Ferroresonant Switchgear Regulator System (SGRS)

Removable Constant Current Regulator Powerpack

User Manual

96A0304, Rev. F, 2025/03/26

ADB SAFEGATE

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.

ADB SAFEGATE reserves the right to examine goods upon which a claim is made. Said goods must be presented in the same condition as when the defect therein was discovered. ADB SAFEGATE furthers reserves the right to require the return of such goods to establish any claim.

ADB SAFEGATE's obligation under this guarantee is limited to making repair or replacement within a reasonable time after receipt of such written notice and does not include any other costs such as the cost of removal of defective part, installation of repaired product, labor or consequential damages of any kind, the exclusive remedy being to require such new parts to be furnished.

ADB SAFEGATE's liability under no circumstances will exceed the contract price of goods claimed to be defective. Any returns under this guarantee are to be on a transportation charges prepaid basis. For products not manufactured by, but sold by ADB SAFEGATE, warranty is limited to that extended by the original manufacturer. This is ADB SAFEGATE's sole guarantee and warranty with respect to the goods; there are no express warranties or warranties of fitness for any particular purpose or any implied warranties of fitness for any particular purpose or any implied warranties other than those made expressly herein. All such warranties being expressly disclaimed.

Standard Products Guarantee

Products manufactured by ADB SAFEGATE are guaranteed against mechanical, electrical, and physical defects (excluding lamps) which may occur during proper and normal use for a period of two years from the date of ex-works delivery, and are guaranteed to be merchantable and fit for the ordinary purposes for which such products are made.

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.

FAA Certified products manufactured by ADB SAFEGATE

ADB SAFEGATE L858 Airfield Guidance Signs are warranted against mechanical and physical defects in design or manufacture for a period of 2 years from date of installation, per FAA AC 150/5345-44 (applicable edition).

ADB SAFEGATE LED products (with the exception of obstruction lighting) are warranted against electrical defects in design or manufacture of the LED or LED specific circuitry for a period of 4 years from date of installation, per FAA EB67 (applicable edition). These FAA certified constant current (series) powered LED products must be installed, interfaced and powered with and through products certified under the FAA Airfield Lighting Equipment Program (ALECP) to be included in this 4 (four) year warranty. This includes, but is not limited to, interface with products such as Base Cans, Isolation Transformers, Connectors, Wiring, and Constant Current Regulators.

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.

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.

	WARNING Failure to observe a warning may result in personal injury, death or equipment damage.
	DANGER – Risk of electrical shock or ARC FLASH 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.
	WARNING – Wear personal protective equipment Failure to observe may result in serious injury.
	WARNING – Do not touch Failure to observe this warning may result in personal injury, death, or equipment damage.
	CAUTION Failure to observe a caution may result in equipment damage.
	ELECTROSTATIC SENSITIVE DEVICES This equipment may contain electrostatic devices.

Qualified Personnel

	**Important Information** The term **qualified personnel** 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. Always use required personal protective equipment (PPE) and follow safe electrical work practice.

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 Material Handling: Heavy Equipment

DANGER

UNSTABLE LOAD
USE CAUTION WHEN MOVING HEAVY EQUIPMENT

- USE EXTREME CARE WHEN MOVING HEAVY EQUIPMENT.
- VERIFY THAT THE MOVING EQUIPMENT IS RATED TO HANDLE THE WEIGHT.
- WHEN REMOVING EQUIPMENT FROM A SHIPPING PALLET, CAREFULLY BALANCE AND SECURE IT USING A SAFETY STRAP.

FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN DEATH, SERIOUS INJURY, OR 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

1.1.7 Arc Flash and Electric Shock Hazard

DANGER

SERIES CIRCUITS HAVE HAZARDOUS VOLTAGES
THIS EQUIPMENT PRODUCES HIGH VOLTAGES TO MAINTAIN THE SPECIFIED CURRENT - DO NOT DISCONNECT WHILE ENERGIZED.

- ALLOW ONLY QUALIFIED PERSONNEL TO PERFORM MAINTENANCE, TROUBLESHOOTING, AND REPAIR TASKS.
- ONLY PERSONS WHO ARE PROPERLY TRAINED AND FAMILIAR WITH ADB SAFEGATE EQUIPMENT ARE PERMITTED TO SERVICE THIS EQUIPMENT.
- AN OPEN AIRFIELD CURRENT CIRCUIT IS CAPABLE OF GENERATING >5000 VAC AND MAY APPEAR OFF TO A METER.
- NEVER UNPLUG A DEVICE FROM A CONSTANT CURRENT CIRCUIT WHILE IT IS OPERATING; ARC FLASH MAY RESULT.
- DISCONNECT AND LOCK OUT ELECTRICAL POWER.
- ALWAYS USE SAFETY DEVICES WHEN WORKING ON THIS EQUIPMENT.
- FOLLOW THE RECOMMENDED MAINTENANCE PROCEDURES IN THE PRODUCT MANUALS.
- DO NOT SERVICE OR ADJUST ANY EQUIPMENT UNLESS ANOTHER PERSON TRAINED IN FIRST AID AND CPR IS PRESENT.
- CONNECT ALL DISCONNECTED EQUIPMENT GROUND CABLES AND WIRES AFTER SERVICING EQUIPMENT. GROUND ALL CONDUCTIVE EQUIPMENT.
- USE ONLY APPROVED ADB SAFEGATE REPLACEMENT PARTS. USING UNAPPROVED PARTS OR MAKING UNAPPROVED MODIFICATIONS TO EQUIPMENT MAY VOID AGENCY APPROVALS AND CREATE SAFETY HAZARDS.
- CHECK THE INTERLOCK SYSTEMS PERIODICALLY TO ENSURE THEIR EFFECTIVENESS.
- DO NOT ATTEMPT TO SERVICE ELECTRICAL EQUIPMENT IF STANDING WATER IS PRESENT. USE CAUTION WHEN SERVICING ELECTRICAL EQUIPMENT IN A HIGH-HUMIDITY ENVIRONMENT.
- USE TOOLS WITH INSULATED HANDLES WHEN WORKING WITH AIRFIELD ELECTRICAL EQUIPMENT.

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

2.0 Ferroresonant Switchgear Regulator System (SGRS)

Removable Constant Current Regulator Powerpack [4-30kW, 6.6 A / 20 A]

2.1 About this manual

The manual shows the information necessary to:

- Install
- Carry Out Maintenance
- Carry Out Troubleshooting on the SGRS.

2.2 How to work with the manual

1. Familiarize yourself with the structure and content.
2. Carry out the actions completely and in the given sequence.

Ferroresonant Switchgear Regulator System (SGRS)

3.0 SGRS Overview

The ADB Airfield Solutions L-828/L-829 Switchgear Regulator System (SGRS) supply either three or five precision output current levels (6.6 A/20 A maximum) for series lighting circuits on airport runways and taxiways. The SGRS Constant Current Regulators (CCRs) referred to as Powerpacks are available in 4 kW through 30 kW sizes.

