperature:	ta 0-40 °C max. The air flow through the cooler must not be interrupted.
Storing temperature:	70 °C max.
Humidity:	10% - 80% relative humidity, no condensation
Case temperature:	tc 70 °C max
IP-protection class:	IP20
Control:	
Control voltage:	0 - 10 V, 50 µA (<0,6 V = off)
Input resistance:	100 kΩ
Potentiometer:	External, 10 kΩ
Potentiometer conductor:	3-pole without screen Ø 0.5 mm². Conductor length max. 100 m
Conductor characteristic:	U_{eff} - linear
Sink current control:	0 - 10 V, 1.2 mA
Input "OFF":	Switched on/off by connection to GND, 1 mA
Input "OFF-Mode":	Inversion of "OFF" input, 1mA
CE-designation:	according to 89/336/EWG and 73/23/EWG
EN 60669-2-1	Safety requirements
EN 55104	Noise immunity
EN 55014	Radio interference
EN 61000-3-2	Harmonics
EN 61000-3-3	Voltage fluctuations (flicker)