



# **COSAL Constant Current Regulator**

**CCR 116, CCR 117, and CCR 518 to CCR 535**

## **User Manual**

**UM-6026, Rev. 1.1.0, 2025-05-09**





## A.0 Disclaimer / Standard Warranty

### CE certification

The equipment listed as CE certified means that the product complies with the essential requirements concerning safety and hygiene. The European directives that have been taken into consideration in the design are available on written request to ADB SAFEGATE.

### ETL certification

The equipment listed as ETL certified means that the product complies with the essential requirements concerning safety and C22.2 No.180:13 (R2018) regulations. The CSA directives that have been taken into consideration in the design are available on written request to ADB SAFEGATE.

### All Products Guarantee

ADB SAFEGATE will correct by repair or replacement per the applicable guarantee below, at its option, equipment or parts which fail because of mechanical, electrical or physical defects, provided that the goods have been properly handled and stored prior to installation, properly installed and properly operated after installation, and provided further that Buyer gives ADB SAFEGATE written notice of such defects after delivery of the goods to Buyer. Refer to the Safety section for more information on Material Handling Precautions and Storage precautions that must be followed.

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### Note

See your applicable sales agreement for a complete warranty description.

Replaced or repaired equipment under warranty falls into the warranty of the original delivery. No new warranty period is started for these replaced or repaired products.

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## Note

See your sales order contract for a complete warranty description.

Replaced or repaired equipment under warranty falls into the warranty of the original delivery. No new warranty period is started for these replaced or repaired products.

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## Liability



### WARNING

Use of the equipment in ways other than described in the catalog leaflet and the manual may result in personal injury, death, or property and equipment damage. Use this equipment only as described in the manual.

ADB SAFEGATE cannot be held responsible for injuries or damages resulting from non-standard, unintended uses of its equipment. The equipment is designed and intended only for the purpose described in the manual. Uses not described in the manual are considered unintended uses and may result in serious personal injury, death or property damage.

Unintended uses, includes the following actions:

- Making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine ADB SAFEGATE replacement parts or accessories.
- Failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards if not in contradiction with the general rules.
- Using materials or auxiliary equipment that are inappropriate or incompatible with your ADB SAFEGATE equipment.
- Allowing unskilled personnel to perform any task on or with the equipment.

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# 1.0 Safety

## Introduction to Safety

This section contains general safety instructions for installing and using ADB SAFEGATE equipment. Some safety instructions may not apply to the equipment in this manual. Task- and equipment-specific warnings are included in other sections of this manual where appropriate.

## 1.1 Safety Messages

### HAZARD Icons used in the manual

For all HAZARD symbols in use, see the Safety section. All symbols must comply with ISO and ANSI standards.

Carefully read and observe all safety instructions in this manual, which alert you to safety hazards and conditions that may result in personal injury, death or property and equipment damage and are accompanied by the symbol shown below.

|                                                                                     |                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p><b>WARNING</b></p> <p>Failure to observe a warning may result in personal injury, death or equipment damage.</p>                                                                                                                                          |
|    | <p><b>DANGER – Risk of electrical shock or ARC FLASH</b></p> <p>Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage. ARC Flash may cause blindness, severe burns or death.</p> |
|   | <p><b>WARNING – Wear personal protective equipment</b></p> <p>Failure to observe may result in serious injury.</p>                                                                                                                                           |
|  | <p><b>WARNING – Do not touch</b></p> <p>Failure to observe this warning may result in personal injury, death, or equipment damage.</p>                                                                                                                       |
|  | <p><b>CAUTION</b></p> <p>Failure to observe a caution may result in equipment damage.</p>                                                                                                                                                                    |
|  | <p><b>ELECTROSTATIC SENSITIVE DEVICES</b></p> <p>This equipment may contain electrostatic devices.</p>                                                                                                                                                       |

## Qualified Personnel

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Important Information</b></p> <p>The term <b>qualified personnel</b> is defined here as individuals who thoroughly understand the equipment and its safe operation, maintenance and repair. Qualified personnel are physically capable of performing the required tasks, familiar with all relevant safety rules and regulations and have been trained to safely install, operate, maintain and repair the equipment. It is the responsibility of the company operating this equipment to ensure that its personnel meet these requirements.</p> <p>Always use required personal protective equipment (PPE) and follow safe electrical work practice.</p> |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 1.1.1 Introduction to Safety



### CAUTION

#### Unsafe Equipment Use

This equipment may contain electrostatic devices, hazardous voltages and sharp edges on components

- Read installation instructions in their entirety before starting installation.
- Become familiar with the general safety instructions in this section of the manual before installing, operating, maintaining or repairing this equipment.
- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Make this manual available to personnel installing, operating, maintaining or repairing this equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.
- Install all electrical connections to local code.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet local codes.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Protect components from damage, wear, and harsh environment conditions.
- Allow ample room for maintenance, panel accessibility, and cover removal.
- Protect equipment with safety devices as specified by applicable safety regulations
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning prior to returning power to the circuit.

**Failure to follow this instruction can result in serious injury or equipment damage**

## Additional Reference Materials



#### Important Information

- IEC – International Standards and Conformity Assessment for all electrical, electronic and related technologies.
- IEC 60364 – Electrical Installations in Buildings.
- CSA – C22.2 No.180:13 (R2018), series isolating transformers for airport lighting.
- FAA Advisory: AC 150/5340-26 (current edition), Maintenance of Airport Visual Aid Facilities.
- Maintenance personnel must refer to the maintenance procedure described in the ICAO Airport Services Manual, Part 9.
- ANSI/NFPA 79, Electrical Standards for Metalworking Machine Tools.
- National and local electrical codes and standards.

## 1.1.2 Intended Use



### CAUTION

#### Use this equipment as intended by the manufacturer

This equipment is designed to perform a specific function, do not use this equipment for other purposes

- Using this equipment in ways other than described in this manual may result in personal injury, death or property and equipment damage. Use this equipment only as described in this manual.

**Failure to follow this instruction can result in serious injury or equipment damage**

### 1.1.3 Material Handling Precautions: Storage



#### CAUTION

##### Improper Storage

Store this equipment properly

- If equipment is to be stored prior to installation, it must be protected from the weather and kept free of condensation and dust.

**Failure to follow this instruction can result in equipment damage**

### 1.1.4 Operation Safety



#### CAUTION

##### Improper Operation

Do Not Operate this equipment other than as specified by the manufacturer

- Only qualified personnel, physically capable of operating the equipment and with no impairments in their judgment or reaction times, should operate this equipment.
- Read all system component manuals before operating this equipment. A thorough understanding of system components and their operation will help you operate the system safely and efficiently.
- Before starting this equipment, check all safety interlocks, fire-detection systems, and protective devices such as panels and covers. Make sure all devices are fully functional. Do not operate the system if these devices are not working properly. Do not deactivate or bypass automatic safety interlocks or locked-out electrical disconnects or pneumatic valves.
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Never operate equipment with a known malfunction.
- Do not attempt to operate or service electrical equipment if standing water is present.
- Use this equipment only in the environments for which it is rated. Do not operate this equipment in humid, flammable, or explosive environments unless it has been rated for safe operation in these environments.
- Never touch exposed electrical connections on equipment while the power is ON.

**Failure to follow these instructions can result in equipment damage**

### 1.1.5 Maintenance Safety



#### DANGER

##### ELECTRIC SHOCK HAZARD

THIS EQUIPMENT MAY CONTAIN ELECTROSTATIC DEVICES

- DO NOT OPERATE A SYSTEM THAT CONTAINS MALFUNCTIONING COMPONENTS. IF A COMPONENT MALFUNCTIONS, TURN THE SYSTEM OFF IMMEDIATELY.
- DISCONNECT AND LOCK OUT ELECTRICAL POWER.
- ALLOW ONLY QUALIFIED PERSONNEL TO MAKE REPAIRS. REPAIR OR REPLACE THE MALFUNCTIONING COMPONENT ACCORDING TO INSTRUCTIONS PROVIDED IN ITS MANUAL.

**FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DEATH OR EQUIPMENT DAMAGE**

## 1.1.6 Material Handling Precautions, ESD



### CAUTION

#### Electrostatic Sensitive Devices

This equipment may contain electrostatic devices

- Protect from electrostatic discharge.
- Electronic modules and components should be touched only when this is unavoidable e.g. soldering, replacement.
- Before touching any component of the cabinet you shall bring your body to the same potential as the cabinet by touching a conductive earthed part of the cabinet.
- Electronic modules or components must not be brought in contact with highly insulating materials such as plastic sheets, synthetic fiber clothing. They must be laid down on conductive surfaces.
- The tip of the soldering iron must be grounded.
- Electronic modules and components must be stored and transported in conductive packing.

**Failure to follow this instruction can result in equipment damage**

## 2.0 About this Manual

This operating manual applies to versions CCR 116, CCR 117, and CCR 518 to CCR 535 of the constant current regulator CCRE. This operating manual is intended for qualified specialist personnel for the technical operation and maintenance of electrical equipment.

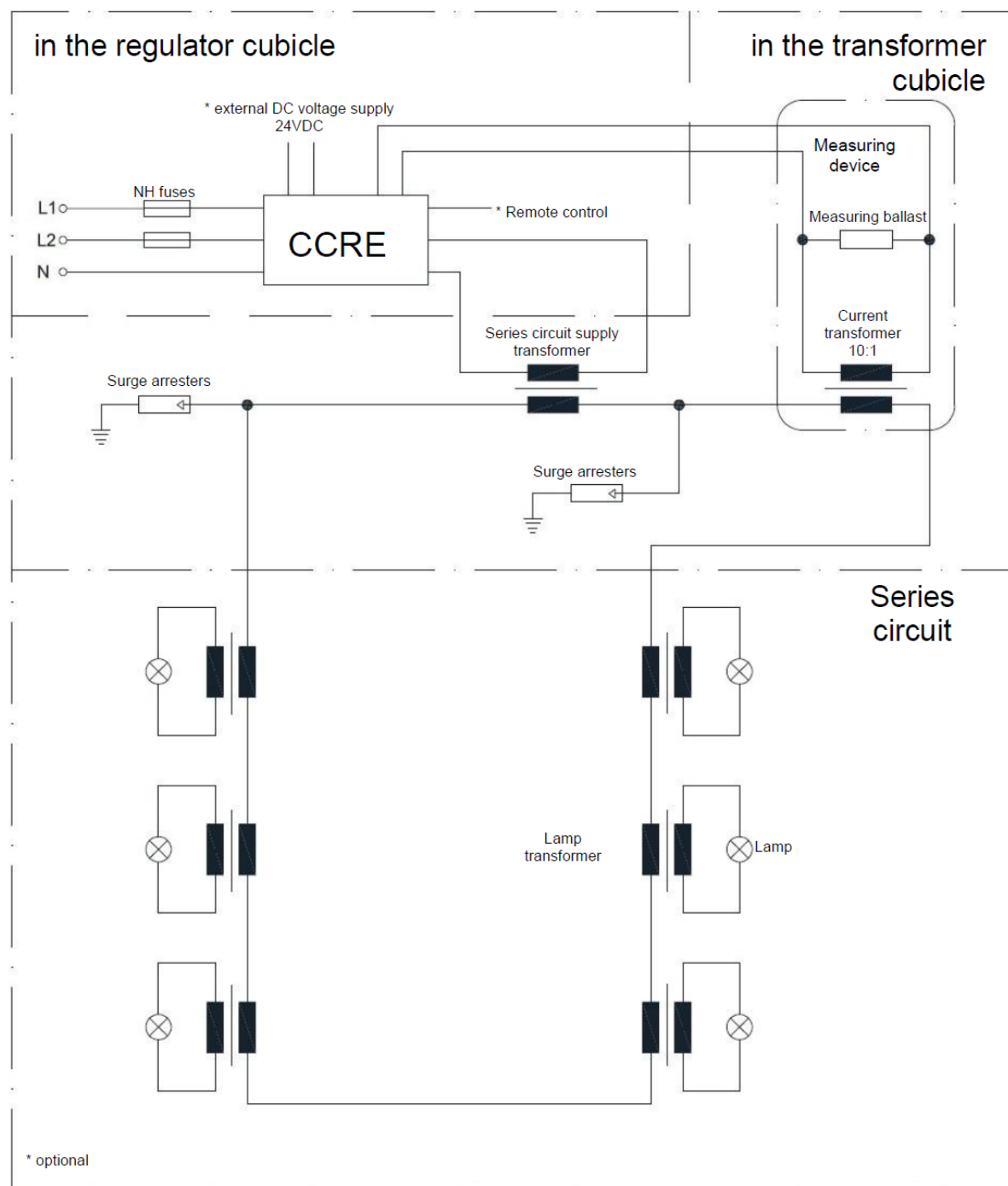


## 3.0 The Constant Current Regulator CCRE

### 3.1 The CCRE in Use

The microprocessor-controlled constant current regulator CCRE (Constant Current Regulator Version E) serves to reliably supply of series circuits in airfield lighting systems. The figure below shows the complete arrangement of a controlled lighting system:

**Figure 1: Complete arrangement of a controlled lighting system**



The lamps are kept at constant light intensity at every brightness level by the control system.