The ADB Airfield Solutions L-828 air-cooled SGRS CCRs are designed to:

- Accurately regulate the output current to within ±3% of the adjustable nominal level from no load to full load and with input voltage variations of -5% to +10% of nominal (-40 °C to +55 °C)
- Maintain the nominal output current levels even when 30 percent of the isolation transformers in the series lighting circuit supplied by the regulator have open secondaries

The SGRS system provides for maximum safety and maintainability by:

- Providing the industry's only slide-out Powerpack design
- Separating high voltage and low voltage components
- Mounting only low voltage components to the doors, for example, printed circuit boards
- Placing high voltage components behind an additional clear polycarbonate shield
- Using color warning labels throughout the system for technical safety

3.1 SwitchGear Regulator System

Compliance with Standards

FAA:	L-828/L-829 AC 150/5345-10 (Current Edition). Monitoring according to AC 150/5345-10 (Current Edition). Ferroresonant powerpacks are ETL Certified.
ICAO:	Aerodrome Design Manual Part 5, para. 3.2.1.4 to 3.2.1.6
Military:	UFC 3-535-01; NAVAIR 51-50AAA-2

Uses

Supplies three or five precision output currents to power series lighting circuits on airport runways and taxiways. The SwitchGear Regulator System is available in a ferroresonant design, which is optimized for lowest EMI and best power factor.

Features

- Integrated Advanced Control Equipment (ACE) system provides full control and L-827/L-829 capabilities. See DS-3097 for additional information.
- Uses up to 67% less space in the airfield vault
- All wiring goes into an incoming power bay and is transferred via bus bars to the power packs, eliminating the need for separate input power wiring to individual Constant Current Regulators (CCRs)
- Front doors have a two-point latching system for smooth operation and positive seal
- Built-in True-RMS reading ammeter
- Available in two classes and styles:

  Class 1 = 6.6 A max. output current from 2.5 kW to 30 kW

  Class 2 = 20 A max. output current from 15 kW to 70 kW

  Style 1 = 3 Brightness Step CCR (6.6 A only)

  Style 2 = 5 Brightness Step CCR (6.6 A or 20 A)
- Air-cooled to allow more efficient transfer of heat from the power core and eliminate the need for oil containment reservoirs in the vault
- Accurately regulates the output current to within ±3% of the adjustable nominal level from no load to full load and with an input voltage variation of -5% to +10%
- Nominal output current levels are maintained even when 30% of the isolation transformers have open secondaries
- If input power loss occurs, operation will resume within five seconds after restoration of input power

- A gray polyester electrostatic paint is applied over a zinc undercoat to the NEMA 12-rated enclosure.

Ordering Information

To order a SwitchGear Regulator System, contact the ADB SAFEGATE Sales Department.

Protection

L-828 SGRS CCRs have the following protection devices:

- Output overcurrent
- Output open-circuit
- Lightning and transient protection on output terminals
- Fuse protection: Remote control supply voltage (+48 VDC or 120 VAC) and power supply for control board
- Input breaker for supply voltage
- Input lightning protection

Control

L-828 SGRS CCRs have the following controls:

- Local operation using a front panel rotary switch
- Remote operation using either 120 VAC (Internal or External) or +48 VDC (External) signals
- Optional remote operation via an Airport Lighting Control & Monitoring System (ALCMS) using ADB SAFEGATE's integrated ACE system

Theory of Operation

Ferroresonant

The regulator consists of a ferroresonant transformer, capacitors, and control circuitry. Output current regulation is accomplished by adjusting the ferroresonance in the capacitor bank using an electronic feedback network.

Operating Conditions

Temperature	-40 °F to +131 °F / -40 °C to +55 °C
Humidity	10 to 95%
Altitude	0 to 6,600 ft / 2,000 m

Optional Equipment

Ferroresonant SGRS Lift, Battery Operated (Requires 11 ft of space in front of lineup)	44A7027

SGRS Power Supply

Power Input	480 VAC, 60 Hz, three-phase Each individual CCR is powered by 480 VAC, 60 Hz, single-phase
Powerpack Power Factor (See Note after the table)	0.99 or more for 2.5 to 30 kW 0.95 or more for 50 and 70 kW
Powerpack Efficiency (See Note after the table)	90% minimum for 2.5 to 25 kW 92% minimum for 30 kW 93% minimum for 50 kW 94% minimum for 70 kW

Note

Powerpack Power Factor and Efficiency tested with 100% resistive load according to FAA AC 150/5345-10 (current edition)

Options

- Built-in LED True-RMS output current digital meter can optionally display output True-RMS voltage and VA
- Custom fault current ratings available, 65K AIR standard
- Temperature alarm
- Double bus for large systems
- Fan ON indicator
- Door interlock LED indicates door not properly closed
- Airfield insulation resistance measurement system (see data sheet 1218 for details)

SGRS CCR Dimensions/Weight

Ferroresonant H × W × D
Powerpack Bay 102 × 38.5 × 48 in / 259 × 97.79 × 121.92 cm
Cutout Bay 102 × 38.5 × 48 in / 259 × 97.79 × 121.92 cm
Power Bay 102 × 24 × 48 in / 259 × 61 × 121.92 cm
Interface Bay 102 × 24 × 48 in / 259 × 61 × 121.92 cm
Maximum Weight - 30kW Powerpack 1300 lb / 590 kg

Note

Ferroresonant SGRS is certified under part number FLPPXXXX/XXXX for 2.5 to 30kW powerpacks and PHFXXXX/XXX for 50 to 70 kW powerpacks.

3.2 SGRS Configuration Options

The SGRS consists of a multipurpose indoor enclosure system designed to use a bus bar style system to distribute input power to a series of regulator bays. The enclosure integrates the input power, control signal wiring connections and airfield series circuit output cables in a single station. The SGRS system consists of a combination of several possible types of bays:

- Incoming Power Bay
- Remote Lighting Control Bay
- S1 Series Circuit Cutout Bay
- L-847 Circuit Selector Bay
- L-828 / L-829 Powerpack Bay)

Note

SGRS Systems are designed to the requirements of each airport. Please refer to the system prints package supplied with the SGRS system for the bay configuration of a particular SGRS.

4.0 Installation

Read the installation section of all system component manuals before installing the equipment. A thorough understanding of system components and their requirements helps install the system safely and efficiently.

WARNING

Failure to follow these safety procedures can result in personal injury or death.

- Allow only qualified personnel to install ADB Safegate products and auxiliary equipment. Use only approved equipment. Using unapproved equipment in an approved system may void agency approvals.
- Make sure all equipment is rated and approved for the environment in which it is being used. Follow all instructions for installing components and accessories.
- 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

5.0 Operation

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.
- 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.

5.1 System or Component Malfunction

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.

5.2 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

6.0 Switchgear Regulator Overview

The ADB Safegate L-828/L-829 Switchgear Regulator System (SGRS) supplies either three or five precision output current levels (6.6 A/20 A maximum) for series lighting circuits on airport runways and taxiways. The SGRS Constant Current Regulators (CCRs) referred to as Powerpacks are available in 4 kW through 30 kW sizes.

