

LUCEBIT



COSAL®

Control System for Airfield Lighting System Description

- Power supply ➤ Switching ➤ Controlling
- Regulating ➤ Monitoring ➤ Visualizing ➤ Logging



Airport Stuttgart



COSAL has been developed specifically for use at airports of any size and category. A maximum of integrated dependability assures operation under all visibility and weather conditions.

COSAL is modularized in structure. It supplies and controls the individual systems, regulates lamp brightness levels, monitors each light for failure, and provides comprehensive taxiway guidance.



COSAL – power supply, regulation

- ✦ **Constant-current regulator** ✦ **Supply transformer**
- ✦ **System cubicle** ✦ **Compact controller**

For clear recognition of the visual aids under all visibility conditions, it has to be possible to adjust the brightness of the lights to suit the ongoing environmental conditions. Uniformly over the entire airport, despite the miles of cabling involved. For this reason, the individual lighting systems are supplied with constant current through series circuits, each of which is fed by its own supply transformer.

Constant-current regulator

- ✦ **Supply** ✦ **Constant current** ✦ **Intensity levels**
- ✦ **Soft start** ✦ **Shutdown on fault** ✦ **Lamp failure detection** ✦ **Remote operation** ✦ **SCROLL interface**

The microprocessor-controlled CCRE constant-current regulator serves to ensure dependable power supply to the series circuits of the lighting systems.

The brightness can be adjusted in 8 user-selectable steps between 0% and 100%.

In order to extend the useful lifetimes of the lamps, a soft-start feature regulates the series circuit current to the setpoint value at power-up.

Disturbances caused by network fluctuations, for example, or a lamp failure, are quickly and dependably corrected. If the preset series circuit current is exceeded due to a short-circuit or an open circuit at the current sensor, or if the lower limit has been violated due to an open series current circuit, the system will be shut down immediately. The lamp failure detection feature is a constituent part of the constant-current regulator's software. Any lamp failure



Container solution for difficult operating conditions

is detected and displayed in numerical or percentage form. Important operating data like series circuit designation, actual value of the current, lamp failure and insulation resistance are shown using a four-line LC display at the front of the regulator's drawer. A membrane keyboard is used for parameterizing the operating values.

All operator control functions, operational and error messages, can be made accessible to an operations monitoring system via a field bus interface.

Small systems can be linked up via a parallel interface. In its construction and functionality, the regulator conforms to the present VDE specifications, the IEC 61822 standard, and the requirements laid down by ICAO, FAA, STANAG and HB BA.

It can be expanded using options like the SCROLL module for individual lamp control and taxiway guidance, and modified to suit the particular job profile involved. The constant-current regulator is constructed as a 19" drawer, and can be supplied as a single or double unit.

Compact controller

- ⚡ Minimized dimensions
- ⚡ No ventilation
- ⚡ Integrated ISO measurement
- ⚡ Integrated circuit selector switch
- ⚡ Ten power ratings



Compact controller

The compact controller offers an affordable alternative for airport lighting systems featuring only a few series circuits.

Both control and power assemblies are accommodated in a compactly dimensioned housing that requires no additional cooling or ventilation.

The electronic components of this compact controller are constructionally identical to those of the 19" units. Insulation monitoring can be directly integrated into the constant-current regulator.

There is an option for integrating circuit selector switches into the cubicle's housing, enabling up to five subcircuits to be selectively supplied.

Selectable expansion options enable the compact controller to be adapted to suit all conceivable requirements of the airfield concerned.

Thanks to its compact dimensions and to its being delivered with already-defined parameters, the compact controller can be connected up and commissioned directly on site by the customer. The compact controller is available in ratings from 1 kVA to 30 kVA, and conforms to the specifications laid down by the FAA, the ICAO and the IEC 61822 standard.

Transformer module

- ⚡ Power supply
- ⚡ Modularized construction
- ⚡ Customized power ratings

The supply transformers, in conjunction with the constant-current regulator, provides the requisite power for a series circuit.

