Name of Work : Construction, Operation and Maintenance of 2-Lane Bi-Directional Silkyara Bend – Barkot Tunnel With Escape Passage Including Approaches On Dharasu-Yamunotri Section Between Ch. 25.400 Km And Ch. 51.000 Km Falling Along NH-134 (OLD NH-94)in the State Of Uttarakhand on EPC mode"

Detailed Project Report - Preliminary Tunnel Design : Technical

Specifications - Fixed Operating Equipment :

Product Information Sheet

SELF-ILLUMINATING LIGHT MODULES (GUIDANCE SYSTEM)

Illustration

Basic Information

The LED modules are installed on the kerbstone on both sides of the road. They are usually placed in a spacing of 15 m (49.2 feet) in the tunnel entrance area and 25 m (82 feet) throughout the rest of the tunnel. The housings of the modules are made of a flame-retardant plastic material. Power is transmitted either through a cable connection or through induction. Via an interface the control units can be connected to the tunnel control centre. The control unit regulates the LEDs' brightness, and enables flashing mode and other functions.

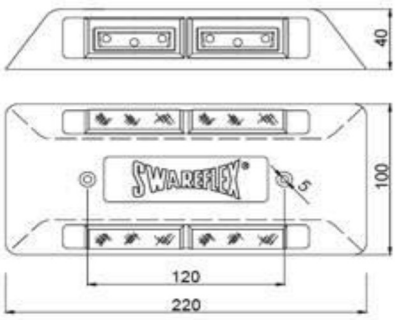
Technological Description

The optical lane indication has been developed to mark the roadside. It consists of one or more control units (depending on the length of the tunnel and the location of the power supply), which operates light-emitting modules connected with each other via cable. These modules are best mounted on to or as near as possible to the kerbstone. The brightness of the modules is adjustable via the control unit. The change-over from daylight to night intensity (and vice versa) can be carried out by an extern signal or by a brightness sensor. The power supply can result from the existing main supply or from an extern solar station.

Technical Data

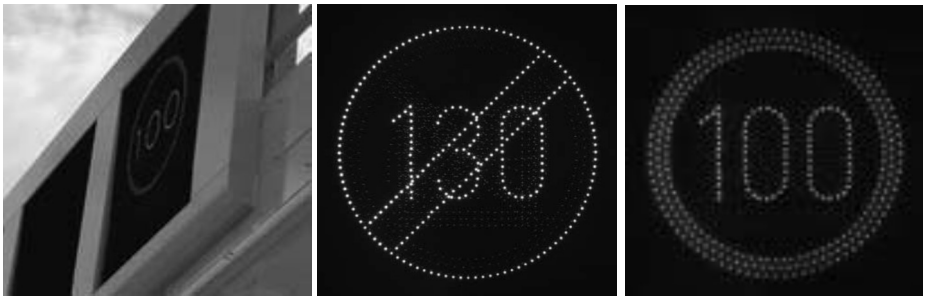
Power consumption: white: 0.6 VA (25 mA) red, yellow: 0.3 VA (12 mA)
Housing material: plastic, low inflammability
Dimensions: 220 x 100 x 40 mm
Colour of LED's: white, red, yellow (green, blue - special designs)
Average luminous intensity: white: 22 cd / red: 25 cd / yellow: 24 cd
Durability of LED's: 100,000 h
Aperture angle of LED's: +/- 10°
Admissible operation voltage: 24 V DC
Protection of LED's: flexible screening grid
Protection class: IP 68 (electronic sealed)
Connection technology: T-connection or serial connection
Pressure resistance: 10 tons
Fastening: screws and dowels or 2-component adhesive

Basic Dimensional Sketch



VARIABLE MASSAGE SIGNS (VMS)

Illustration



Basic Information

Clear signalisation with up to 30 different signals in one variable massage sign. Limited LED VMS are the backbone of numerous highway traffic management systems. With "limited VMS" a predefined (limited) number of aspects can be displayed. The amount of messages or graphical aspects of the signal depends on various parameters like size, pixel pitch, design of the aspect, etc. The different signals are combinable with flashers and alphanumerical text sections. Beside highway guidance systems, limited VMS are also used for advanced warning at black spots or schools, for speed reduction at town entrances, as mobile signalisation devices for fire brigades or abnormal load escorts, as lane signalisation and for road/travel information.