The ADB Safegate L-828 air-cooled SGRS CCRs are designed to:

- Accurately regulate the output current to within ±3% of the adjustable nominal level from no load to full load and with input voltage variations of -5% to +10% of nominal (-40 °C to +55 °C).
- Maintain the nominal output current levels even when 30 percent of the isolation transformers in the series lighting circuit supplied by the regulator have open secondaries.

The SGRS system provides for maximum safety and maintainability by:

- Providing the industry's only slide-out Powerpack design.
- Separating high voltage and low voltage components.
- Mounting only low voltage components to the doors, for example, printed circuit boards.
- Placing high voltage components behind an additional clear polycarbonate shield.
- Using color warning labels throughout the system for technician safety.

7.0 SGRS Configuration Options

The SGRS consists of a multipurpose indoor enclosure system designed to use a bus bar style system to distribute input power to a series of regulator bays. The enclosure integrates the input power, control signal wiring connections and airfield series circuit output cables in a single station. The SGRS system consists of a combination of several possible types of bays:

- Incoming Power Bay
- Remote Lighting Control Bay
- S1 Series Circuit Cutout Bay
- L-847 Circuit Selector Bay
- L-828 / L-829 Powerpack Bay)

Note

SGRS Systems are designed to the requirements of each airport. Please refer to the system prints package supplied with the SGRS system for the bay configuration of a particular SGRS.

7.1 Incoming Power Bay

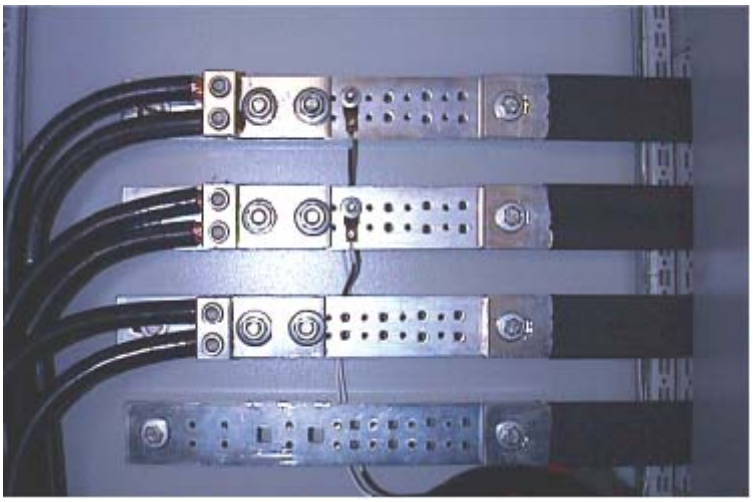
The Incoming Power Bay houses terminals for the input electrical power wiring and a step-down power transformer and protective fuses.

The optional main fuseable disconnect for the SGRS is located on the front door of the Incoming Power Bay. By transferring the disconnect to the ON or OFF position, power to the entire SGRS can be turned on or off. Refer to Figure 1.

Figure 1: Fuseable Disconnect

From the main fuseable disconnect (optional) the power is then distributed to the bus bar located at the back of the SGRS enclosure. See Figure 2.

Figure 2: Incoming Electrical Power from Disconnect



7.2 Single Main Fuseable Disconnect

CAUTION

If the disconnect option is not included in your system configuration, you must provide adequate rated overcurrent protection prior to incoming service to the SGRS. Failure to observe this warning may result in personal injury, death, or equipment damage.

The optional main fuseable disconnect provides proper rated overcurrent protection and the ability to disconnect incoming service to the SGRS. Two options exist in the Incoming Power Bay; a single disconnect (discussed in this section) and a dual disconnect (discussed in next section).

Table 1: Single Disconnect Operation

Single Disconnect Position	Function
ON	Incoming service is supplied to entire SRGS
OFF	Incoming service is disconnected to entire SRGS

Refer to "Operation" for summary of operation. When the disconnect is set to the ON position:

- Input power from the disconnect is routed to bus bars (A, B, C) run in back of the SGRS enclosure.
- Bars A, B, C, N (neutral) and GND (Ground) run horizontally across the top and back of the enclosure.
- Power to lower bays is via electrical wiring from upper bus bar to lower bay regulators.
- Input power is also routed to an auxiliary step-down Transformer T1 (480 V/120 VAC) which provides dedicated 120 VAC power for other auxiliary equipment. Refer to wiring diagrams in the SGRS system drawings for more information.

7.3 Dual Main Fuseable Disconnect

CAUTION

If the disconnect option is not included in your system configuration, you must provide adequate rated overcurrent protection prior to incoming service to the SGRS. Failure to observe this warning may result in personal injury, death, or equipment damage.

The optional dual main fuseable disconnect provides proper rated overcurrent protection and the ability to disconnect incoming service to both the upper and lower SGRS independently of each other.

Table 2: Dual Disconnect Operation

Upper disconnect position	Upper disconnect position	Function
OFF	OFF	Incoming Service is Disconnected from Both Upper and Lower SRGS
OFF	ON	Incoming Service is Connected to Lower SRGS only
ON	OFF	Incoming Service is Connected to Upper SRGS only
ON	ON	Incoming Service is Connected to Both Upper and Lower SRGS

WARNING

Always confirm power is disconnected with a proper votage tester prior to working in the SRGS.

Refer to "Operation" for summary of operation. When the corresponding disconnect is set to the ON position:

- Input power from the corresponding disconnect is routed to bus bars (A, B, C) run in back of the SGRS enclosure.
- Upper bus bars A, B, C, N (neutral) are run horizontally across the top and back of the enclosure.
- Lower bus bars A, B, C, N (neutral) are run horizontally across the bottom back of the enclosure.
- The GND (Ground) bus is run approximately in the back-middle of the enclosure and provides ground connections for both upper and lower cabinets.
- Input power is also routed to an auxiliary step-down Transformer T1 (480 V/120 VAC) which provides dedicated 120 VAC power for other auxiliary equipment. Refer to wiring diagrams in the SGRS system drawings for more information.

WARNING

Operating the upper bank of CCRs with the lower main breaker off could cause the CCRs to overheat. It is recommended that if the lower circuit breaker is off, the CCRs should not be run.

7.4 Digital Voltage and Current Meter

See Figure 3. The Incoming Power Bay may optionally be designed with an input digital voltage and current meter. The meter is located on the front door of the Incoming Power Bay and is interfaced to the incoming power bay bus bar and installed Current Transformers (CT).

Figure 3: Digital Voltage and Current Meter

See Figure 4. The incoming power cable is routed through the CTs before being attached to each phase of the incoming power. The secondary side of each CT is interfaced with the digital meter.