In addition to the nine power ratings between 1 kVA and 30 kVA specified in the IEC 61822 standard, other customized transformers sizes are available. The gradations in the power units have been selected so as to ensure that by virtue of choosing the appropriate winding taps the transformer can be optimally matched to the series circuit power desired. The transformer modules are mounted in 19" module frames.

System cubicle

- ⚡ CCR cubicle
- ⚡ Transformer cubicle
- ⚡ Dual-purpose cubicle

All components of the power supply systems are constructed in 19" design. For operation, they are accommodated in separate, standardized system cubicles, the CCR and the transformer cubicles.

The controller cubicle accommodates the following electronic modules: constant-current regulator, insulation measuring unit and the lamp failure measuring unit. The transformer cubicle serves to accommodate the trans-

former modules. The two cubicle types can be combined with each other at will, so that customized solutions are possible for all expansion stages required. At LUCEBIT, by the way, all components are accessible from the front of the cubicle: this enhances service-friendliness, permits retrofit jobs without any unnecessary work, and enables the cubicle to be space-savily wall-mounted.

For the lighting system of a small airfield, or a heliport, sometimes only a few components are required. For these cases, a dual-purpose cubicle can be supplied as an alternative to the other two cubicle types. This cubicle can appropriately accommodate both the electronic assemblies and the transformer modules.

All system cubicles are also available in earthquake-proof design.



Constant Current Regulator Cabinet



COSAL – switching, controlling, monitoring, visualizing, logging

AGL-ACMS

Airfield Ground Lighting – Advanced Control and Monitoring System

The stipulations for safety, dependability and speed when operating airport lighting systems entail stringent requirements for the operator control, display and diagnostic systems. Here, too, thanks to its modularized construction and its versatility, the COSAL AGL-ACMS guarantees the optimum solution for all applications, from a heliport to a major international airport. Special products responsively developed for the needs of air traffic operations not only create effective solutions, but also permit retrofit and expansion jobs without any changes to the existing systems. COSAL grows smoothly to keep pace with the airport concerned.

The ACMS is usually installed in system sections that can be distributed over the entire airfield: in the tower, in AGL substations, in workshops, in offices, etc. Data from third-party systems (e.g. Meteo), can be acquired and displayed. The ACMS links these subsystems by means of a high-speed transmission capability, which if at all possible should feature glass-fiber cables, which ensure the best protection against external influencing factors.

The operators' workplaces can be customized to suit the particular circumstances on site. So for small airfields or heliports, simple control panels can be installed, and touch-screen solutions for international airports. These then provide not only display, operator control and diagnostic functions for the lighting system, but if so desired also displays of weather and other important data. There is even an option for displaying and operating the airfield's infrastructural systems (e.g. wastewater disposal or power distribution networks) using the ACMS.

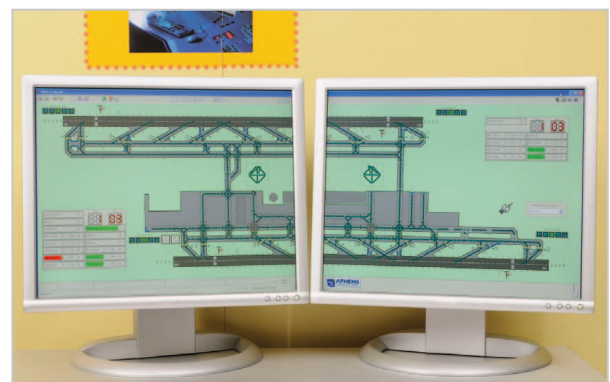
Different operator control structures, each matched to the system's complexity and based on Windows operating software, result in high acceptance levels among the operating or maintenance staff. Intuitive operator control and options for clients to make their own modifications with convenient ease: these are some of the superlative capabilities provided by the LUCEBIT ACMS.

UCS

Universal Control Server

The UCS 1000 Universal Control Server, developed specifically for airport lighting systems, is an integrated industrial PC. It can be used both as a control computer on small and medium-sized airfields, and as an interface for controlling components of the lighting system.