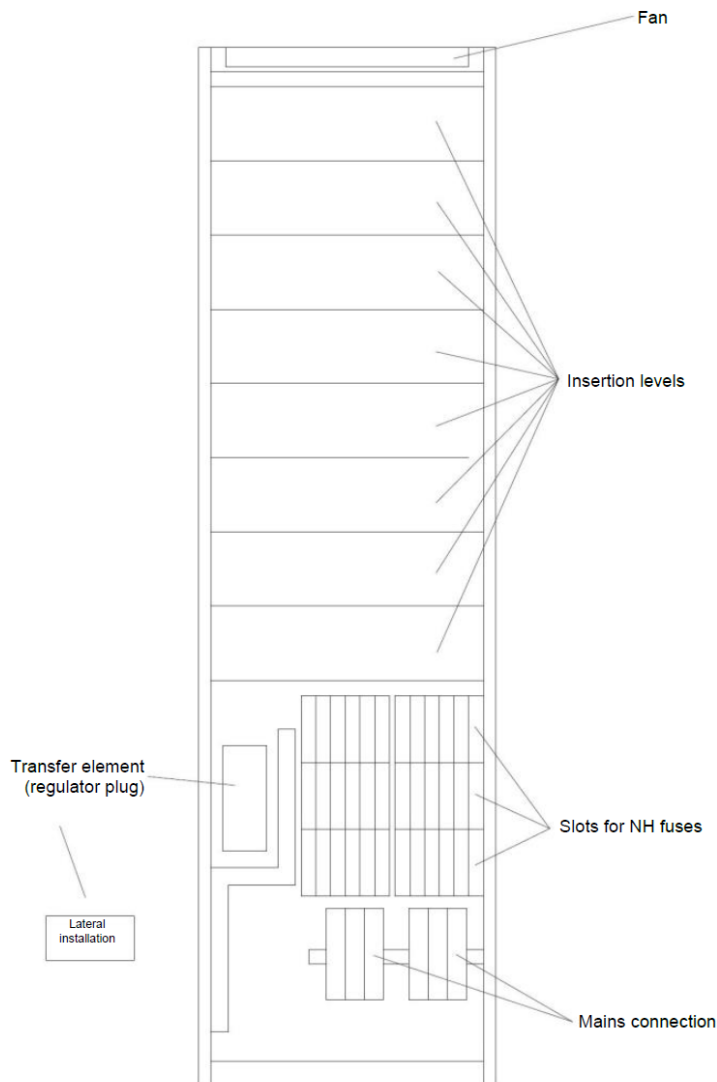
## 3.2 Integration of the Regulator Into the Periphery

The CCRE is housed in a cubicle system with the series circuit transformer and the measuring device for the series current. This comprises the regulator and transformer cubicles.

### Regulator Cubicle

The regulator cubicles are designed so that all installation and maintenance work can be performed from the front. Each regulator cubicle is fed in via two supply lines and two NH fuse outlets (see the figure below).

**Figure 2: Regulator Cubicle**



### Transformer Cubicle

The transformer cubicles comprise the following components:

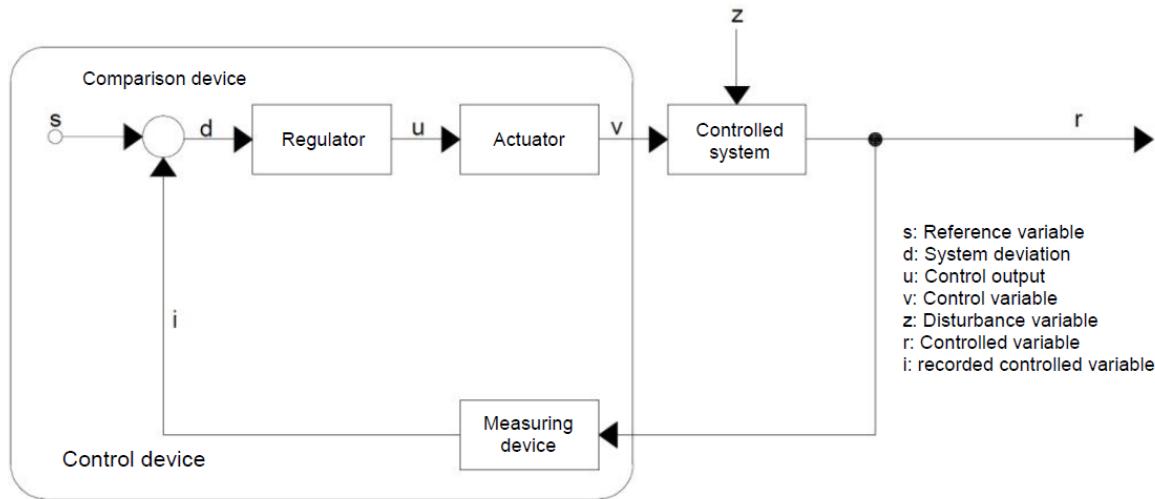
- Support frame with mounting plate
- Series circuit supply transformer
- Measuring transformer for recording the actual value of the series circuit
- 2 surge arresters to protect the system
- Insulation measuring device

Transformer outputs are possible in accordance with the European standard EN 61822:2003 1; 2.5; 5; 7.5, and 10 kVA. Transformers with other outputs are also available optionally.

### 3.3 Basic Concepts and Function of a Control Circuit

The following block diagram of a control circuit is used to explain basic concepts and operating modes.

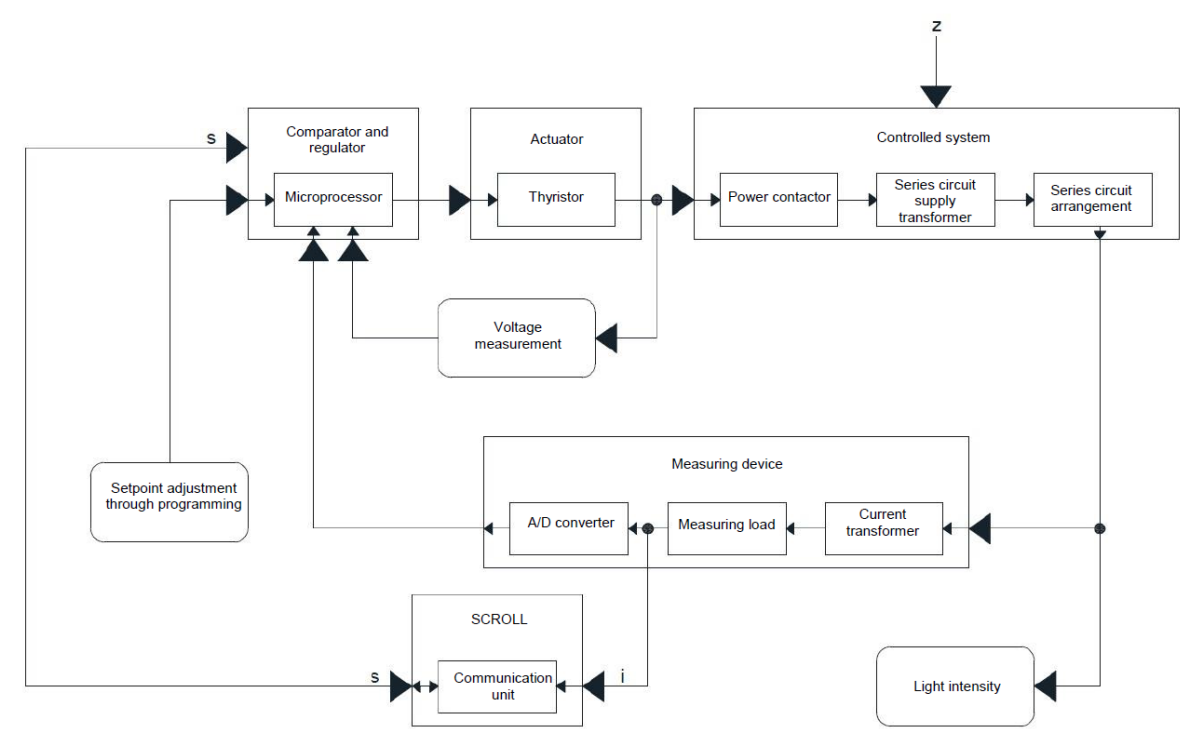
**Figure 3: Control Circuit Diagram**



The **disturbance variable  $z$**  requires regulation. This stochastic variable affects the entire controlled system. The **controlled variable  $r$**  is continuously recorded and adapted to the reference variable  $s$  in the measuring device for regulation. The **reference variable  $s$**  is a measure of the setpoint; the **measured controlled variable  $i$**  is a measure of the actual value. Both variables will then be compared and transferred to the regulator as the **system deviation  $d$** . If the **system deviation  $d$**  is not equal to zero, the regulator will send an instruction for correction to the actuator. The actuator will react and influence the controlled system with the **control variable  $v$**  so that the disturbance that occurs is compensated. Fluctuations in the **controlled variable  $r$**  are kept as small as possible in this way.

### 3.4 Control Circuit of the CCRE

Figure 4: CCRE Control Circuit



## 4.0 General Information

### 4.1 Functional Features

#### Light Intensity Levels

The CCRE has 7 light intensity levels. The actual number of stages required and the assigned currents are parameterized. The following table reflects the relationship between light intensity and effective circulating current. The regulator is pre-initialized with these values upon delivery. Intensities 1 to 100% as specified below correspond to those of the European standard EN 61822:2003. Each stage can be parameterized individually, with valid current values from 1.7 to 6.6 A.

| Relative intensity in % | Effective circuit current in A |
|-------------------------|--------------------------------|
| 0.1                     | 1.7                            |
| 0.3                     | 2.1                            |
| 1                       | 2.8                            |
| 3                       | 3.4                            |
| 10                      | 4.1                            |
| 30                      | 5.2                            |
| 100                     | 6.6                            |

#### Keeping the Intensity Levels Constant

The CCRE optimally regulates disturbance variables such as:

- Grid fluctuations
- Lamp failure
- Earth fault in the series circuit
- Operation with emergency power generator.

#### Shutdown in Cases of a Fault

The regulator is shut down in case of a fault to prevent the lamps in the lighting circuit from being destroyed. The criteria for shutting down the regulator in case of a fault are defined in the European standard EN 61822:2003.

The software prevents the CCRE from being switched on again. A fault is displayed and reported remotely. Once the fault has been remedied, the shutdown must be acknowledged locally in local operation and thus canceled.

Electronic blocking of the thyristors ensures that the power contactor is shut down without load.