Figure 4: Current Transformer Installation

7.5 S1 Series Circuit Cutout Bay

An optional cabinet in the SGRS line-up exists to accommodate S1 Series Circuit Cutout(s) and a convenient tie-in for the output electrical wiring to the airfield lighting circuit. Typically, there is one S1 plug cutout for each series lighting loop circuit. Refer to Figure 5.

Figure 5: S1 Series Circuit Cutout

The S1 cutout is a device that shorts the output of the regulator together when the handle is removed. The airfield circuit is also be shunted together to dissipate any electrical charge built up in the circuit.

WARNING

S1 cutouts are not designed to be removed while the load is active. Circuits connected to S1 cutout must be turned OFF prior to S1 removal. Failure to observe this warning may result in personal injury, death, or equipment damage.

The S1 cutouts are panel-mounted and arranged so the output field cabling is routed from each CCR to the S1 cutout, and from the S1 cutout to the airfield lighting circuit. See Figure 6.

Figure 6: S1 Series Circuit Cutout Bay

7.6 S1 Cutout Operations

Refer to S1 cutout manual for more detailed information on S1 operation. The table below provides basic information for operation of the S1 cutout.

Table 3: S1 Series Circuit Cutout Operation

Operation	Result
Remove the handle portion of the cutout	Shorts the output of the regulator and shunts the airfield circuit
Re-insert the handled portion of the cutout	Connects the field circuit to the output of the regulator

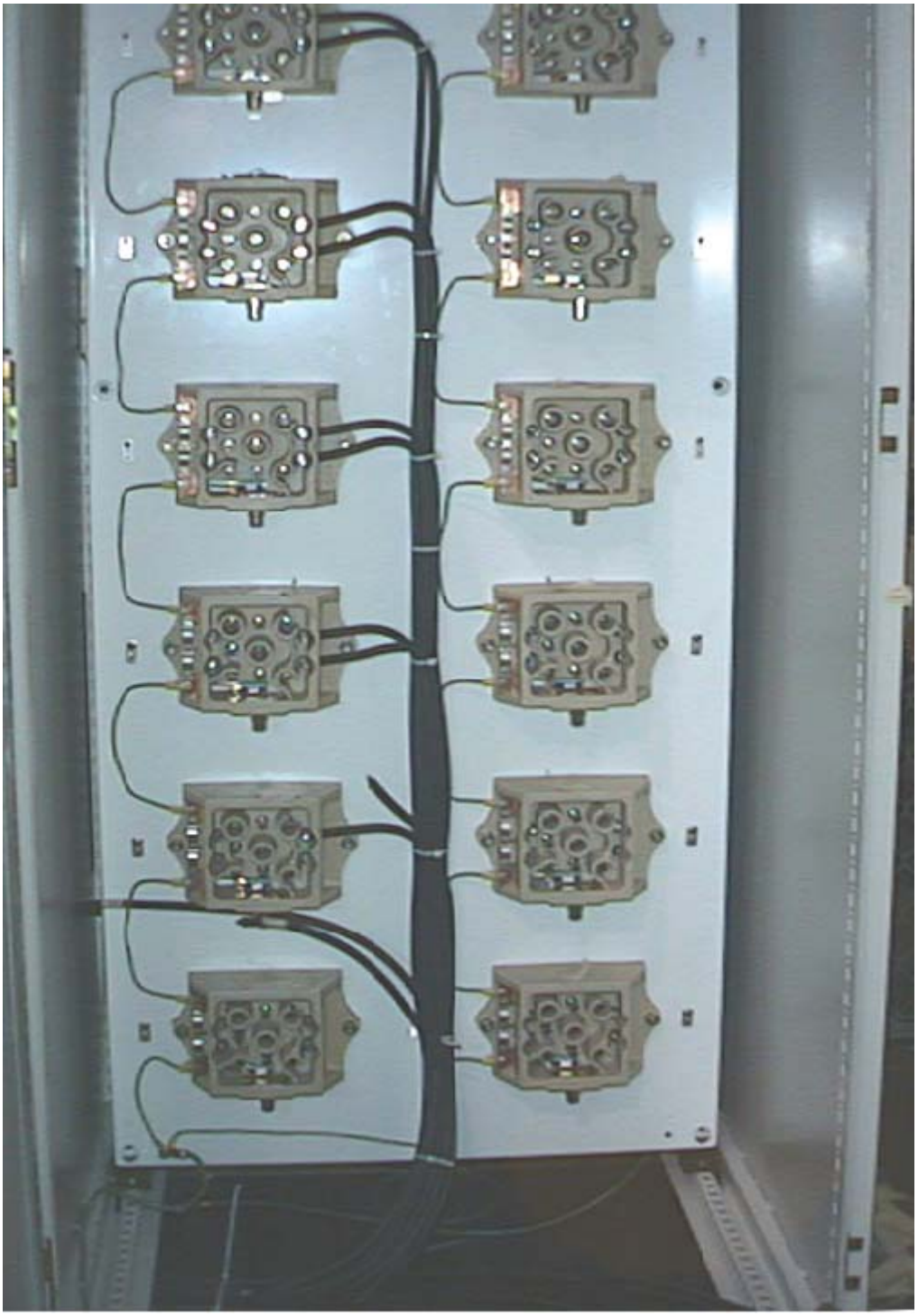
The S1 cutout has two functions:

1. To disconnect and shunt the airfield lighting circuit from the regulator configuration for maintenance.

2. To short the output of the constant current regulator, to allow for equipment tests and calibration that would not be available otherwise.

Figure 7 with its S1s removed, shows the S1 cutout bay with the S1 housings.

Figure 7: S1 Series Circuit Cutout Bay with S1s Removed



7.7 S1 Series Circuit Cutout with Optional Interlock

The optional S1 cutout interlock provides an additional safety feature to prevent a deenergized circuit from being energized while being serviced by maintenance personnel.

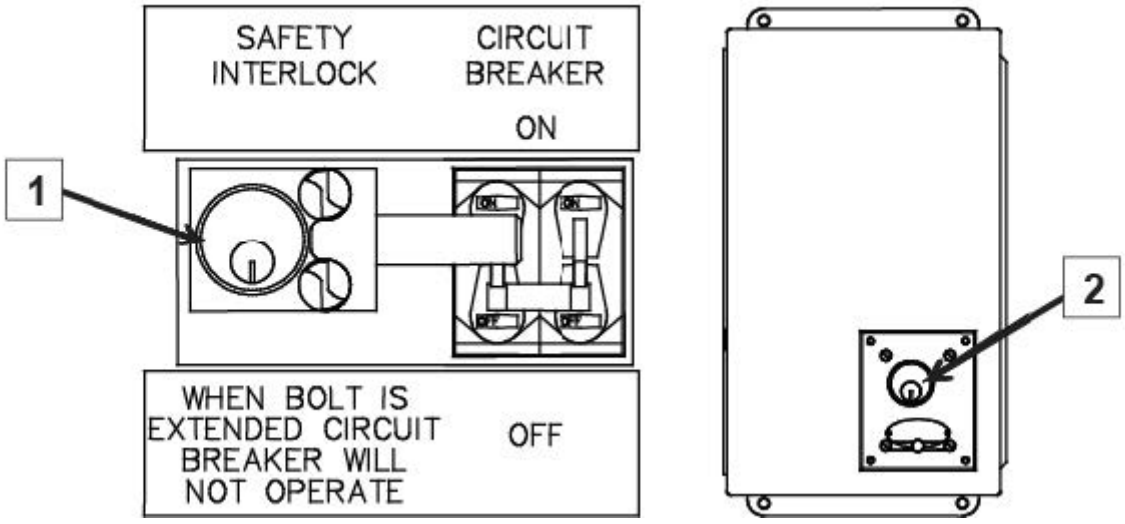
This is accomplished by using interlocks on both the CCR powering the circuit and on the S1 enclosure doors. See Figure 8 for an example of this option.