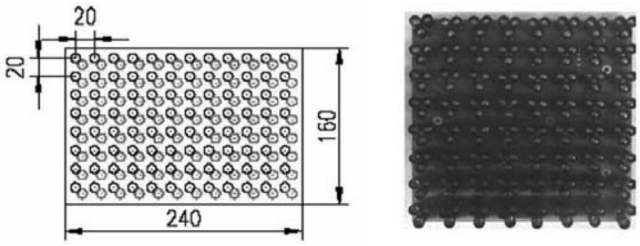
Technological Description

The tailor-made design allows to follow all kinds of special market requests, for large quantities used of PCB, unlimited flexibility design of graphical or text messages, short delivery time and low price even for small quantities, all LEDs are permanently supervised, even if switched off; the status can be reported to the traffic center or local control, universal power supply, all diodes and logical parts using the same supply, longevity – long LED life cycle results in extended maintenance intervals, optimised stability with proven mechanical design, traceability – most important data available via module's barcode, optically appealing and modern appearance, adaptable to ambient light conditions, USB connection with PC possible, integrated temperature sensor.

Technical Data

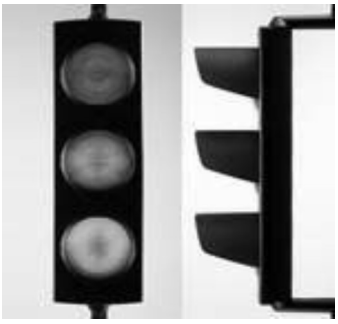
Light source: High Power LEDs
Housing: Aluminium profile, AlMg3 or stainless steel (V4A, 1.4571)
Protection class: P1, P2, P3, drainage and ventilation holes IP54
Temperature classes: T1 (-15 - +60°C) / T2 (-25 - +55°C) / T3 (-40 - +40°C)
Humidity range: 20 – 95% rel. humidity
Controller: Several solutions depending on application; SF2100 + SF4007C, LED-Chain-Driver
Interfaces: RS485/RS422 interfaces, interface for Profibus, Profinet, Ethernet IP, WLAN and future interfaces
UDP/IP connection digital inputs digital and analogue sensors
Mounting options: C-rails, pipe clamps, other constructions on request protocols
Optics: The optical equipment fits tightly into the matrix. Contrast ratio up to 100, even at low sun position <5°
Pixel pitch: Tailor-made design according to application Light
Matrix: Anodised aluminium with special coating – avoiding the front screen is our standard
Power supply: 80-230 VAC, 12 - 48 VDC, others on request
Maintenance access: Easy maintenance access doors on the rear side of the VMS or also front side of sizes up to 2x1.5m are possible
Certification: EN12966 CE

Basic Dimensional Sketch



TRAFFIC LIGHTS

Illustration



Basic Information

The slim and elegant design will change the look of urban landscapes around the globe. At the same time it offers a new level of efficiency and environmental respect. Choosing modern traffic lights makes you contribute to the reduction of CO2 emissions from product manufacture and energy production. Modern traffic lights are developed under eco-design principles and set a new level in 21st century traffic signalling.

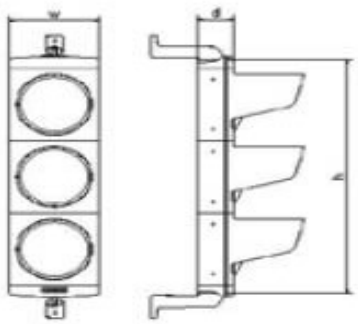
Technological Description

The optic ensures highest energy efficiency, optically appealing and modern appearance, slim design perfectly fits into historical urban areas, available in ø 100 / 210 / 300 mm, optimized strength and stability, cannot be opened by unauthorized persons, available in different colours and colour combinations, can be mounted vertically as well as horizontally, available with integrated frame to fix backing boards, LED optic ensures highest energy efficiency.