#### Percentage-Based and Numerical Lamp Failure Monitoring

Percentage-based and numerical lamp failure monitoring is an integral part of the CCRE software.

Failure of lamps in the lighting circuit is recorded and displayed as a numerical or percentage value. Set values being exceeded will be reported remotely. Three freely selectable limit values can be programmed.

#### Remote Operation via Serial Fieldbus Interface

In order to considerably reduce the number of remote control lines with a large number of series circuits, all operating functions as well as operating and error messages are connected to the operating monitoring system (e.g., in the tower) via a serial interface. A "multi-drop" capable serial fieldbus interface enables up to 32 CCREs to be fully operated with just two lines without additional modems. The serial interface can be designed redundantly.

#### Local Operation for Service/Emergency Operation

The CCRE can be operated using the controls on the front panel if the operation monitoring system fails or for service purposes. Local operation is signaled remotely and indicated by an LED.

## Service Interface

The internal operating parameters (e.g., number of steps, light intensity) can be entered, changed, and saved using a PC via the service interface on the front.

## Mains Operation/Operation with External DC Voltage

The control section of the CCRE is supplied via the mains voltage, an uninterruptible UPS-supported, external DC voltage, or optionally from an internal battery pack. In the last two cases, the CCRE will immediately assume the same operating state after a power failure as before the failure. This ensures that the lighting system is operational within the required time limits under CAT II/III conditions.

## Operating Hours Counter

The CCRE is equipped with an operating hours counter. It counts the operating hours in the respective brightness level. The operating hours can be called up from the standard display using button 3.

## SIM Card

All CCRE parameters are stored on a SIM card. Simply accept this SIM card and set the Profibus address on the dial switch when replacing a regulator (see [Profibus Interface](#)). The replacement regulator is then immediately ready for operation.

## Expansion Stages of the CCRE

- SCROLL  
Individual lamp control and monitoring
- Internal buffering of the processor supply during a brief mains voltage failure

## 4.2 Device Versions and Order Code

| Type order code | SCROLL | 2-phase supply |       | Double CCRE | for RGL |
|-----------------|--------|----------------|-------|-------------|---------|
|                 |        | 50 A           | 100 A |             |         |
| CCR 116-E       |        |                | X     |             |         |
| CCR 117-E       | X      |                | X     |             |         |
| CCR 518-E       |        | L, R prep.     |       |             |         |
| CCR 519-E       | L      | L, R prep.     |       |             |         |
| CCR 520-E       |        | R, L prep.     |       |             |         |
| CCR 521-E       | R      | R, L prep.     |       |             |         |
| CCR 522-E       |        | X              |       | X           |         |
| CCR 523-E       | L      | X              |       | X           |         |
| CCR 524-E       | R      | X              |       | X           |         |
| CCR 525-E       | L, R   | X              |       | X           |         |
| CCR 526-E       | L, R   | X              |       | X           | X       |
| CCR 527-E       | L      | X              |       |             | X       |
| CCR 528-E       | R      | X              |       |             | X       |
| CCR 530-E       |        | L              |       |             |         |
| CCR 531-E       | L      | L              |       |             |         |
| CCR 532-E       |        | R              |       |             |         |
| CCR 533-E       | R      | R              |       |             |         |
| CCR 534-E       | L      | L              |       |             | X       |
| CCR 535-E       | R      | R              |       |             | X       |

- X=equipped
- L=left side equipped.

- R=right side equipped.
- L=prep left side can be expanded with double regulator.
- R=prep right side can be expanded with double regulator.

All regulator types in this table are equipped with a key switch and Profibus.

Spare devices can be reordered with the type designation indicated on the type plate.

## 4.3 Structure and Views

The CCRE is designed as a 19" plug-in unit with electronic plug-in cards in European format accessible from the front.

It comprises the following components:

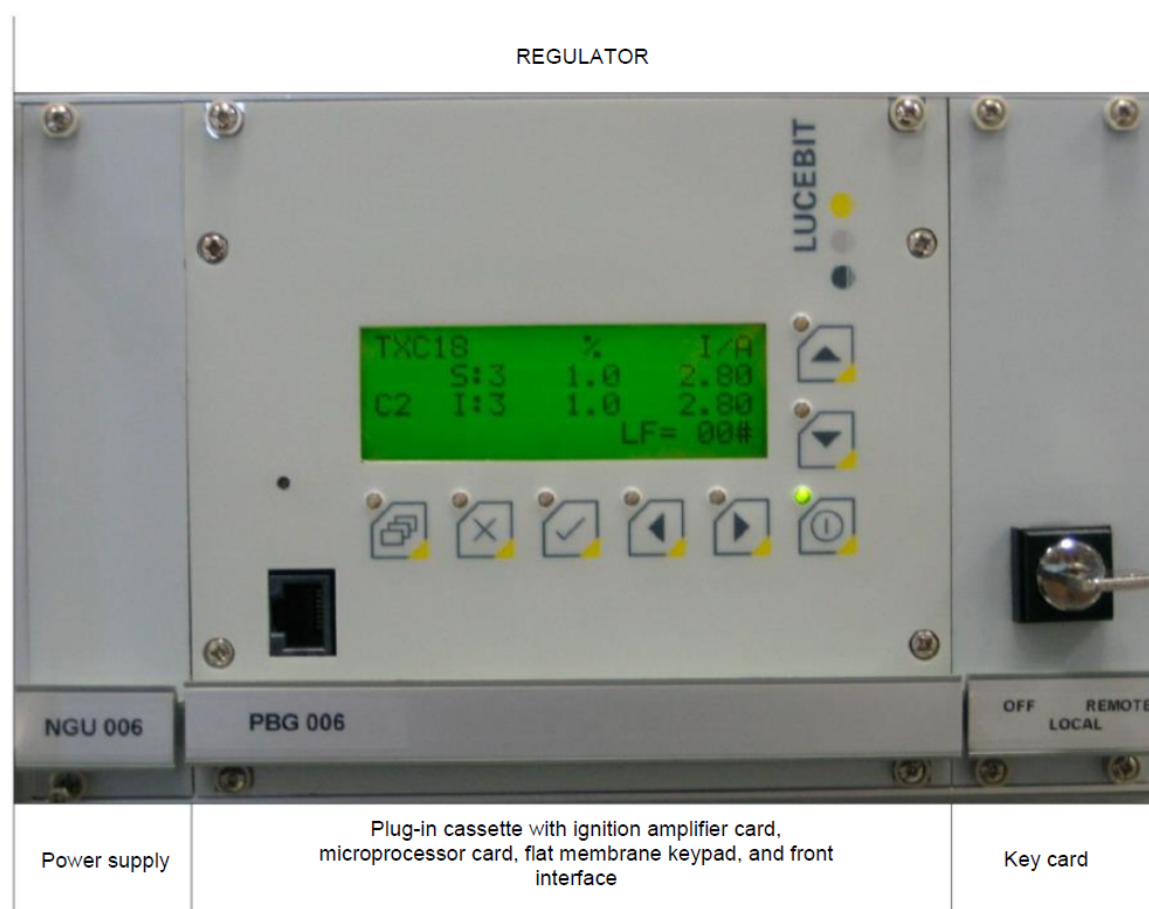
- Regulator chassis LST xxx
- Power supply NGU xxx
- Processor module PBG xxx
- Key switch SCS xxx

xxx: 3-digit number, depending on the extension variant. (e.g., NGU 006)

Individual electronic plug-in cards or complete inserts can be replaced. All electrical connections to the cubicle wiring are made when the CCRE is plugged in due to the power and control plugs on the rear.

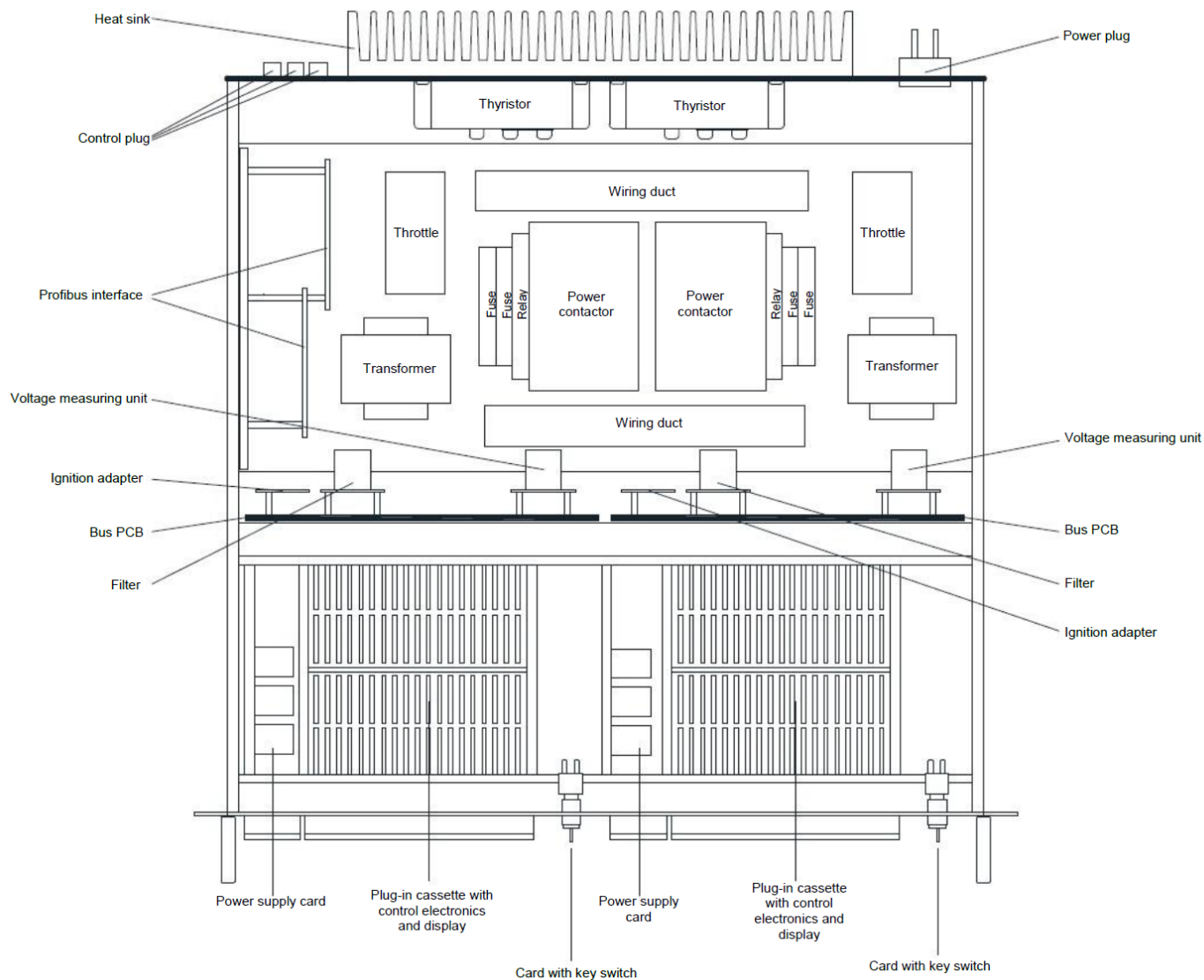
The control and power sections are physically separated. This ensures a high level of immunity to electromagnetic interference.