Figure 8: S1 Cutout Bay with Interlock Option

7.8 S1 Cutout Interlock Operations

A unique key is serialized for each CCR and associated S1 enclosure door interlock. Only one key opens both the CCR interlock (1) and the S1 enclosure door interlock (2) See Figure 9. The key only functions with its associated CCR and S1 enclosure door. The key and the corresponding lock tumblers are identified by serial number.

Figure 9: CCR breaker locked out with S1 enclosure



This safety key can only be removed from the interlock on the CCR's circuit breaker when the interlock bolt is extended ¾ locking the switch on the circuit breaker in the OFF position as seen in Figure 9.

Lock out a circuit:

1. Turn CCR circuit breaker OFF.
2. Using key, extend interlock bolt past the circuit breaker switch and remove key. The circuit breaker is locked in the OFF position.
3. Using the same key, unlock the S1 cutout enclosure to access the S1 cutout inside.
4. Remove the S1 cutout from the cutout housing.

The airfield circuit is now shunted and the output of the constant current regulator is shorted.

Return a circuit to operation:

1. Return the S1 cutout into the S1 cutout housing.
2. Using the key, lock the S1 enclosure and remove key.
3. Using the same key, retract the interlock bolt from the circuit breaker switch.
4. Turn the circuit breaker ON.

7.9 Remote Control Bay

The optional Control Bay houses the terminal blocks for controlling the brightness steps of the Constant Current Regulators (CCR) shown in Figure 10.

This bay is used when interfacing to an existing control system requires individual control wires for each CCR step. Each terminal block is labeled by the constant current regulator (CCR) reference and has connections for seven remote control wires. These wires are CCI, CC, B2, B3, B4, B5, and N.

Figure 10: Typical Control Bay

Note

Picture may not represent every SGRS exact layout. Refer to the SGRS system print package provided with the SGRS system present for details regarding the Control Bay.

7.10 Powerpack Bay(s)

The CCRs, also referred to as Powerpacks, have ratings ranging from 4kW up to 30kW. Output current options are 6.6A and 20A. Each Powerpack is installed in either an upper or a lower bay using ADB Safegate's Powerpack lift device (optional). See Figure 11 for one configuration.

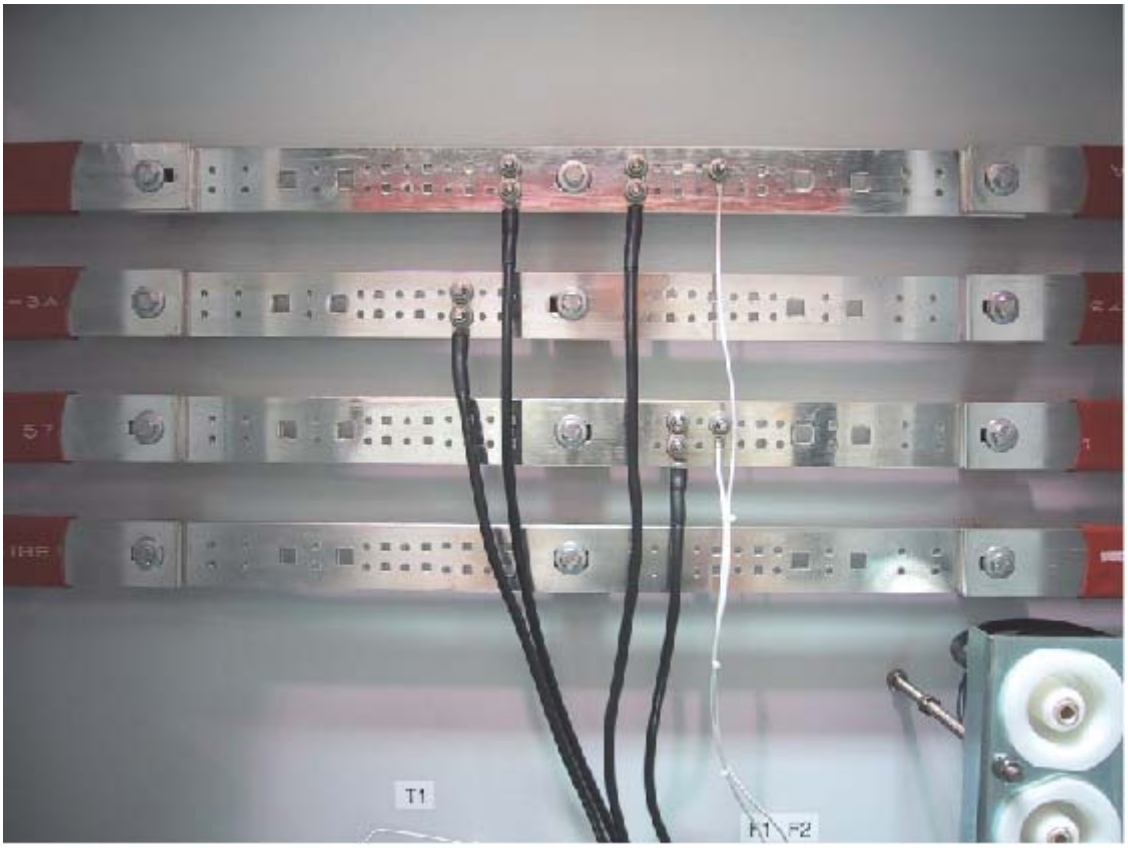
Figure 11: Powerpacks inserted into Bay

The front doors of each Powerpack Bay have a three-point latching system for smooth operation and a positive seal. Each door has a locking handle for security and is provided with two keys. All door locks are keyed alike.