Technical Data

Material: UV-stabilized polycarbonate
Diameters: 100, 210, 300 mm 1, 2, 3 as standard; more aspects on request
Optic: 100 / 210 / 300 mm
Mounting: Two point fixing
Backing Boards: fixation via basic frame or ALU/PC Composite
Housing colours: black (RAL 9005),light grey (RAL 7032),fir green (RAL 6009),orange (RAL 2000)
Impact resistance: acc. to EN60598-1; class IR 3 acc. to EN12368
Change of temperature: EN60068-2-14 passed

Basic Dimensional Sketch



CCTV CAMERA

Illustration

Basic Information

This system is a dynamic camera unit with universal qualities, ranging from traffic and tunnel surveillance under extreme outdoor conditions up to stadium recordings in studio quality. High-quality video technology is used for this broad application spectrum and must be protected accordingly. The protective camera housing always consists of double walls. In order to maintain an optimum temperature range, additional options like controlled heating, a sun roof and further accessories are available for this system.

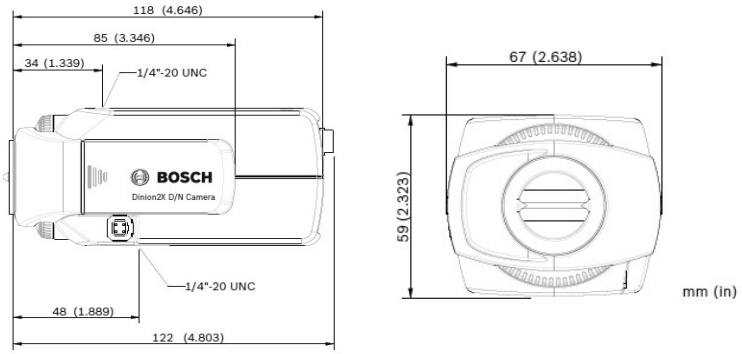
Technological Description

The camera automatically detects the lens type. The lens wizard ensures accurate back-focusing for perfectly sharp pictures at all times. For especially challenging situations where fine tuning or special settings are required, the camera parameters can be individually set using the control buttons on the side of the camera and an On-screen Display.The day/night mode provides enhanced night viewing by increasing the IR sensitivity. The reliability of the system even in extreme temperatures from -30° to +60° Celsius and in adverse weather conditions like snow, rain and hail.

Technical Data

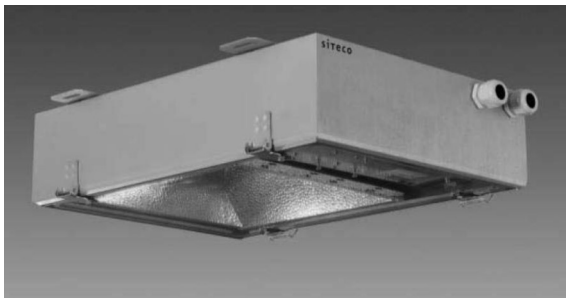
Certification: CE,UL,FCC,CSA
Power Consumption: 350 mA (12 VDC), 250 mA (24 VAC), 70 mA (120-240 VAC) CCD
Type:1/2-inch interline
Pixel Mode: PAL Model, NTSC Model
Signal-to-Noise Ratio: >50 dB
Video Output:Composite video 1 Vpp, 75 ohm
Day/Night Mode: Color, Mono, Auto
Modes: 6 preset programmable modes
Dimensions camera (H x W x L): 58 x 66 x122 mm without lens
Dimensions housing (L x D x H): 275 x 257 x 379 mm
Weight: approx. 6,5 kg
Mounting: upright or inverted
Temperature range extended: -30 up to +60 °C