**Figure 5: Front view**



## Top view

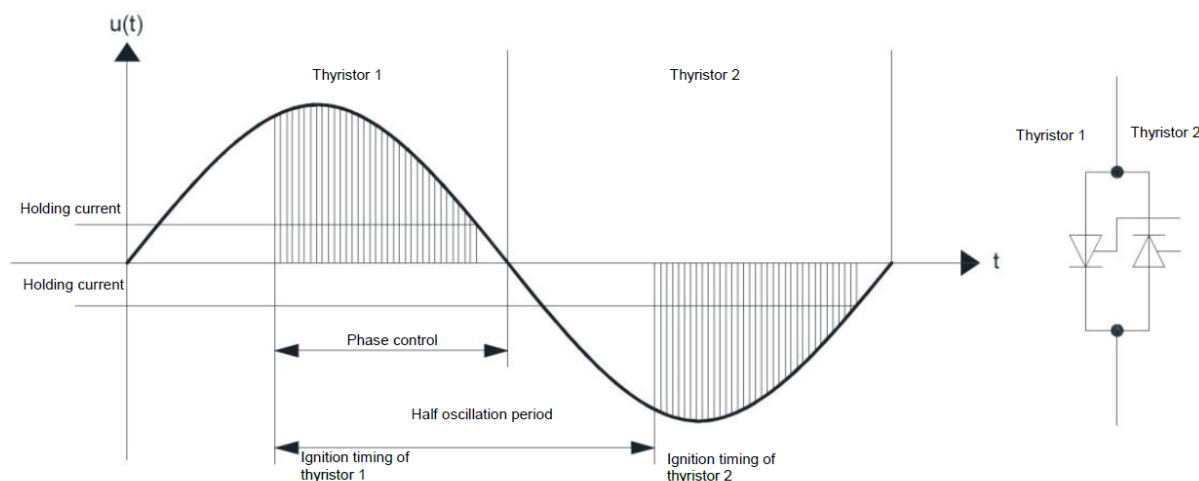
Figure 6: Top view



## 4.4 Power Section

The power section corresponds to the actuator of the control circuit. The actuator is a fully controlled two-phase alternating path circuit that comprises two thyristors connected in antiparallel. This is referred to as phase angle control since a specific voltage phase is cut when the thyristor is ignited. The power depends on the phase angle, which results from the ignition time of the thyristor in relation to the zero crossing of the voltage. Efficiency of 98% is achieved with this grid-connected power converter (see the figure below).

**Figure 7: Current/time wave diagram**



A special RCD circuit of the thyristor serves as surge arrester. The anti-parallel connected thyristors are located in a common housing. This thyristor assembly is mounted with the RCD circuit directly on the heat sink.

There also is a power contactor in the power section, which guarantees galvanic isolation of the power circuit and a safe emergency shutdown.

The ignition amplifier and ignition stage form the galvanic isolation point between the control and power sections by means of optocouplers. The electronically generated ignition pulses are amplified and fed to the power thyristors with potential separation.

## 4.5 Control Section

The control section comprises several electronic plug-in cards in a plug-in cassette:

- Power supply card
- Electronic cassette with microprocessor control, flat membrane keypad and LCD display
- Key switch

The power supply card generates the required operating voltages.

The voltages for the electronics are generated from the mains voltage via an electronic transformer integrated in the power section or as an external uninterruptible DC voltage. In UPS mode, the CCRE's control electronics operate without interruption in case of a power failure.

The microprocessor regulator takes care of all signal processing, control and operation monitoring. Percentage lamp failure detection is an integral part of the software. The operating unit indicates all important operating information of the CCRE on an LCD display. It contains the operating elements for service operation as well as a service interface for connecting a PC. The different operating elements and displays are described in [Displays and Monitoring](#).

The microprocessor control is also used for data exchange between CCRE and the operational monitoring system. The microprocessor control unit evaluates the signals from the remote unit and passes them on to the higher-level control system if the option for individual control and monitoring of lamps in the series circuit (SCROLL) is installed.

Three operating modes can be selected via the key switch:

- **REMOTE**

The regulator can only be controlled via the field bus interface (Profibus). All functions, including those of the individual lamp control, can be controlled remotely. Local operation is not possible.

- **LOCAL**

The regulator can be operated "manually" on site. Individual lamp control is operated using the lucDMC service program. Remote control signals from the control technology via the field bus are ignored. All feedback signals are transmitted to the control system via the fieldbus. This means that the regulator can also be monitored remotely during local operation.

- **OFF**

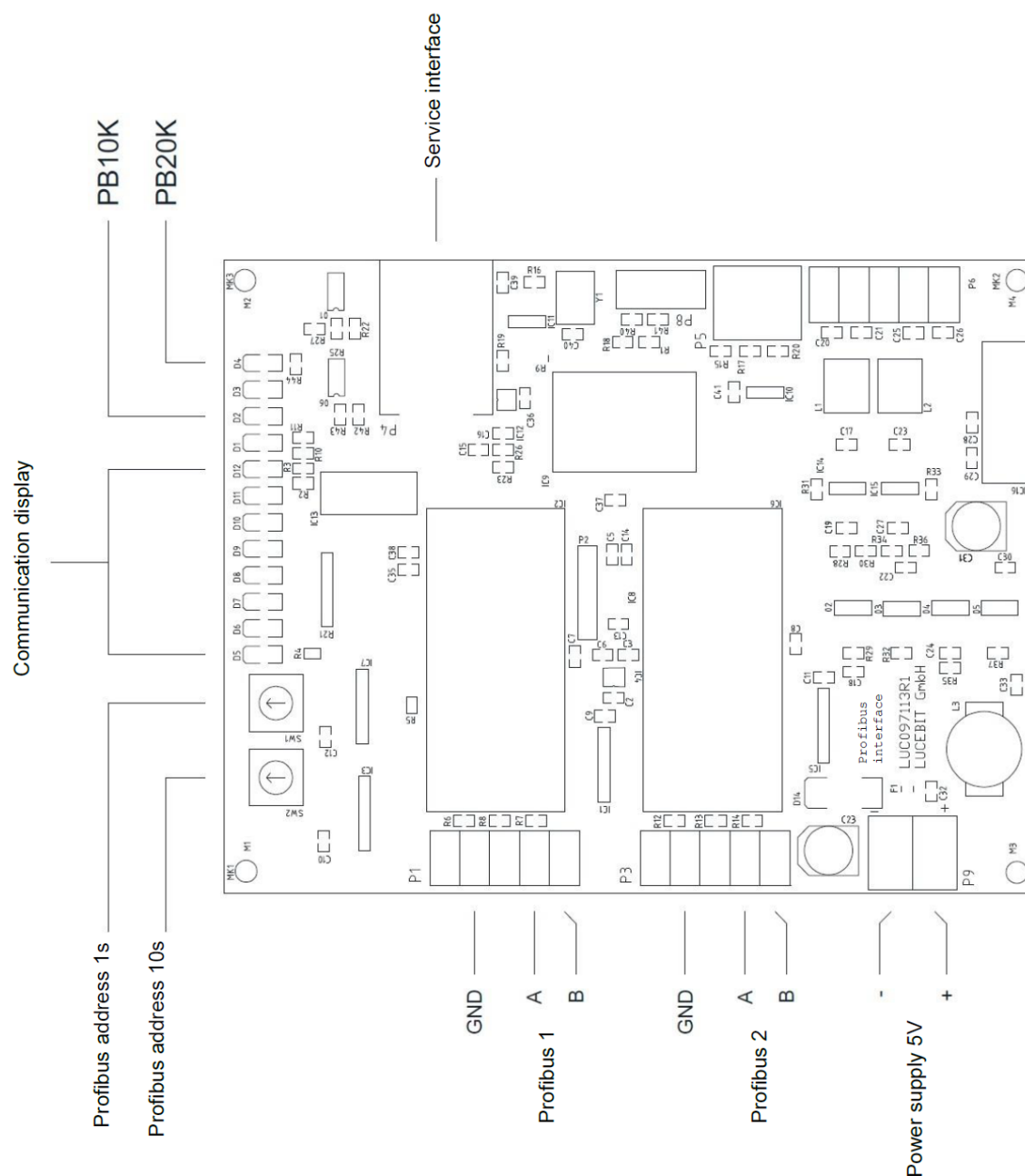
The regulator cannot be switched on manually or by field bus. Setpoint level 0 is selected automatically, i.e., the regulator does not supply any current to the series circuit.

## 4.6 Profibus Interface

The Profibus interface provides 2 connections for 2 separate Profibus and acts as a participant in the system. The address of the subscriber is set via the two Profibus address switches (see the figure below). The address must only be changed when the operating voltage is switched off.

The LEDs PB10K (D2) and PB20K (D4) signal the connection on the respective Profibus.

**Figure 8: Profibus interface**



## 4.7 Effective Voltage Measuring Unit

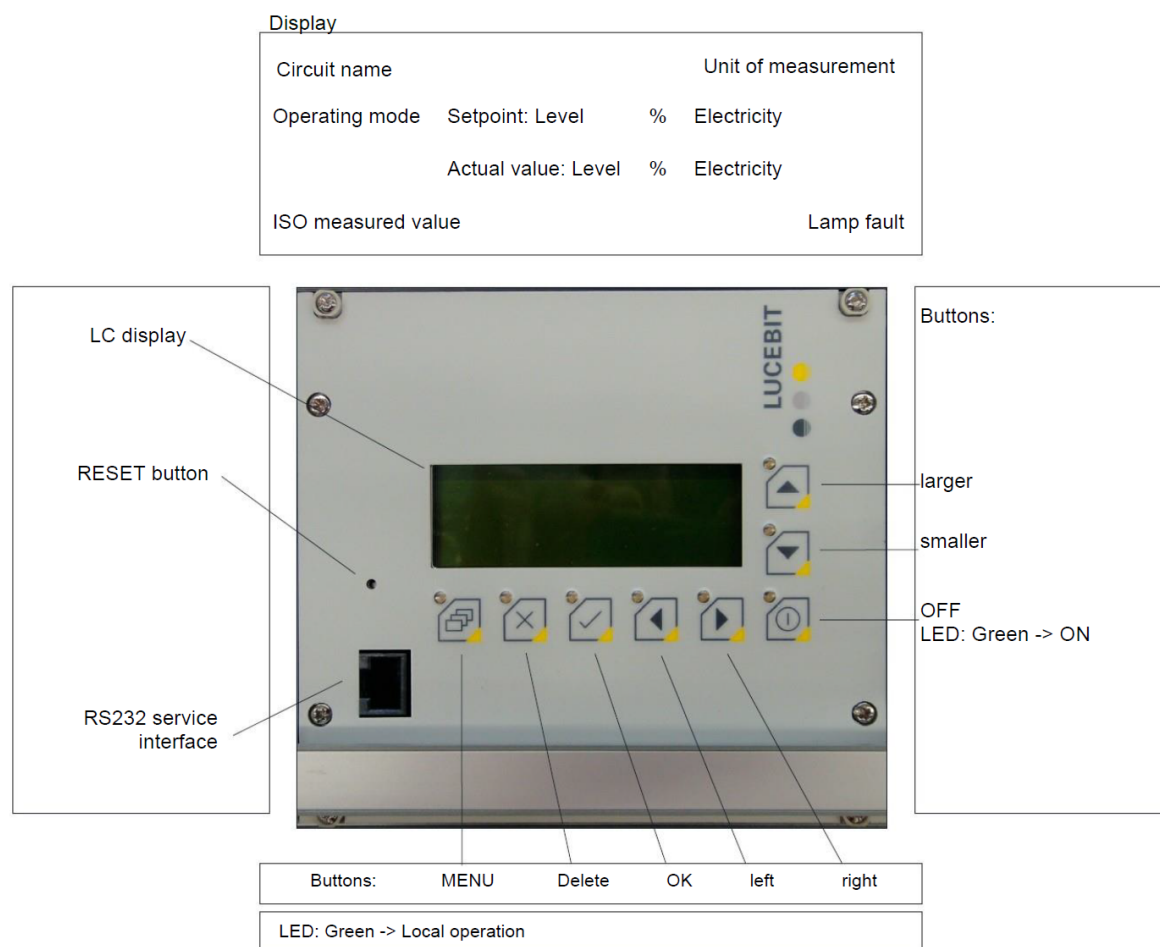
The RMS voltage measuring unit uses a DSP to provide the exact RMS value of the phase-cut voltage. The control section can use this, amongst other things, to calculate the power consumed by the series circuit. This value is also included in the lamp failure detection.