7.11 Powerpack Bay Overview

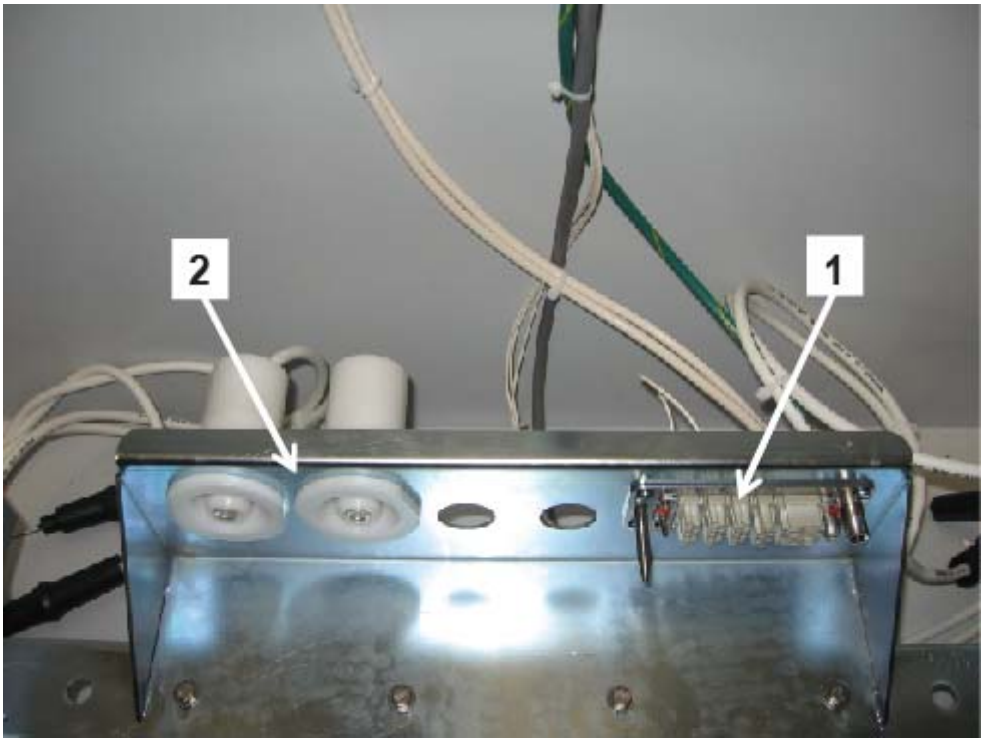
The Powerpack's incoming electrical power is distributed from the bus bars that run along the back of the cabinet. Electrical wiring is connected to the bar using bolt-on compression lugs. See Figure 14.

Figure 12: Powerpack Electrical Power Connections



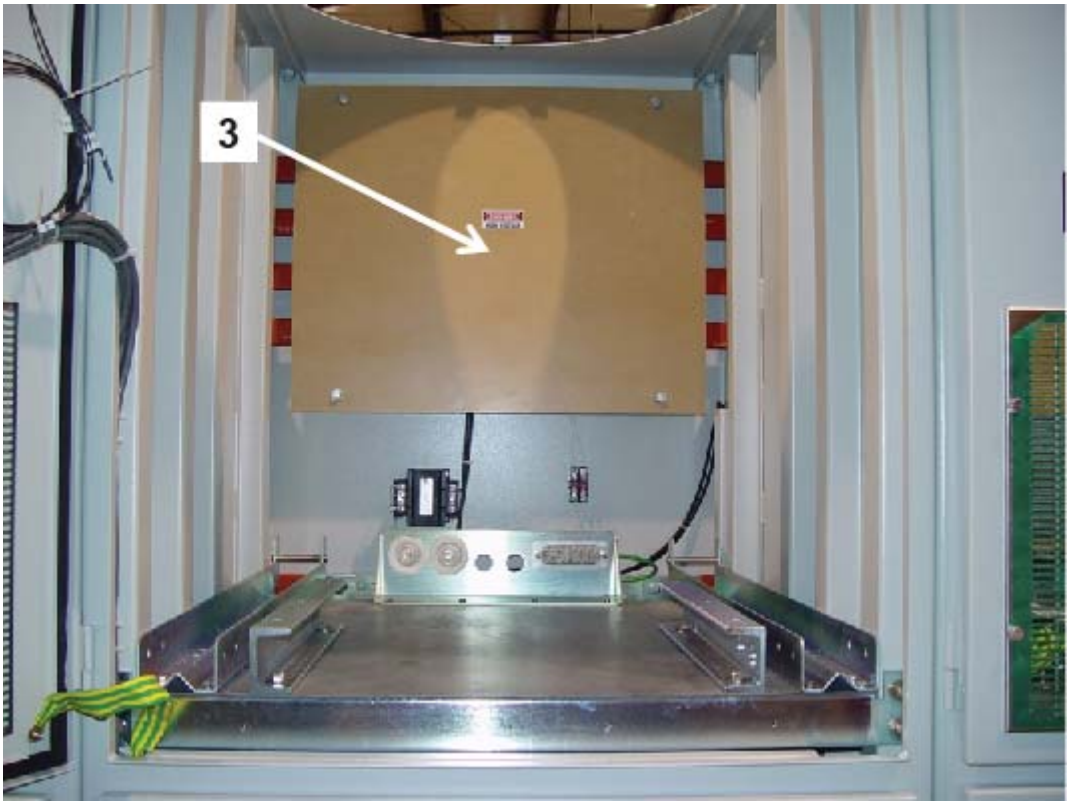
See Figure 13. From the bus bar, the incoming power is inserted in the receptacle side of the Powerpack's 'Stab Connector' (1). The 5kV, series circuit, output cable from each Powerpack is connected to the high voltage stabs (2) and is directed into the high voltage tray at the bottom of the bay.

Figure 13: Powerpack Stab Connector (Receptacle)



See Figure 14. The bus bar is shielded by a non-conductive, insulating plate (3) preventing accidental contact with live bus bar.

Figure 14: Bus Bar Shield



The recessed base has wireway channels that are divided into two (2) sections:

High Voltage Wireway

Contains the high voltage, 5000VAC, output series circuit cabling.