The UCS features a CAN bus and two RS232 interfaces. Lighting components that do not possess a field bus can be controlled directly via local inputs and outputs. Three Ethernet connections enable the UCS to be connected redundantly to the higher-order instrumentation and control system, providing a function as router for subordinate systems. Four USB 2.0 connections are incorporated for integrating a touch-system, a keyboard, a mouse and other special devices as well. In addition, the UCS features connections for monitors with a VGA or DVI-I interface. With a hard disk or a standard 2-GB compact flash memory card, and with the Windows operating system, it serves as an industrial PC for touch-screens and/or other applications of the man-machine interface.



Operator workstations

SCROLL®

Individual lamp control

SCROLL switches and monitors individual lights, light groups or sensors directly via the series circuit without any additional communication cabling. SCROLL consists of a central unit (CU), which is an optional constituent of the constant-current regulator (CCRE) and the remote control units (SRUs), which are installed between the series circuit transformer and the light. All control commands are transmitted to the SRUs, and their checkback messages acquired, via the central unit. Communication between the regulator and the CU prevents overvoltages in the circuit that would occur when sizable groups of lights are switched off simultaneously.

To enable the multifarious requirements of a lighting system to be met, there are 4 different types of SRU, all of which excel in terms of very low power dissipation levels. Parameter, monitoring and control addresses can also be assigned via the series circuit. Manual adjustments or protracted commissioning routines are not necessary. Settings are adjusted automatically at each power-up.

There is an option for providing SRUs with a flashing mode, rendering them suitable for controlling runway guard lights, for example. It is even possible to synchronize the flashing modes of all SRUs in the series circuit.

Defective lamps are detected in cyclical mode, whose time can be set between 5 s and several minutes.

CAS

Lamp failure measuring unit

The CAS system is a scalable measuring system for acquiring, displaying and forwarding lamp failure figures in the series circuits of airport lighting systems. CAS also enables a circuit current's actual value to be measured. Installed in a 19" drawer, the system is able to accommodate a maximum of eight measuring modules, each of which can in its turn monitor eight series circuits.

CAS is controlled and parameterized by hand by means of a user-friendly communication function featuring a membrane keyboard at the front in conjunction with an LC display. The measured values are made available to the higher-order instrumentation and control system via a field bus, which can also be provided in redundant form. In addition, there is an option for serial protocols like RCOM and Modbus in non-redundant function via the system's own RS 485 interface.

IME

Insulation Measurement Equipment

The IME system serves to measure, display and transmit insulation resistance values from series circuits in the airport lighting systems. Installed in a 19" drawer, the system can cyclically monitor up to 64 series circuits one after the other. The LC display at the front, plus a membrane keyboard, ensure user-friendly communication for manual control and parameterization of the system.

The measured values acquired are made available to the higher-order instrumentation and control system via the field bus. This link can also be provided in redundant design. The insulation value measured in each case will appear in the IME's display. When constant-current regulators of the COSAL family are being used, the insulation value measured can also be shown additionally in the display of the regulator concerned – significantly simplifying any trouble-shooting involved.

LMS

Loop Measurement System

Besides the lighting, aircraft and vehicle movement detection is a crucial safety consideration on every airfield. The LUCEBIT LMS 100 detects the movement of aircraft and ground vehicles by means of loops laid in the ground. Thanks to this system's innovative constellation, it is optimally suited for the particular requirements of an airport: by virtue of the system's self-adaptive capability, for example, no parameterization routines are required.

In addition to the loops, the connection unit near the loop and the evaluation unit, which can also be installed a long way away from the connection unit, constitute the system's heart. It should also be noted that no separate power supply is required for the connection unit. A multi-stage over-voltage protection feature ensures dependable operation even under the extreme weather conditions of an airport.



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Advantages

The modularized design of LUCEBIT – COSAL, complemented by ERNI's sophisticated product portfolio, constitutes the foundation enabling us to supply customized airport lighting systems for every size of airfield and every operating category. A high degree of user-friendly operator control, plus dependable diagnostic capabilities, are important operational features of these airport lighting systems. The concept we have adopted makes sure that these systems can be upgraded and expanded flexibly and affordably at any desired juncture.

Already-installed system sections can also be linked up without any problems using open interfaces. And, last but not least, in each and every one of our airport lighting systems we have incorporated one characteristic right from the start: maximized operational dependability.

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