## 5.0 Displays and Monitoring

### 5.1 Text Display During Undisturbed Operation

Figure 9: Interface



C1/C2 (Communication) is displayed under "Operating mode" instead of L (Local) if communication is functional in remote mode.

### 5.2 Monitoring

Monitoring is required by European standard EN 61822.

There are a total of 4 main function groups:

- Mains voltage monitoring
- Actual value failure monitoring
- Overcurrent monitoring
- Lamp failure monitoring

#### Mains Voltage Monitoring

If the power supply card is operated with 24 V via the control plug, the CCRE will monitor the mains supply. The processor will switch to an error routine if there is no mains voltage at the load plug of the CCRE or the synchronous voltage (information for the processor about the phase position of the mains current fed in) is missing. The CCRE will display an error message.

The thyristors can no longer receive lighting pulses via their gate. The load contactor will drop out. The previously set level is switched on when the voltage returns.

## Actual Value Failure Monitoring

An actual value failure occurs when there is no signal from the measuring device at the regulator. There are 3 main possible causes for this:

- Sensor break (supply lines to the measuring device interrupted)
- Short circuit on the sensor
- Open power section

The load circuit is shut down electronically and mechanically in case of a fault. The electronic shutdown blocks the pulses for phase control. The thyristors do not ignite. The contactor ensures mechanical shutdown. Although both shutdown commands are generated simultaneously, electronic deactivation takes effect more quickly due to the drop-out delay of the contactor contacts. This ensures that the contactor does not switch under load. This increases the service life of the contacts.

The CCRE device distinguishes "sensor break" from "sensor short circuit/open power circuit". The device will respond accordingly with the error messages described in [Fault Tables and Troubleshooting](#).

Once the error has been rectified, the corresponding error message in local operation must be acknowledged with the X button to resume normal operation.

## Overcurrent Monitoring

The CCRE is equipped with monitoring of the current in the series circuit. This prevents destruction of the lamps in the series circuit by quickly shutting down the regulator in case of overcurrent (from 6.75 Aeff). An additional, independent overcurrent monitor will respond at 8.3 A. The regulator thus complies with the "overcurrent protection" requirement of European standard EN 61822:2003.



### CAUTION

If the overcurrent monitoring responds, the contactor switches off under load. The contacts can be subjected to heavy loads and should be checked after such a shutdown.

---

The RESET button must be pressed after the error has been rectified.

## Lamp Failure Monitoring

Lamp failure monitoring is part of the software. It is only activated once the software has been calibrated to the connected series circuit. A special self-learning parameterization is available. The percentage or numerical lamp failure is shown on the LCD display.

If the lamp failure exceeds one of the three adjustable thresholds, this is also signaled to the remote control. The threshold values are entered via a PC or via the menu.

Lamp failure detection can also be deactivated if desired. See sections [Menu Navigation](#), and [Setting the Lamp Fault Measurement](#) for more information.

## Capacity Monitoring

The CCRE uses a software module to monitor any capacitance in the series circuit. Since a series circuit should always behave inductively due to the high number of transformers, a capacitance in the circuit indicates an open power circuit. This capacitance is created when the forward and return conductors are running in parallel over longer distances. Currents thus flow via this capacitance; a lethal circuit voltage can be present at the ends of a disconnected series circuit cable, for example. As a result of this, the CCRE switches off with the message I=0 if the capacitance measurement is set correctly.

Setting the capacity measurement of the CCRE: (The lucDMC service program is required for this.)

- Set the capacity threshold to 0 (capacity is not evaluated by the CCRE).
- Switch on the regulator in all stages and read off the "CAP value" by pressing the  button twice (see [Measurement Data](#)).
- Now use lucDMC to set the capacity threshold to 80% of the highest measured value.

Example: At 6.6 A, the CCRE delivers a CAP value of 200. The capacity threshold to be set thus is:  $200 \cdot 0.8 = 160$

## 6.0 Operation

### 6.1 Operating Modes

The CCRE can be operated in local or remote operation.

The operating mode is selected with the "LOC/REM" key switch. If the switch is set to REM, remote operation is enabled. Otherwise, local operation applies, which is displayed in green via the "Local" LED. The regulator is switched off in the "Off" position.

Remote operation is activated when

1. the corresponding interface is enabled by parameterizing the SIM card of the regulator,
2. the LOC/REM switch is set to REM and
3. remote operation is activated via the interface or in the telegram.



#### ATTENTION

The last level selected via remote control is adopted when switching from remote to local operation.

### 6.2 Local Operation

In local operation, the CCRE is operated using the controls on the plug-in unit. All remote control signals are rendered ineffective in this operating mode. The feedback device remains active.

#### Step Selection in Local Operation

The level is selected using the "Up" and "Down" buttons.

| Button                                                                             | Function                                                        |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------|
|  | Switch from "Off" to level 1<br>Switch to the next higher level |
|  | Switch from level 1 to "Off"<br>Switch to the next lower level  |
|  | Switch off the regulator from any brightness level              |

Levels will only be switched after pressing a button or after pressing it again. Holding down a button will not keep changing the level.

If a level is set to 0% brightness, it is not approached via the keypad.

The values of the selected level are shown on the LCD display if there is no fault. The values are displayed either as a decimal number with a maximum of 2 digits or as an integer with a maximum of 3 digits.

#### Acknowledging Errors

A fault must be reset after being removed. This will delete the fault memory. The CCRE will then go back to running at the level selected before the fault. The button for resetting the errors is identified by **X**. Resetting is only possible in LOCAL operation.



**CAUTION**

Fault shutdown indicates faulty operation of the system. The system must, therefore, only be switched back on after the cause of the fault has been rectified.

**6.3 Status Display**

In any error-free operating state, press the "tick" button once or twice. See [Figure 9](#)

**6.4 Menu**

Parameters can be changed using the keypad to configure the regulator.

| Button | Function                         |
|--------|----------------------------------|
|        | Access to the configuration menu |
|        | Navigate or change value         |
|        | Navigate or change value         |
|        | Next menu level or confirm       |
|        | Return or discard                |
|        | Change input position            |
|        | Change input position            |

You can decide whether to save the parameters to the SIM card or discard them when you exit the menu after making any changes.



## 6.4.1 User Menu

### Description of the PINs

Please enter your 4-digit PIN:

0000

The menu is protected by requesting two PINs. The user PIN and the service PIN are distinguished. The user PIN enables all parameters relevant to the operator to be changed. The service PIN allows you to set special parameters that directly affect the control system. See [Menu navigation](#).

The default PINs after initializing the SIM card (see [Error when reading the SIM card](#)) are:

- **user PIN:** 0000
- **service PIN:** 0001

### Setting the Circuit Data

|                 |      |
|-----------------|------|
| circuit type    | AAAA |
| circuit number  | 0000 |
| number of lamps | 0000 |

Enter the circuit name and the number of lamps in it in this display. The circuit type and circuit number may contain numbers, letters and some special characters. The circuit name may be, for example, TXE/SIGN. Up to 8 characters are possible.

The number of lamps indicates the number of lamps in the circuit and is relevant for the lamp fault measurement.

### Setting the Lamp Error Thresholds

|                        |     |    |
|------------------------|-----|----|
| Threshold 1            | (%) | 05 |
| Threshold 2            | (%) | 10 |
| Threshold 3            | (%) | 15 |
| Calibration parameters |     |    |

The thresholds indicate the three limits for LF1, LF2, and LF3. If the measured lamp error exceeds one of these thresholds, the corresponding message is sent to the control system or indicated by the LED on the regulator. The thresholds are shown either in % or in #, depending on the setting (general display).

### Setting the Lamp Fault Measurement

|                 |    |
|-----------------|----|
| Pulled lamps 1  | 00 |
| Pulled lamps 2  | 00 |
| Start calibrate | no |

This menu section contains the data required for the lamp fault measurement.

The parameters "Pulled lamps 1" and "Pulled lamps 2" specify the number of lamps pulled for which calibration is to be performed. See [Control Section](#); "Start calibration" is set to "yes" if the circuit is to be calibrated. Then exit the menu and save the data. Calibration will commence automatically. (Only possible if the regulator is set to setpoint level 0 and local operation when entering the menu)

### Setting the Brightness Levels

|         |     |     |
|---------|-----|-----|
| Level 1 | (A) | 1.7 |
|---------|-----|-----|

|         |     |     |
|---------|-----|-----|
| Level 2 | (A) | 2.1 |
| Level 3 | (A) | 2.8 |
| Level 4 | (A) | 3.4 |

|         |     |     |
|---------|-----|-----|
| Level 5 | (A) | 4.1 |
| Level 6 | (A) | 5.2 |
| Level 7 | (A) | 6.6 |
| Level 8 | (a) | 0   |

The brightness of the lamps in the respective levels is indicated as a percentage. The current for the series circuit is calculated automatically from these percentages. If levels 1 and 2 are not required (e.g., civil airport), they may be hidden by setting the brightness to 0%. Ensure that level 1 is set to 0 before level 2 since intermediate levels with a brightness value of 0 are not permitted. See also [Light Intensity Levels](#)

## Setting the Display

|                  |        |
|------------------|--------|
| Language         | German |
| Display LF/ISO   | --     |
| Display form. LF | %      |

- **Menu language**
- **Lamp fault display:**
  - + = Display active
  - - = Display inactive
- **Insulation display:**
  - e = Display of the insulation value of an external measuring unit
  - i = Internal insulation measurement (only for compact regulators)
  - - = Insulation display inactive
- **Display format lamp error:**
  - % = Percentage display of the lamp fault
  - # = Numerical display of the lamp error

## Advanced Functions Failsafe

|                |   |
|----------------|---|
| Failsafe level | 0 |
|----------------|---|

**Failsafe level:** If the set value is not 0, this level is selected in case of a communication failure in remote mode.

## Cut Out (Optional)

|               |    |
|---------------|----|
| Cut out pres. | no |
|---------------|----|

**Cut out present:** If a "cut out" with monitoring switch is connected to the CCR, this must be activated here by selecting "yes".

## LED Features

|          |
|----------|
| LED mode |
|----------|

**LED mode:** LED mode is only required in combination with the SCROLL single lamp control and monitoring system. LED mode prevents the LED lights from flickering when switching segments with a lamp current > 6 A.

## Miscellaneous

|                   |   |
|-------------------|---|
| Key switch        | - |
| SCROLL power fail | - |

- **Key switch:** If a key switch module is used, "+" must be entered here so that the switch position is queried by the microregulator.
- **SCROLL power fail:** The SCROLL modules save the last set status (on or off) in order to restore it after a power failure in this mode.

## 6.4.2 Service Menu



### CAUTION

The following settings should only be changed by trained specialists. Changes may lead to non-conformity between the regulator and the European standard EN 61822:2003 and cause the regulator to malfunction.

## Setting the PID Regulator

|              |      |
|--------------|------|
| P share      | 0000 |
| I share      | 0000 |
| D share      | 0000 |
| Thyristor on | neg  |

The thyristors are assigned to the corresponding voltage half-waves here. There are two versions of ignition stages in the CCRE. This must be selected correctly in the menu.



### ATTENTION

If an incorrect ignition level is specified, the power fuse may trip or the regulator may not work.

## Fine Adjustment of the Regulator

|                    |        |    |
|--------------------|--------|----|
| Del. I=0           | (0.1s) | 10 |
| min.ZW (μs)        | 1000   |    |
| max.ZW (μs)        | 9750   |    |
| Current inc. (A/s) | 30     |    |

The settings usually cannot be changed.



### CAUTION

Incorrect parameterization can lead to the destruction of the lamps in the entire series circuit!