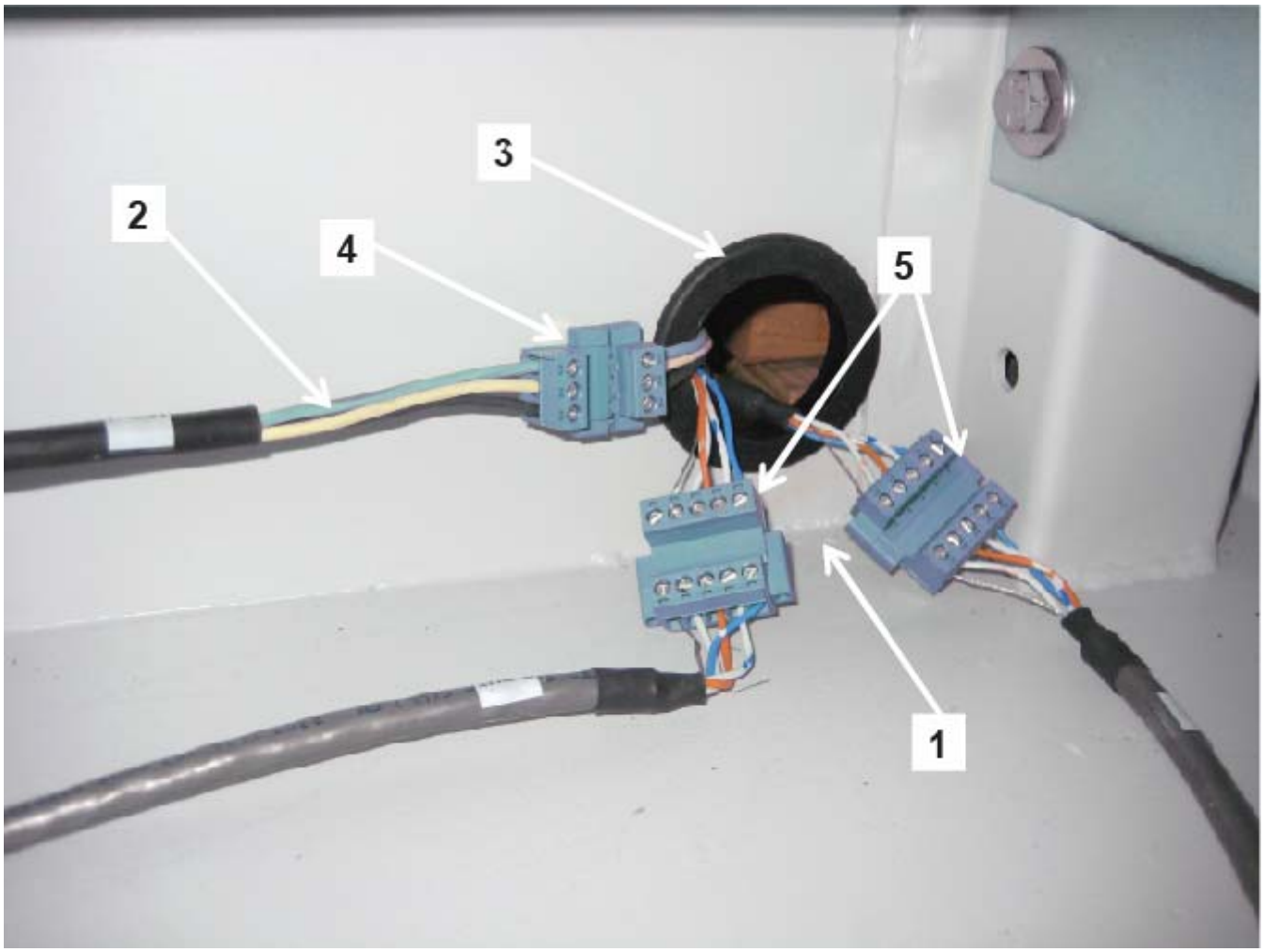
Low Voltage Wireway

Contains the low voltage power, 120VAC, for the communication equipment and for the individual remote control wiring (optional). Daisy-chained power for the system is connected at Terminal Block 1. Item 4 of illustration in Figure 15

Communication Wireway

Contains the communication network, RS-422/485, for the control and monitoring system. This daisy-chained communication cable is connected at Terminal Block 2. Item 5 of illustration. The Powerpack communications (1) and the ACE UPS power (2) are routed to the base of the Powerpack bay to the low voltage wiring tray (3). This wiring is daisy-chained from bay to bay via the wire tray and terminated at terminal blocks in each bay.

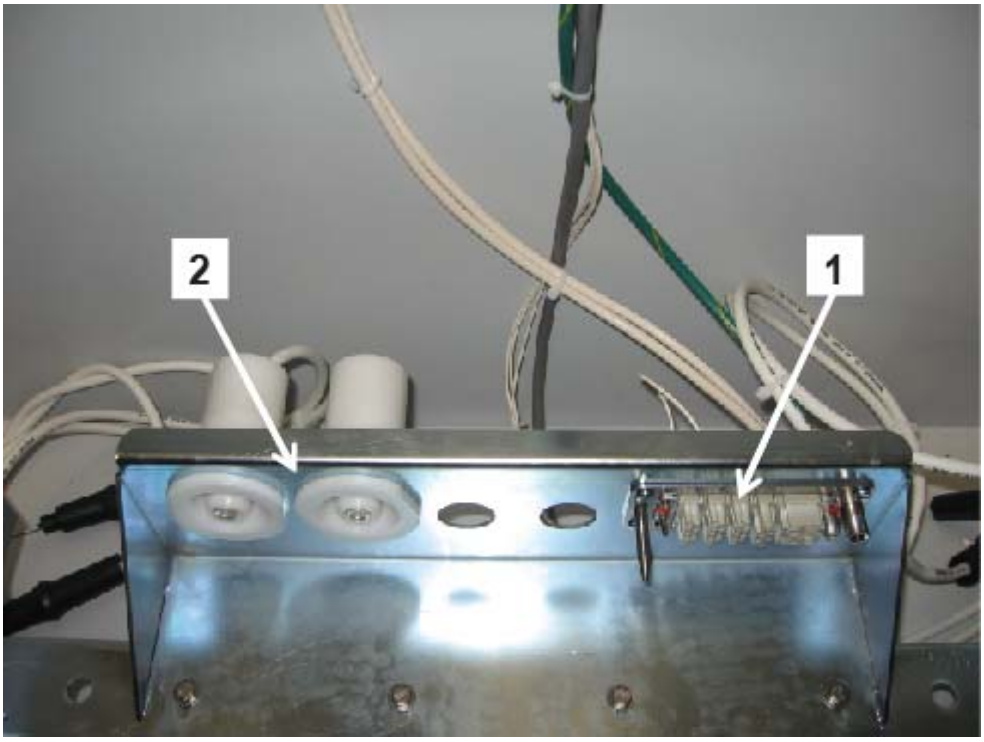
Figure 15: Low Voltage Wiring



7.12 Powerpack Stab Connector

See Figure 16. Each Powerpack has the plug side of a Stab Connector which mates with the receptacle installed in the Powerpack Bay.

Figure 16: Powerpack Stab Connector (Plug)



The 'Stab Connector' plug has five key elements:

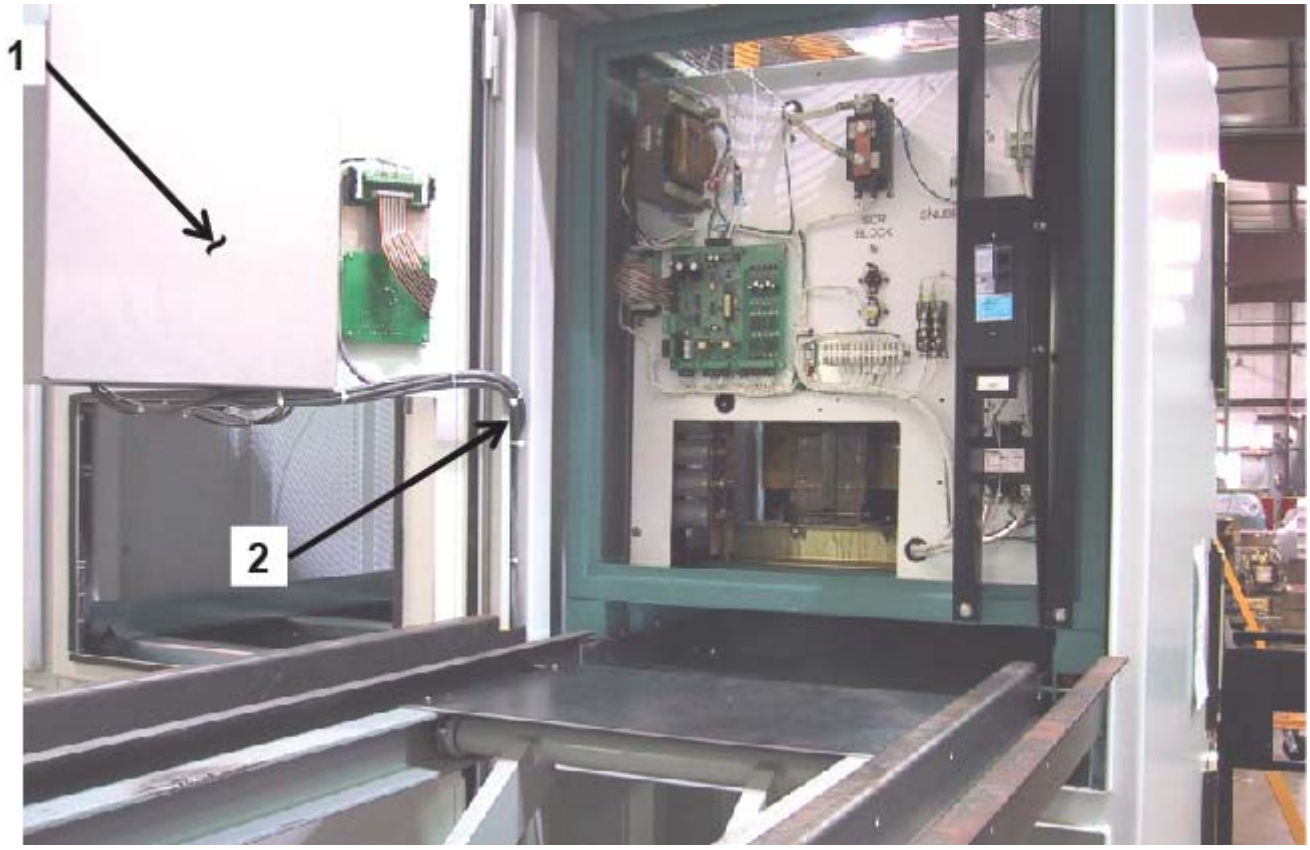
1. Input Power. The connections for the CCR's input power.
2. Early-break pins. The connections for the CCR's early-break pins that de-energize the contactor before the input power is disengaged. This provides added safety in the event the Powerpack is removed before turning off the input power.
3. Control and monitoring connections. The electrical connections for controlling the CCR, only used when a computer system is not used, and the fiber optic interface between the Powerpack monitoring components and the computer monitoring system.
4. Ground. The Ground connections between the Powerpack and the SGRS system.
5. Self-aligning 'Stab.' Tapered steel pins are built into the plug and in the receptacle to "self-align when the Powerpack is installed into the bay.

7.13 Powerpack Bay Door Assembly

See Figure 17. Each Powerpack bay has associated control and monitoring electronics referred to as Advanced Control Equipment or ACE. These ACE circuit boards are responsible for controlling the brightness levels and for monitoring the status of each Powerpack.

ACEs are installed on the inside of the Powerpack Bay door in an aluminum enclosure (1). All electrical wiring is routed from the Powerpack to the front door via a cable harness (2).

Figure 17: Powerpack Bay Door



Note
For information on the Powerpack Constant Current Regulator, please refer to the L-828/L829 Constant Current Regulator Manual. Document Number: 96A0288

Note
For information on the ACE equipment, please refer to the ACE Operator Manual. Document numbers 96A0245 (ACE), 96A0357 (ACE2) and 96A0500 (ACE3).

7.14 SGRS Door Handles

This subsection provides information for using the two styles of door handles located on the SGRS systems. Refer to system drawings to determine the style

Below are procedures for opening locked and unlocked doors with door handle style 1.

CAUTION
When closing the door, make sure both the top and bottom of the door is shut all the way before latching the door. If it doesn't latch properly, there is a risk of breaking the locking mechanism.

Opening Unlocked Door

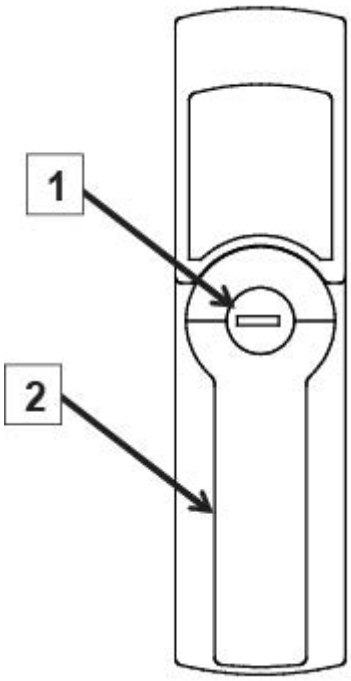
To open an unlocked bay door, rotate the handle 90 degrees in either direction.

Opening Locked Door

Note
The door is locked if the handle does not rotate left or right.

To open a locked bay door, perform the following procedure: See Figure 18. Place the key in the lock (1) on the door handle and rotate the key. Rotate the handle (2) 90 degrees in either direction.

Figure 18: Door Handle



8.0 SGRS Specifications

Power

CAUTION
The main input power to the SGRS system must be externally current limited to 600 Amps.

The input power to the SGRS system is as follows:

- 480VAC, three phase A, B, and C
- Neutral bar is run to allow interface of 277 VAC hardware
- The Neutral is an integral component of the ALCS and must be landed
- A volt and ammeter provides true RMS values, within ±2%, of the incoming main power.

Bus Bar

The bus bar has the following specifications:

- The bus bar system is braced for faults of 25,000 Amps symmetrical.
- Each phase A, B, C, and N is a continuous horizontal copper bus bar.
- A total of four (4) bus bars are distributed in the enclosure for single bus systems.
- Each bar consists of two pieces of 2" x 0.25" copper. The effective area is one square inch per bar.
- A continuous, horizontal, copper GROUND bus is run inside the SGRS system.

Fuseable Disconnect (Optional)

The fuseable disconnect has the a bus bar system braced for faults of 25,000 Amps symmetrical.

9.0 SGRS Enclosure

The SGRS system is designed using an industrial enclosure with these specifications:

- Enclosure is NEMA 12 rated.
- Designed for indoor use to provide protection against dust, dirt, dripping water, and external condensation of non-corrosive liquids.
- Industrial enclosure includes a pagoda top with exhaust fan and ventilation kit for proper convection cooling

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, contact ADB SAFEGATE Support via email at 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, offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

A.2 Recycling

A.2.1 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.

A.2.2 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.

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