Basic Dimensional Sketch



TUNNEL LUMINAIRE
(symmetric distribution)

Illustration



Basic Information

A series of tunnel luminaires with different functional elements for all kinds of lighting inside and outside tunnels. The tunnel lighting has a major effect on traffic safety, the smooth flow of traffic and the efficiency of the energy input. The high concentration of exhaust gases combined with gritting salt produces a highly corrosive atmosphere in the tunnel, yet the lighting must continue to operate reliably for many, many years. Modern tunnel luminaires are meeting all these requirements in terms of lighting technology and cost-efficiency.

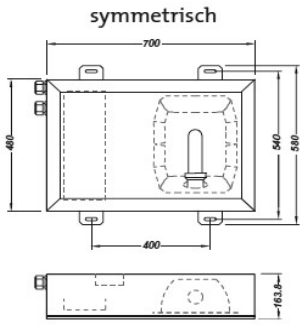
Technological Description

Tunnel luminaire with a housing of stainless steel. Surface pretreated and powder-coated with a minimum film thickness of 80 µm. The external catches and fixing elements are similarly made of stainless steel to prevent contact corrosion. Gear tray can be opened without tools for easy servicing. Precision reflector with high lighting efficiency, of high-gloss anodized ultra-pure aluminium, symmetrical and asymmetrical distribution of the light for all forms of entrance and interior illumination, 8 mm thick safety glass resistant to temperature fluctuations.

Technical Data

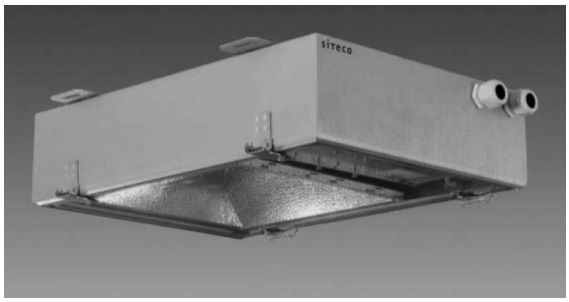
Cover: cover panel, transparent
Symmetry: symmetric distribution
Light emission: direct distribution
Lamps: 1x HST 150W (E40)
Supplement: with 6.3A T fuse
Material Colourluminaire housing: stainless steel 1.4571, etched and passivated
Electrical connection: terminal, 5-pole, max. 10mm²
Nominal voltage: 230 V, AC, 50Hz
Dimensions: 680x460x168 mm
Approval Protection rating: IP66
Certification: CE, ENEC in preparation

Basic Dimensional Sketch



TUNNEL LUMINAIRE (asymmetric distribution)

Illustration



Basic Information

A series of tunnel luminaires with different functional elements for all kinds of lighting inside and outside tunnels. The tunnel lighting has a major effect on traffic safety, the smooth flow of traffic and the efficiency of the energy input. The high concentration of exhaust gases combined with gritting salt produces a highly corrosive atmosphere in the tunnel, yet the lighting must continue to operate reliably for many, many years. Modern tunnel luminaires are meeting all these requirements in terms of lighting technology and cost-efficiency.

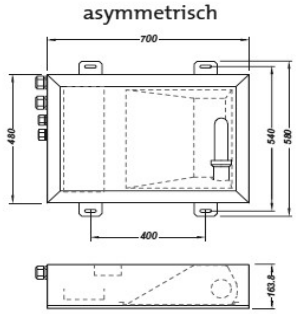
Technological Description

Tunnel luminaire with a housing of stainless steel. Surface pretreated and powder-coated with a minimum film thickness of 80 µm. The external catches and fixing elements are similarly made of stainless steel to prevent contact corrosion. Gear tray can be opened without tools for easy servicing. Precision reflector with high lighting efficiency, of high-gloss anodized ultra-pure aluminium, symmetrical and asymmetrical distribution of the light for all forms of entrance and interior illumination, 8 mm thick safety glass resistant to temperature fluctuations.