**Delay I=0:** The waiting time can be extended. Note that the IEC standard is 1s. This means that the regulator will wait for longer before the protective shutdown is triggered if a power circuit is open. This may be necessary if the series circuit has many defective lamps, open transformers, or a primary transformer too small in terms of voltage in rare cases. In such cases, it may take considerably more time before an effective current flow can be detected.

**Min. and max. ZW:** The control range of the phase angle (ignition angle) is limited here.

**Current increase:** The speed at which the current is increased can be limited here.

## Soft Start

|                     |    |
|---------------------|----|
| Current inc. (A/s): | 10 |
|---------------------|----|

|               |      |
|---------------|------|
| SCROLL offset | 100  |
| SCROLL-SYNC   | 0000 |
| RGL SYNC mode | -    |

**Soft start:** The speed at which the current is ramped up immediately after switching on can be set here.

**SCROLL offset:** The modulation deviation for SCROLL telegrams is set here. The value can be increased in highly inductive circuits.

**SCROLL-SYNC:** Time between synchronization commands and runway guard lights in seconds. (see RGL sync mode)

**RGL-Sync-Mode:** Several regulators can be synchronized in RGL-Sync-Mode so that the runway guard lights flash synchronously in combination with the corresponding radio hardware.

- - = RGL sync mode off
- **M** = RGL sync mode master: specifies the flashing frequency
- **S** = RGL sync mode slave: synchronizes to the master

## Setting the Effective Current Adjustment

|                        |    |
|------------------------|----|
| I adjustment:          |    |
| Current adjustment (%) | 00 |
| Not issued             | 05 |
| Symmetry_adj.          | 00 |

**Current adjustment:** The effective value of the current can be adjusted. The actual current value shown on the display is compared with the calibrated current meter for this purpose. The current value in the regulator can be increased or decreased to match the value of the ammeter.

**Delay not output:** This parameter is reserved for future applications.

**Symmetry\_adj.:** The positive and negative current half-waves should be as consistent with each other as possible to minimize system feedback. They can be adjusted here.

## Settings for ISO Measurement

|                 |      |
|-----------------|------|
| ISO warning (k) | 0000 |
| ISO alarm (k)   | 0000 |
| Max. display    | 1500 |
| Timeout. (s)    | 0020 |

**ISO warning (k):** An insulation warning will be output by an LED on the regulator and be forwarded to the remote control if the measured ISO value undercuts this threshold.

**ISO alarm (k):** An alarm will be output by an LED on the regulator and be forwarded to the remote control if the measured ISO value undercuts this threshold.

**Max. display:** Threshold in kOhm of the ISO value above which  $\infty$  is output on the display instead of the measured value.

**Timeout (s):** If no ISO value is received from the control system for longer than the time specified here in seconds during external ISO measurement, "----" is output on the display instead of the ISO value.

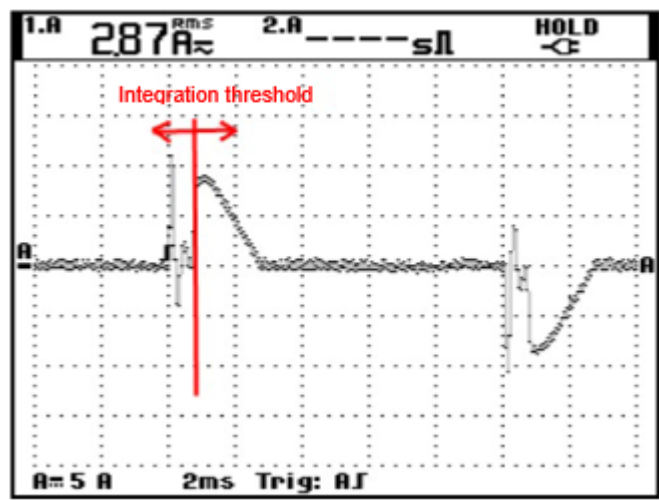
## Setting for Lamp Fault Measurement

|                    |      |
|--------------------|------|
| Integral threshold | 0120 |
| Corr. 1st lamp     | 0000 |
| Corr. fact >10%    | +0   |
| Int. reset         | 0250 |

Only two parameters are currently active:

Integration threshold: This value can be used to define the threshold at which the current is considered to be present at a point on the current curve. It can be helpful in cases of a sawtooth-like increase in current (caused by disturbed outer circuits), for example. See the following figure:

Figure 11: Integration threshold



The current flow for the lamp fault measurement is detected on the red line. This line can be shifted to the left or right using the "Integration threshold" parameter.

Int. reset: This parameter deletes the current integration when the current falls below a certain value. This can be helpful if, as in the figure displayed under Integration threshold section, the current breaks down again before the actual current flow.

Setting the Remote Control

|               |         |
|---------------|---------|
| Interf.       | CAN125k |
| Address       | 01      |
| Parallel reg. | Impulse |

The interface for this can be one of the following ones:

- CAN125k
- RCOM9600
- RCOM+9600
- RCOM+19200
- Parallel

The regulator address can be set in the menu. If address 00 is set, the regulator will adopt the address set on the DIP switches on the transfer element.

**Profibus:** If the regulator is operated with Profibus, CAN125k must be set. The address is set according to the device list of the insulation measuring unit IME.

## 6.4.3 Information Displays

### Operating Hours Counter

```
Operating-h 0 0 0000
1 000 2 0000 3 0000
4 000 5 0000 6 0000
7 000 8 0000 E 0000
```

The operating hours counter counts the time during which the respective brightness level was selected. "E" indicates the time that has elapsed in an error state (e.g., power failure). The time will be given in hours. The "LUC DMC" service program can be used to reset the operating hours counter to 0, which may be necessary after changing light sources, for example.

### Regulator and Circuit Data

```
APH 2501 SN:00000000
HWVS SW-K-VS SW-R-VS
3.28 7.30 6.10
Address 00 CAN125k
```

**APH 2501:** Lamp circuit name.

**SN::** Serial number of the regulator cassette.

**HWVS 3.28:** Hardware version of the processor PCB

**SW-K-VS 7.30:** Software version of the communication processor

**SW-R-VS 7.30:** Software version of the control processor

**Address :** Serial address (not Profibus)

**CAN125k:** Interface (for Profibus, "CAN125k" must be selected)

### Measurement Data

```
APH 2501 AQQCRR
Control reserve(%) 0000
Phase:0000 Cap:0000
```

AQQCRR Internal self-monitoring:

- **A:** stable communication was recognized
- **AQQ:** Input buffer of the CAN interface OK
- **A-Q:** Commands to the CAN interface were lost due to lack of memory
- **A-...:** Processing of control commands is faulty
- **C:** CU available. This CCR is able to communicate with single lamp control and monitoring module
- **RR:** The control processor is working correctly.
- **-R:** The control processor had a fault
- **--:** The control processor is in fault at the moment

**Control reserve:** in percent; for RGL regulator: Tail angle in  $\mu$ s

**Phase:** Measured inductance of the circuit (without unit)

**Cap:** Measured capacity of the series circuit (without unit)

## Monitoring of the Serial Interfaces on RS232 Basis

|           |           |
|-----------|-----------|
| SER0:0000 | SER2:0000 |
| len0:0000 | len2:0000 |
| crc0:0000 | crc2:0000 |
| cmd0:0000 | cmd2:0000 |

**SERX:** Frameerror

**lenX.:** Length of received telegram invalid

**crcX:** Checksum of the received telegram invalid

**cmdX:** Invalid command received

## Monitoring the SCROLL single lamp control unit

|              |               |
|--------------|---------------|
| 00000001     | 00000002      |
| CMD00/00     | Ta00Tb000     |
| T00          | INT00 R00 T00 |
| 3 04 05 0006 | SCROLL        |

**1:** Last SCROLL telegram to be sent

**2:** Last SCROLL telegram received

**CMD.:** SCROLL command counter

**Ta:** Timer in seconds until the next group switching command is sent automatically

**Tb:** Timer in seconds until the next lamp test command is sent automatically

**T:** Telegram timeout

**INT:** Internal processing error

**R:** Telegram repetitions

**T0:** Repetition of telegram failed

**3:** SCROLL active

**4:** SCROLL Statemachine Lifetime

**5:** SCROLL Statemachine Status

**6:** 4 flags:

- Regulator processor is currently modulating SCROLL command
- New SCROLL telegram is being processed
- SCROLL telegram ready to send
- RGL-SYNC command is being executed

|           |            |
|-----------|------------|
| RSET:0000 | INT:0000   |
| CRC 0000  | OVFL:10000 |
| NAK01 02  | 03 04      |
| 00000000  | 00 CU      |

**RSET:** KOM-SIO reset

**INT:** KOM internal error

**CRC:** KOM checksum error

**OVFL:** KOM send buffer overflow

**NAK:**

- 1 Start sign missing
- 2 Unknown command
- 3 Checksum error

- 4 Receive buffer overflow

7 Flags (last line) Are all telegrams received by the CU? Process cycle CU

## 6.4.4 Error Displays

### "No Mains Voltage"

```
APH000      Error!  
No mains voltage  
Active level:      0
```

This message indicates that the regulator is not supplied with mains voltage. One reason for this is, for example, that a back-up fuse of the regulator has tripped. If this is the case, the regulator must be switched to local operation. Then push the button O and check that the "Active level" is 0. You can now replace the fuse.

### "Overcurrent"

```
Error!  
I>IN  
Eliminate cause, press reset
```

or

```
Error!  
Overcurrent fuse, eliminate cause, press reset
```

The regulator has detected an excessive current in the series circuit if this error message appears. See [Overcurrent monitoring](#). For the remedy, see [Fault tables and troubleshooting](#).

### "Actual Value Failure"

```
Error!  
I=0  
Eliminate cause, press reset
```

or

```
Error!  
Sensor short circuit, eliminate cause, press reset
```

or

```
Error!  
Sensor cable open!  
Eliminate cause, press reset
```

If one of these error messages appears, an open series circuit has been detected. See [Actual value failure monitoring](#). For the remedy, see [Fault tables and troubleshooting](#).

### "SIM Card Error"

```
Error!  
SIM card not readable. Please reinitialize!
```

For the remedy, see [Error when reading the SIM card](#).

## "Mains Voltage Error"

```
Error!  
No mains voltage, last selected  
level: 0
```

The main power supply to the regulator has failed. For the remedy, see [Error when reading the SIM card](#).

## 6.5 Lamp Fault Calibration

---



### WARNING

#### Installation, commissioning, and service instructions

Work on airport lighting systems must, in accordance with EN 61821 (VDE 0161 Part 103), only be performed by appropriately qualified personnel. Accordingly, all persons who perform such work must have relevant and verifiable training, as well as appropriate experience and technical knowledge.

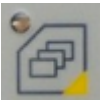
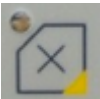
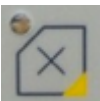
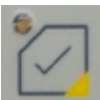
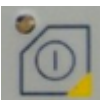
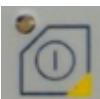
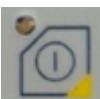
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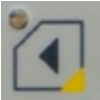
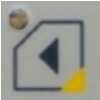
The lamp fault measurement is performed as follows:

1. Check that all lamps in the series circuit are OK and that there are no open transformers in the circuit.
2. Enter the number of lamps in the series circuit in the menu item **Circuit parameters < Number of lamps**.
3. Enter the following in the menu item for small circuits (approx. up to 20 lamps)
  - a. **Lamp error measurement < Calibration parameters < Pulled lamps 1** approx. 10% of the number of lamps (rounded, without decimal places).
  - b. The menu item ..... **< Pulled lamp 2** must have the value 0.
  - c. A second measuring reference is required for larger circuits. For example, enter the value for 15% of the lamps in the menu item ..... **< Pulled Lamps 2** on.
4. Start calibration by setting the parameter in the menu item **Lamp error measurement < Calibration parameters < Start calibration** to **yes** and exiting the menu.
5. The regulator measures the circuit at 0 % lamp error.
6. Then follow the instructions on the display.
7. The regulator will now measure the faulty lamp circuit (twice for larger circuits).
8. The data will be saved when you exit the configuration menu.
9. Replace all lamps.

