Light dimming
Amplitude controller

Saving energy by controlling the lighting level in tunnels

Light dimming – Amplitude controller

Features

- Variable electronic transformer to control lighting systems
- Stepless control of the lamp voltage's amplitude, i.e. the brightness of:
  - Sodium vapour lamps (high and low pressure), high pressure mercury vapour lamps, fluorescent lamps and metal halide lamps
  - other loads, no matter if pure resistive or with capacitive or inductive components
- Dimmer control by
  - Floating contacts to activate pre-configured nominal values
  - Analogue value (4-20 mA or 0-10 V)
  - MODBUS, Profibus
- Configurable burn-in and latency time
- Configurable rates for voltage increase and descrease
- Stabilised constant output voltage (compensation of mains voltage fluctuations or load induced fluctuations)
- Visible status LEDs
- Basic unit for currents up to 20 A, higher currents possible using intermediate transformer

System setup

- t/DIM-A-20 amplitude controller
- Intermediate transformer for currents higher than 20 A

Operation

The requirements for tunnel lighting are determined by the nature of the human eye. The tunnel lighting must be controlled such that users, both during the day and by night, can approach, pass through and exit the tunnel without changing direction or speed with a degree of safety equal to that on the approach road.

The lighting of a tunnel needs to be designed in a way that the required luminance levels are achieved at full supply voltage even after aging, soiling and the failure of a part of the lamps. As a consequence not implementing a lighting control system leads to lighting levels too high. Energy is wasted.

An intelligent lighting control system uses stationary luminance meters like JES t/LUM to monitor the actual luminance levels in the tunnel. The tunnel lighting is then dimmed by light controllers until the actual luminance levels match the nominal (required) levels.

Especially in the threshold zone but also in the interior zone substantial savings can be achieved by stepless dimming instead of switching lamps on or off in groups.

Advantages

- Optimisation of luminance levels and minimisation of energy consumption at the same time
- Stepless dimming of lamps by controlling the amplitude of the lamp voltage
- Stabilised lamp voltage
- Retrofit to existing lighting systems without changing lamp ballasts or lamps
- Longer lamp life at reduced lamp voltage

Application

Tunnels are important infrastructure elements in road networks and facilitate the connection of regions.

Environmental conditions in tunnels are influenced by fog, particles and emissions and need to be monitored to protect people on their passage through the tunnel from danger and impacts on their health. Accidents in tunnels, and particularly fires, can have dramatic consequences and can prove extremely costly in terms of human life, increased congestion, pollution and repair costs.

At every time people in the tunnel need to be supplied with breathable air and sufficient visibility.

Since 1990 JES Elektrotechnik GmbH develops, installs and maintains systems to monitor air quality and lighting conditions in tunnels. Our systems are robust, durable and resistant against the corrosive atmosphere in a tunnel. They operate reliably and have a high accuracy in measurement.

All systems fulfil the requirements of the EC guideline 2004/54/EC (Minimum safety requirements for tunnels in the trans-European road network) and the more precise national guidelines and provisions:

- Austria: RVS 09.02 Tunnelausrüstung
- Germany: RABT Richtlinien für die Ausstattung und den Betrieb von Straßentunneln
- Switzerland: ASTRA Richtlinien und Fachhandbuch Betriebs- und Sicherheitsausrüstungen (BSA)

Our range of products for tunnel covers systems for monitoring of

- Toxic gases like CO, NO, NO_2 (extractive or in-situ)
- Visibility (extractive or in-situ)
- Air speed, direction and temperature
- Luminance (access, threshold and interior zone)
- Illuminance

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Technical Specifications

Amplitude controller	
Type	t/DIM-A-20
Operating voltage	230 VAC ± 10 % , 47 .. 63 Hz
Nominal power	4.6 kVA
Output voltage	185 .. 230 VAC controlled
Output resolution	approx. 250 mV
Load	any, 0.3 ≤ cos φ ≤ 1
Temperature range	0 .. 50 °C

Type	max. output current	Nominal power
t/DIM-A-20	20 A	4,6 kVA
t/DIM-A-32	32 A	7,3 kVA
t/DIM-A-40	40 A	9,2 kVA
t/DIM-A-50	50 A	11,5 kVA
t/DIM-A-63	63 A	14,5 kVA

Mechanical data	
Housing material	Galvalume®
Protection class	IP 20
Dimensions	232 x 130 x 385 mm (without intermediate transformer)
Weight	9.9 kg (without intermediate transformer)

Conformities	
Electrical standards	2006/95/EC Low Voltage Directive (LVD) 2004/108/EC Electromagnetic compatibility(EMC) EN61000-6-3:2007 EN61000-6-2:2005

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