Technical Data

Cover: cover panel, transparent
Symmetry: symmetric distribution
Light emission: direct distribution
Lamps: 1x HST 150W (E40) and 1x HST 400W (E40)
Supplement: with 6.3A T fuse
Material Colourluminaire housing: stainless steel 1.4571, etched and passivated
Electrical connection: terminal, 5-pole, max. 10mm²
Nominal voltage: 230 V, AC, 50Hz
Dimensions: 680x460x170 mm
Approval Protection rating: IP66
Certification: CE, ENEC in preparation

Basic Dimensional Sketch



ROAD LIGHTING
(pole luminaires)

Illustration

Basic Information

This Streetlight is the standard for an LED outdoor luminaire designed completely according to efficiency and lighting effect. Purist, functional design comes together with high power LEDs and outstanding photometrics. The concept of replaceable optical modules is also highly future-fit. These can be simply upgraded and thus ensure a sustainable and future-oriented use of the high quality luminaire housing. The microprocessor-controlled LED operating electronics enable even more efficiency potential.

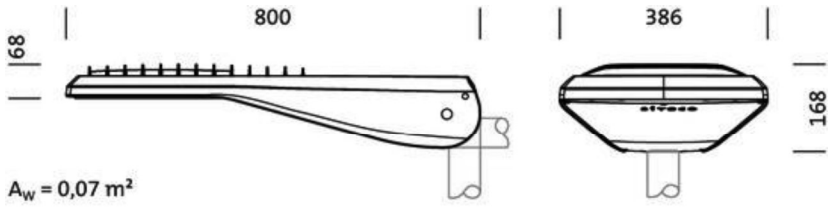
Technological Description

Mast luminaire, primary light control with pedestrian crossing optic, of plastic, aluminium vaporised, primary optical cover: cover, of PMMA, transparent, direct distribution, asymmetric light characteristic, left, side entry installation type, posttop, for 2xLED module, ECG Basic control gear, overheat protection, electronic power reduction,interchangeability of ECG and LED module,long system lifetime (50,000hrs).

Technical Data

Lamps: LED modul 159W
Light colour: neutral white
Control: power reduction, overheat protection
Electronic power reduction, 50%
Mains connection: 220..240V, AC, 50/60Hz
Connection: terminal, 5-pole, max. 2.5mm²
Dimensions: 800x387x168mm
Certification: CE,ENEC
Protection rating: IP66

Basic Dimensional Sketch



EMERGENCY CALL UNIT (TUNNEL UNIT)

Illustration

Basic Information

An emergency call unit is a telecommunication device that allows people to call for assistance in the tunnel area. Incoming calls are received at the Operation and Maintenance Centre. Emergency calls are routed to the appropriate rescue coordination centre. Breakdown messages are relayed to the desired breakdown service. Emergency call units are situated every 125 m on one side of the tunnel and every 375 m on the other side. Emergency call units also contain fire extinguishers, which can be operated by the car drivers to fight small fires. The ECUs also contain fire alarm push buttons and emergency push buttons to submit alarm messages.

Technological Description

Modern emergency call units are using Ethernet (Voice over IP) to communicate with the operation and maintenance centre. In these devices, a location identifier is also transmitted. The signaling and voice transmission is handled with the VoIP standard protocols, SIP / SDP (Session Initiation Protocol) and RTP (Realtime Transport Protocol). The driver initiates a call by lifting the reciever. Until the operator in the OMC answers the call, a message to wait and keep calm is being presented to the driver. Once the call is established, the driver and the operator can speak to each other. The call can be ended by the operator or the driver, who has to put down the reciever.

Technical Data

Emergency call units are assembled in modular design especially after customer specifications.
They can be fitted into various niches sizes, remaining openings can be covered with apertures.
This creates a uniform appearance. ECUs have to withstand various loads like pressure, temperature, corrosion, moisture and exhaust.