## 6.6 Messages on the Regulator

Messages are shown in plain text on the LC display to indicate operating and error states. To provide a quick overview of the system, the statuses are simultaneously displayed by status LEDs in red and green.

| Button                                                                             | Color | Condition | Meaning                             |
|------------------------------------------------------------------------------------|-------|-----------|-------------------------------------|
|    | green | static    | Local operation                     |
|    | red   | flashing  | Fieldbus communication disrupted    |
|    |       | off       | Remote operation, communication OK  |
|    | green | flashing  | Lamp fault 1, lamp fault 2          |
|  | red   | flashing  | Lamp error 3                        |
|  | red   | flashing  | General error, observe display!     |
|  | green | static    | Regulator switched on               |
|  | green | flashing  | Regulator on, current not regulated |
|  |       | off       | Regulator switched off              |

| Button                                                                           | Color | Condition        | Meaning     |
|----------------------------------------------------------------------------------|-------|------------------|-------------|
|  |       | flashing briefly | ISO warning |
|  |       | flashing long    | ISO alarm   |

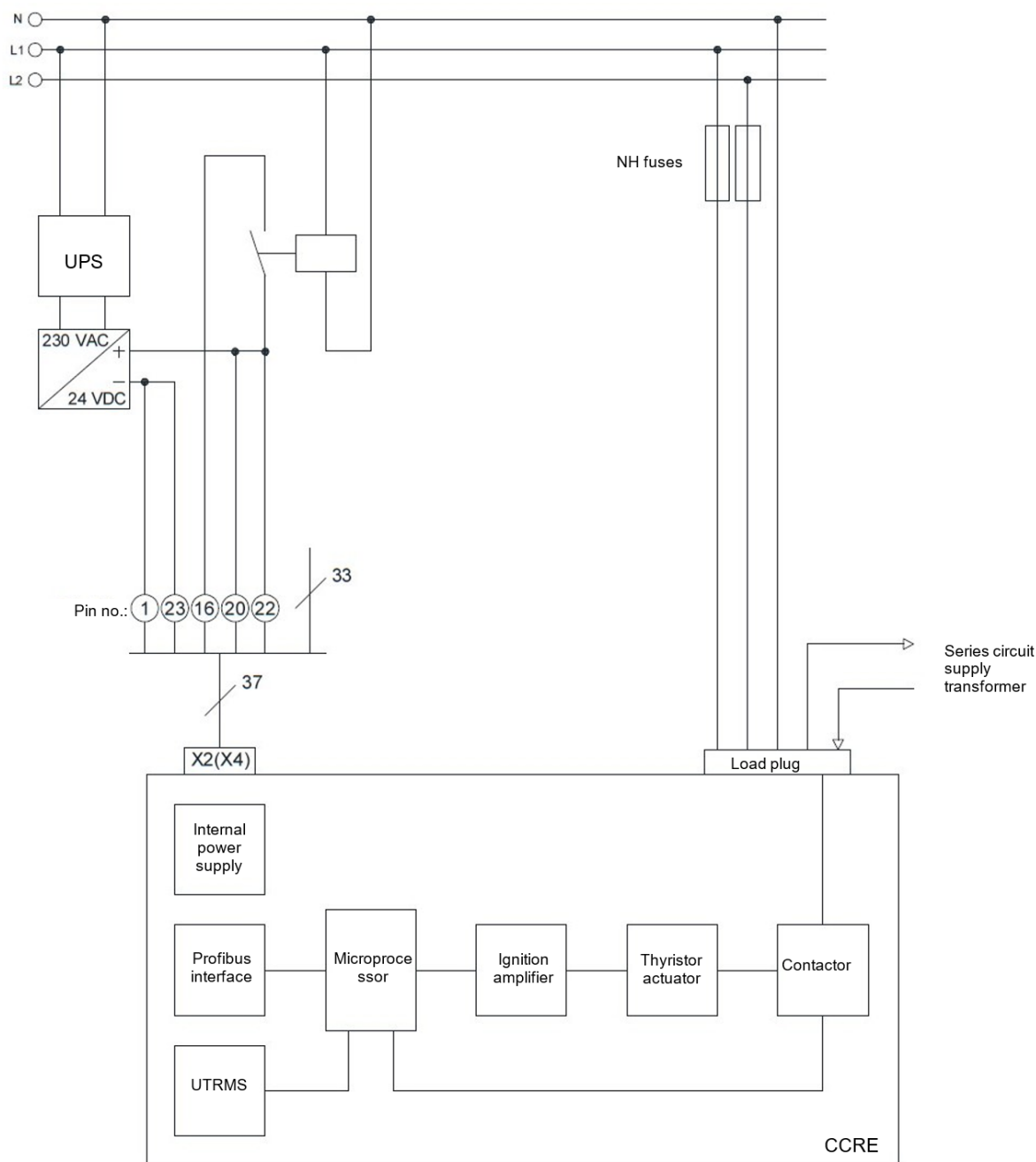
## 6.7 Remote Operation

The CCRE is operated remotely via Profibus, using a redundant interface. This automatically adapts its baud rate to the respective bus.



## 7.0 Operation with External DC Voltage Buffering

Figure 12: Circuit Diagram



The control section is supplied by a UPS-supported DC voltage. If a power failure occurs, the microprocessor saves the current status and interrupts the control of the thyristors. A corresponding message appears on the display. The saved status is immediately resumed when the mains voltage is applied again.



### WARNING

Installation, commissioning, and service instructions

Work on airport lighting systems must, in accordance with EN 61821 (VDE 0161 Part 103), only be performed by appropriately qualified personnel. Accordingly, all persons who perform such work must have relevant and verifiable training, as well as appropriate experience and technical knowledge.



## 8.0 Simple Maintenance Work and Replacement of a Regulator

### 8.1 Installation/Removal of the CCRE

#### 8.1.1 Sequence for Removal

1. Set the operating mode to "Local".
2. Switch off the constant current regulator ("OFF" level).
3. Loosen the fixing screws of the plug-in unit.
4. Pull out the regulator evenly by both handles.
5. Pull the back-up fuse.

#### 8.1.2 Installation Sequence

1. Insert the back-up fuse in the regulator cubicle.
2. Set "Local" operating mode before installation.
3. Insert the regulator into the plug-in compartment and push it evenly backwards until all the plug connections engage.
4. Insert and tighten the fixing screws.
5. If an error message is displayed, press the "Reset" button.
6. The function of the regulator is now tested in the "Local" operating mode.
7. Set the desired operating mode.

#### 8.1.3 Replacing the Power Supply Card

The plug-in cards can be accessed from the front. Expansion of the CCRE is not necessary. Follow the replacement sequence steps listed below:

1. Set "Local" operating mode.
2. Select operating hours "OFF".
3. Loosen the locking screws on the card, do not pull them out.
4. Pull out the plug-in card using the handle bar.
5. Insert the replacement plug-in card into the slide rail at the top and bottom and push it in until it makes contact with the male connector.
6. Tighten the locking screws.
7. Test the function of the regulator in "Local" operating mode.

### 8.2 Replacing the Electronic Cassette

1. Set "Local" operating mode
2. Switch off the CCRE!
3. Unscrew the cassette, do not pull out the locking screws.
4. Insert the replacement cassette into the upper and lower slide rails and push it in until it makes contact with the blade strip and screw it on.
5. Switch on the CCRE.

6. The function of the regulator is tested in the "Local" operating mode.

## 8.3 Checking the Power Contactor

1. The power contactor is used to mechanically isolate the series circuit from the actuator. It will switch the series circuit potential-free.
2. Check the contacts of the contactor for burn-off and replace them if necessary. The coil may be replaced by simply removing the switching chamber. Wear occurs on the contacts when the overcurrent monitoring system responds.
3. Also check the contacts after replacing the thyristor assembly.

## 8.4 Checking the Plug-In Connector

1. Check the power plug to ensure that its surface is in perfect condition.
2. Check the contact pins for damage caused by improper handling and replace the connection if necessary. They must not be treated with contact grease.

## 8.5 Simple Maintenance on the Entire Device

1. Check the contactor contacts for burn-off.
2. Check the power connections on the contactor for tight fit.
3. Check the electronic plug-in cards for tight fit, tighten the upper and lower locking screws if necessary.
4. Check the 4 fixing screws on the edges and the insertion brackets for tight fit.
5. Check the controls and functions in local operation.

## 8.6 Visual Inspection of the Cubicle Units

1. Check the wiring inside the regulator and transformer cubicles for mechanical stress and damage.
2. Visual inspection of the surge arresters of the series circuit supply transformer and the current transformer for actual value recording.
3. Check the earthing connections for tight fit.
4. The power fuses must be checked for correct fit.

## 9.0 Fault Tables and Troubleshooting

### 9.1 Operation by Remote Control Faulty

**Fault: Remote control not possible or only possible with limitations**

| Cause                                                                            | Remedy                                                                                                                                |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| "Local" operating mode set                                                       | Set operating mode switch to "Remote"; activate corresponding remote interface via menu; check function                               |
| Faulty function in "Local" operating mode                                        | See <a href="#">Device Failure</a>                                                                                                    |
| Overcurrent shutdown, actual value failure ==> regulator locked                  | See the following sections                                                                                                            |
| Remote control commands are present but are not executed.                        | Replace the plug-in cassette. Check function.                                                                                         |
| Remote control commands are not present at the transfer element of the regulator | For parallel operation: Check the control voltage on the connecting cables. For serial operation: check data traffic with bus decoder |
| Constant current regulator defective                                             | Replace regulator, check function                                                                                                     |

### 9.2 Overcurrent Shutdown

**Fault: Device interlock due to overcurrent shutdown**

| Cause                                                                                             | Remedy                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The rated current in the lamp circuit was exceeded by 10%:<br>Phase control cannot be controlled. | Do not press the reset button!<br><ol style="list-style-type: none"> <li>Replacing the plug-in cassette</li> <li>Press reset button, check function</li> </ol> If overcurrent shutdown happens again: <ol style="list-style-type: none"> <li>Replace the thyristor driver on the cooling plate of the CCRE</li> <li>Press reset button, check function</li> </ol> |
| Measuring ballast defective (resistance has increased)                                            | <ol style="list-style-type: none"> <li>Switch off the CCRE!!!</li> <li>Replacing the measuring ballast</li> <li>Press reset button, check function</li> </ol>                                                                                                                                                                                                     |
| Constant current regulator defective. (thyristor assembly through-alloyed)                        | <ol style="list-style-type: none"> <li>Replacing the CCRE</li> <li>Press reset button, check function</li> </ol>                                                                                                                                                                                                                                                  |

### 9.3 Actual Value Failure: "Sensor Line Open"

**Fault: Device interlock due to actual value failure**

| Cause                                                                  | Remedy                                                                                                                |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Lines from the CCRE to the sensor current transformer are interrupted. | <ol style="list-style-type: none"> <li>Check cables for continuity</li> <li>Press X button, check function</li> </ol> |
| Defective plug-in cassette                                             | Replace plug-in cassette, check function                                                                              |
| CCRE defective                                                         | Replace CCRE and check function                                                                                       |

## 9.4 Actual Value Failure: "Sensor Short Circuit / Open Power Circuit"

**Fault: Device interlock due to actual value failure**

| Cause                                                                  | Remedy                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "Series circuit interrupted; No actual value can be acquired"          | Check outdoor system for cable breakage<br>For the series circuit supply transformer:<br>Check the windings for continuity.<br>Check the connecting cables from the CCRE to the series circuit supply transformer.<br>Sensor current transformer: Check the windings for continuity, replace if necessary.<br>After troubleshooting: Press the X button, check function |
| Ignition amplifier does not supply ignition pulses                     | Replace the ignition amplifier assembly, check function.                                                                                                                                                                                                                                                                                                                |
| Defective plug-in cassette                                             | Replace the plug-in cassette, check function.                                                                                                                                                                                                                                                                                                                           |
| Series circuit is not interrupted, but CCR still goes into fault mode" | Check the set capacity threshold.<br>Set the threshold to 0<br>Start the CCR<br>Reset the capacity threshold (see <a href="#">Capacity monitoring</a> )                                                                                                                                                                                                                 |
| Output signal of the current transformer is short-circuited            | Check the connecting cable from the current transformer to the CCRE.<br>Check the control plug assignment:<br>XX2:B3: Current sensor LD1<br>XX2:B4: Reference point                                                                                                                                                                                                     |
| CCRE defective                                                         | Replace CCRE and check function                                                                                                                                                                                                                                                                                                                                         |



### ATTENTION

**When checking the outdoor installation and transformers:**

Switch off the CCRE and remove the NH fuses in the regulator cubicle and the low-voltage distribution system!

