

BASIC TUNNEL SOLUTION (BTS)

Tunnel lighting system's selector Operating according to outside luminance

General

The level of luminance in a tunnel's entrance zone and transition zones depends on the level of luminance in the access zone, L_{20} (average luminance contained in a conical field of view, subtending an angle of 20 degrees with the apex at the approaching driver's eye and aimed at the centre of the entrance portal).

The L_{20} varies throughout the day, from morning until night, and depends on the following factors:

- Geographical location and orientation of the tunnel;
- Tunnel environment (sky, road, surroundings);
- Weather conditions (sun, rain, snow).



Proper adjustment of tunnel lighting essentially depends on the correct measurement of the L_{20} luminance at the vehicle stopping distance, which itself depends on the speed limit of the road. The BTS makes it possible to measure L_{20} continuously and to control the various lighting stages according to the variations in L_{20} .

The change in lighting stages takes place when L_{20} reaches a threshold value, which has been predetermined according to the local conditions and the ratio between the outside luminance and the desired inside luminance. In order to avoid harmful traffic effects, it is recommended that the L_{20} luminance meter be installed at 4.5m height at the stopping distance ahead the entrance portal in the direction to the tunnel.

The system composes essentially of:

- A measuring device;
- A control and adjustment device to allow only for the engaging and switching-off of different lighting stages;
- Electrical connections between these two elements.

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THE MEASURING DEVICE

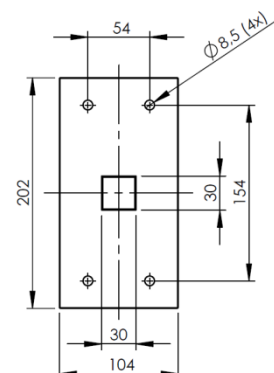
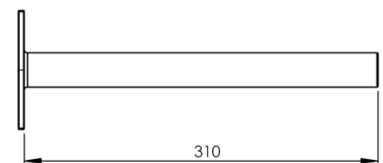
- The measuring device comes in an IP65 aluminium housing, equipped with silicon photodiode carefully filtered to give a spectral response close to that of the human eye, is designed to measure the L_{20} continuously as per the CIE recommendations.
- The device has an output of 4-20 mA DC (for a luminance range to be specified with order), is suitable for computerized system and makes it possible for the output signal to be transmitted over great distances. (Maximum external resistance is 800 ohm.)
- An external overvoltage protection unit is supplied together with the measuring device to offer extra protection against unpredictable induced surges which may damage the electronics in the measuring device.



Technical Data

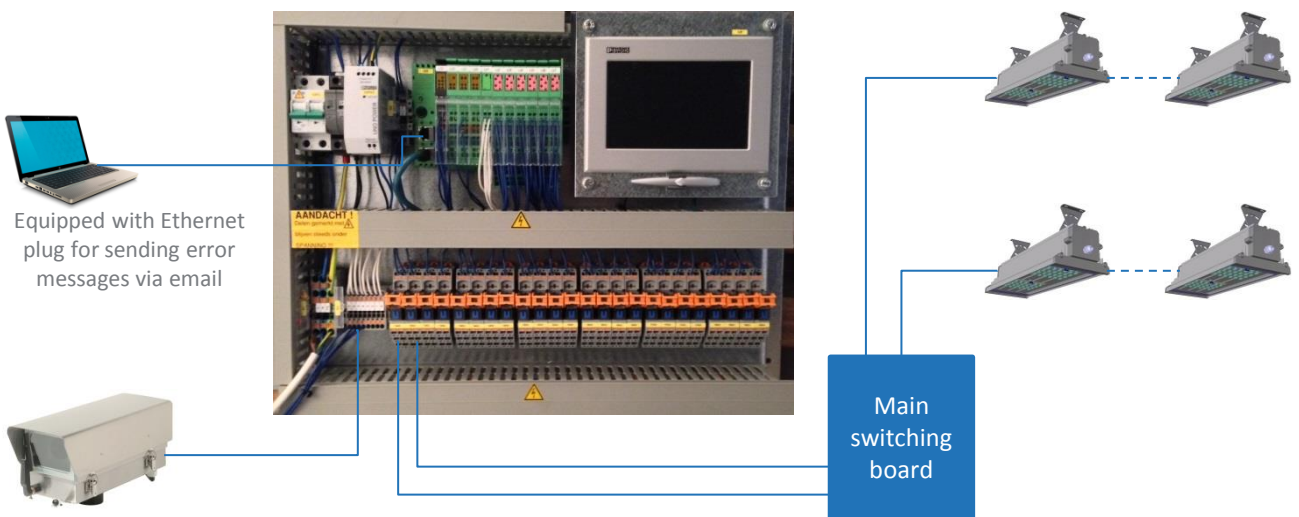
Detector	Silicon photodiode, $V(\lambda)$ corrected
Measuring angle	20°
Measuring range	0 – 8,000 cd/m ² (or specified with order)
Accuracy	± 3%
Output signal	4 – 20 mA DC
Max. external resistance	800 ohm
Temperature range	-30°C to +70°C
Tightness level	IP 65
Power supply	220 – 240 V AC
Heater	6 W (PTC heating)
Dimensions	460 mm x 155 mm x 170 (220) mm
Weight	6.0 kg
Mounting	Wall bracket

Mounting



THE CONTROL DEVICE

- The control device comes in an IP65, single door steel enclosure. The door is designed to be hinged either left or right with 130° opening.
- The control device consists of a robust industrial PLC with a specially designed program for regulating tunnel lighting. The system receives 4-20mA signal from a maximum of 4 measuring devices and is able to activate up to 24 nos. of output relay switches. The relay switches can then be connected to the contactors of the tunnel main switching board which regulate the lighting inside the tunnel.
- The system comes with a 7" touch panel makes it possible to visualize the various parameters (e.g. real-time luminance measured, preset switching levels and time delay) and allows changes to be done easily.
- Overvoltage protection units are provided for the single-phase incoming power supply and also for each L_{20} input to offer extra protection against unpredictable induced surges.



Technical Data

Power supply	220 – 240 V AC
Analog input	max. 4 input ; 4-20mA
Output relay switches	max. 24 output (specified with order)
Overvoltage protection	20kA (for power supply) ; 10kA (for analog input)
Touch panel	7" widescreen display ; 800 x 480 pixels
Temperature range	0°C to +50°C
Enclosure tightness level	IP 65
Dimensions	600 mm x 600 mm x 250 mm
Mounting	Wall mounted



SAFETY



WELL-BEING



SUSTAINABILITY



SAVINGS



SOLUTIONS



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