Material: stainless steel (V4A)
Protection: up to IP 65
Double walling for thermic and acoustic insulation

Emergency call compartment with telephone
Switch to signal "Door opened" to the operation and maintenance centre
Two fire extinguishers
Switch to signal "fire extinguisher removed" to the operation and maintenance centre
Fire alarm push button
Emergency push button
Illumination in compartment
RAL-coating at customer´s option

EMERGENCY CALL COLUMN (OPEN ROAD UNIT)

Illustration

Basic Information

An emergency call column is a telecommunication device that allows people to call for assistance in deserted or high-risk areas. Incoming calls are received at the Operation and Maintenance Centre. Emergency calls are routed to the appropriate rescue coordination centre. Breakdown messages are relayed to the desired breakdown service. Emergency call columns are usually situated in pairs on both sides of the highway, so nobody is tempted to cross the lanes. Emergency call columns are also located in breakdown bays. Especially at peak travel times, in case of overload of the phone networks, in times of heavy frost an in case of major incidents, the emergency call columns are used more and more lively.

Technological Description

Modern emergency call columns are using Ethernet (Voice over IP) to communicate with the operation and maintenance centre. In these devices, a location identifier is also transmitted. The signaling and voice transmission is handled with the VoIP standard protocols, SIP / SDP (Session Initiation Protocol) and RTP (Realtime Transport Protocol), which also control special functions like warning lights, etc. The driver initiates a call by pushing the button on the ECC. Until the operator in the OMC answers the call, a message to wait and keep calm is being presented to the driver. Once the call is established, the driver and the operator can speak to each other. The call is ended by the operator, who has to quit the call.

Technical Data

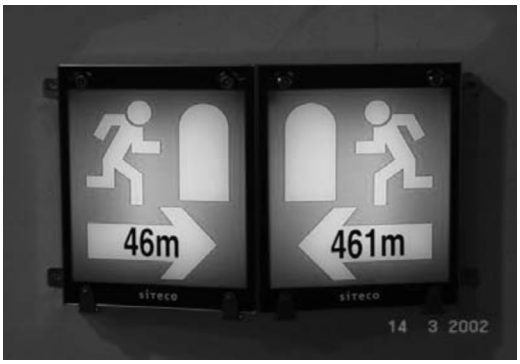
Body:
Dimensions: 200 x 200 x 1600 mm
Material: stainless steel (V4A)
Thickness: 2 mm
Colour: RAL 2000
Protection: IP 43
Opening for speaking panel: app. 380 x 160 mm
Opening for maintenance panel: app. 480 x 160 mm
Warning light on front and back side

Speaking panel:
Dimensions: app. 400 x 180 mm
Material: stainless steel (V4A)
Thickness: 1,5 mm
Colour: RAL 2000
Including speaker, microphone, button

Stickers "SOS" and location identifier, socket inside the body for maintenance, bottom plate for mounting

EVACUATION ROUTE LAMPS

Illustration



Basic Information

Evacuation route lamps show people in the tunnel in the case of an emergency the safe way to escape from the tunnel. Therefore, they show the distances to the next cross passages in the left and right direction in metres. People can be led to the right escape direction by switching off one half of the lamp, illuminating only the safe way to leave the tunnel.

Technological Description

Evacuation route lamps are installed on the tunnel wall on the side of the emergency call niches, in a height of about 1.0 m above the sidewalk. They are situated in distances of about 50 m to each other. Evacuation route lamps have to be powered by UPS (uninterruptable power supply). They have to be made of stainless steel to withstand the conditions in the tunnel, like corrosion, exhaust and moisture. For maintenance the bulbs must be easy to exchange.

Technical Data

Body: stainless steel (V4A)
Dimensions: app. 750 x 500 x 150 mm
Two bulbs 24W
Electronic ballast
Protection: IP 65
Safety glass, thickness 8 mm
Film on the inside of the glass (green film, white symbols, black text)
Four montage brackets of stainless steel

Basic Dimensional Sketch