## 9.5 Device Failure

**Fault: Complete regulator failure**

| Cause                                                  | Remedy                                       |
|--------------------------------------------------------|----------------------------------------------|
| Back-up fuse in the regulator cubicle defective        | Replace the NH00 fuse                        |
| Miniature fuse in CCRE defective                       | Replace the fuse                             |
| Power supply card defective(Failure of all displays)   | Replace power supply card, check function    |
| Defective plug-in cassette(Failure of the LCD display) | Replace the plug-in cassette, check function |
| CCRE defective                                         | Replace CCRE and check function              |

## 9.6 Triggering the Power Backup

| Fault: Power fuse in the regulator cubicle has responded                                |                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cause                                                                                   | Remedy                                                                                                                                                                                |
| Short circuit in the supply line from the CCRE to the series circuit supply transformer | <ol style="list-style-type: none"> <li>1. Pull defective fuse</li> <li>2. Check cables and replace if necessary</li> <li>3. Install intact fuse</li> <li>4. Check function</li> </ol> |
| Series circuit supply transformer has inter-turn short circuit or earth connection      | Replace series circuit supply transformer, check function                                                                                                                             |
| CCRE defective                                                                          | Replace CCRE and check function                                                                                                                                                       |

## 9.7 Error When Reading the SIM Card

### Fault: The SIM card is not readable

| Cause                                               | Remedy                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No SIM card has been inserted in the CCRE           | <ol style="list-style-type: none"> <li>1. Remove the CCRE, see <a href="#">Sequence for removal</a></li> <li>2. Insert the SIM card into the card holder on the bus PCB behind the electronics cassette.</li> <li>3. Install CCRE, see <a href="#">Installation sequence</a></li> </ol> |
| An error has occurred when writing to the SIM card. | <ol style="list-style-type: none"> <li>1. Hold down the UP and DOWN buttons at the same time</li> <li>2. Also briefly press the RESET button. Hold down the buttons UP and DOWN until the display shows: "Initializing SIM-card..."</li> </ol>                                          |
| SIM card defective                                  | Replace SIM card                                                                                                                                                                                                                                                                        |



## 10.0 Pin Assignment of the CCRE

### 10.1 Assignment of Power Plug -X1 for CCR 1XX

| Pin | Signal | Description            |
|-----|--------|------------------------|
| 1.1 | I      | Neutral conductor      |
| 1.2 | PE     | Protective earth       |
| 2.1 | I      | Neutral conductor      |
| 2.2 | PE     | Protective earth       |
| 3.1 | T12    | Transformer output     |
| 3.2 | T12)   | Transformer output     |
| 4.1 | L12    | Supply line phase 2    |
| 4.2 | L12    | Supply line phase 2    |
| 5.1 | ISO    | ISO                    |
| 5.2 | ISO    | ISO                    |
| 6.1 | T11    | Transformer output     |
| 6.2 | T11    | Transformer output     |
| 7.1 | L11    | Supply line phase 1    |
| 7.2 | L11    | in Supply line phase 1 |

### 10.2 Assignment of Power Plug -X1 for CCR 5XX

| Pin | Signal | Description         |
|-----|--------|---------------------|
| 1.1 | I      | Neutral conductor   |
| 1.2 | PE     | Protective earth    |
| 2.1 | I      | Neutral conductor   |
| 2.2 | PE     | Protective earth    |
| 3.1 | T12    | Transformer output  |
| 3.2 | T12)   | Transformer output  |
| 4.1 | L12    | Supply line phase 1 |
| 4.2 | L12    | Supply line phase 2 |
| 5.1 | ISO    | ISO 2               |
| 5.2 | ISO    | ISO 1               |
| 6.1 | T11    | Transformer output  |
| 6.2 | T11    | Transformer output  |
| 7.1 | L11    | Supply line phase 1 |
| 7.2 | L11    | Supply line phase 2 |

### 10.3 Assignment of the Service Interface

There is an RJ45 socket on the front of the electronics cassette. It is used to parameterize the regulator and program the processors.

| Pin | Signal  | Description                                                                |
|-----|---------|----------------------------------------------------------------------------|
| 1   | RXD     | RXD for interface 1 communication processor (programming and LTOP)         |
| 2   | TXD     | TXD for interface 1 communication processor (programming and LTOP)         |
| 3   | PROG100 | Programming command for control processor (must be connected to VSS)       |
| 4   | PROG    | Programming command for communication processor (must be connected to VSS) |
| 5   | MRESET  | Reset input for both processors (must be connected to VSS)                 |
| 6   | VSS     | Earth for RS232 interfaces and reference potential for switching inputs    |
| 7   | TXD100  | TXD for interface 1 control processor (programming)                        |
| 8   | RXD100  | RXD for interface 1 control processor (programming)                        |

## 11.0 Technical Data

|                                           |                              |
|-------------------------------------------|------------------------------|
| <b>Input voltage</b>                      | 400 V AC $\pm 10\%$          |
| <b>Input current</b>                      | max. 50 A / 100 A            |
| <b>Mains frequency</b>                    | 50 Hz $\pm 7.5\%$            |
| <b>max. output current</b>                | 6.6 A                        |
| <b>Average efficiency</b>                 | > 90%                        |
| <b>UPS supply</b>                         | external                     |
| <b>Brightness levels</b>                  | 7 freely configurable        |
| <b>Serial interface:</b>                  | 2 x Profibus                 |
| <b>Control speed</b>                      | in accordance with IEC 61822 |
| <b>Response time</b>                      | in accordance with IEC 61822 |
| <b>Shutdown behavior control accuracy</b> | 1%                           |
| <b>Humidity</b>                           | max. 95% rel.                |
| <b>Installation site/air pressure</b>     | < 2000 m above sea level     |
| <b>Working temperature range</b>          | -5°C - +50°C                 |
| <b>Dimensions WxHxD (mm)</b>              | 483x132x509                  |



## 12.0 Accessories

The following accessories are available on request:

- **Parameterization Adapter**

The ADA 003 parameterization adapter is used in conjunction with service software to implement signal conversion between the regulator and the COM interface of a computer for convenient parameterization of the regulator.

- **Service Software**

The lucDMC service software is used for convenient parameterization of the regulator.

### 12.1 Parameterization Adapter

The ADA 003 parameterization adapter is used in conjunction with service software to implement signal conversion between the regulator and the COM interface of a computer for convenient parameterization of the regulator.

### 12.2 Service Software

The lucDMC service software is used for convenient parameterization of the regulator.



## Appendix A: SUPPORT

Our experienced engineers are available for support and service at all times, 24 hour/7 days a week. They are part of a dynamic organization making sure the entire ADB SAFEGATE is committed to minimal disturbance for airport operations.

### ADB SAFEGATE Support

#### Technical Support – Global

Customers in Europe, the Middle East, Africa or Asia Pacific are more than welcome to our portal for technical support. Trained in all areas of system issues, troubleshooting, quality control and technical assistance, our highly experienced Technical support specialists are available 24 hours a day, seven days a week to provide assistance over the phone. In the Americas, we also offer live technical support.

#### Live Technical Support – Americas

If at any time you have a question or concern about your product, contact ADB SAFEGATE's US-based technical support specialists, available 24 hours a day, seven days a week, to assist you via phone.

ADB SAFEGATE Americas Technical Service & Support (US & Canada) : **+1-800-545-4157**

ADB SAFEGATE Americas Technical Service & Support (Canada): **+1-905-631-1597**

ADB SAFEGATE Americas Technical Service & Support (International): **+1-614-861-1304**

We can also be reached via email during regular business hours:

Airfield and Gate: **techservice.us@adbsafegate.com**

Gate: **gateservice.us@adbsafegate.com**

We look forward to working with you!

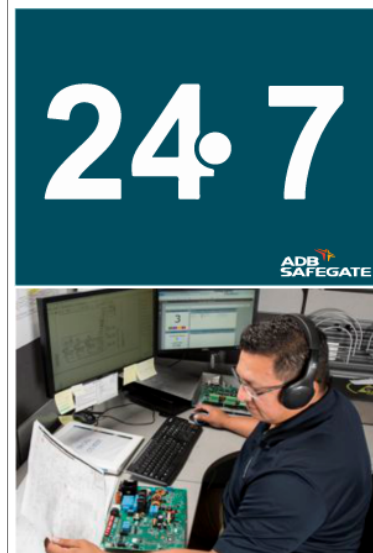
#### Before You Call

When you have an airfield lighting or system control system problem, prior to calling, please ensure the following:

- Review the product's manual and troubleshooting guide.
- Be located with the product ready to troubleshoot.
- Have all necessary information available: airport code/company name, customer id number, contact phone number/email address, product/part number.
- Have a True RMS meter available and any other necessary tools.

When calling about an issue with Safedock A-VDGS, we can serve you better if you collect the following information before you call:

- Relevant information regarding the issue you are calling about, such as gate number, flight number, aircraft type and time of the event.
- What, if any, actions have been taken to resolve the issue prior to the call.
- If available, provide a CCTV recording of the incident to aid in aligning the information from the Safedock log file.



### Note

For more information, see [www.adbsafegate.com](http://www.adbsafegate.com), contact ADB SAFEGATE Support via email at [support@adbsafegate.com](mailto:support@adbsafegate.com) or Europe: +32 2 722 17 11

Americas: +1 614 861 1304. Press 3 for technical service or press 4 for sales support.

China: +86 (10) 8476 0106

Middle East and Africa: +971 4 452 7575

## A.1 ADB SAFEGATE Website

The ADB SAFEGATE website, [www.adbsafegate.com](http://www.adbsafegate.com), offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

## A.2 Recycling

### A.2.1 ADB SAFEGATE Recycling

ADB SAFEGATE is fully committed to environmentally-conscious manufacturing with strict monitoring of our own processes as well as supplier components and sub-contractor operations. ADB SAFEGATE offers a recycling program for our products to all customers worldwide, whether or not the products were sold within the EU.

ADB SAFEGATE products and/or specific electrical and electronic component parts which are fully removed/separated from any customer equipment and returned will be accepted for our recycling program.

All items returned must be clearly labeled as follows:

- For RoHS/WEEE Recycling
- Sender contact information (Name, Business Address, Phone number).
- Main Unit Serial Number.

ADB SAFEGATE will continue to monitor and update according for any future requirements for EU directives as and when EU member states implement new regulations and or amendments. It is our aim to maintain our compliance plan and assist our customers.

#### A.2.1.1 Local Authority Recycling

The disposal of ADB SAFEGATE products is to be made at an applicable collection point for the recycling of electrical and electronic equipment. The correct disposal of equipment prevents any potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling. The recycling of materials helps to conserve natural resources. For more detailed information about recycling of products, contact your local authority city office.



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