LORAIN® CIP 4890/48120 DC Power System

DC Power for Business-Critical Continuity

Key Features

- **Compact flexibility —** provides rectifiers, distribution, and controller in one shelf
- **Constant power —** delivers more current at lower voltages to meet load or recharge demand
- **Wide operating range —** operates in the most demanding environments with operating input voltage from 85VAC to 300VAC
- **Meets industry standards —** NEBS™ Level 3 certified and UL 1801
- **Eight binary inputs (5 user programmable) —** form C contacts for external alarm or control functions
- **Eight user programmable outputs —** eight sets of form C alarm relay contacts are available
- **Remote Access —** TCP/IP, web browser, SNMP compatible
- **Compliant with global standards —** delivers quality, performance and dependability no matter what the application or location demands

LORAIN® CIP 4890

Description

The LORAIN® CIP power system is a modular integrated -48VDC power system contained in a single shelf. Two shelf configurations are available. The LORAIN® CIP 48120 consists of a 23" shelf that incorporates up to four 750W or 1500W plug-in rectifiers and a Multi Function Unit that contains a basic or advanced controller, a distribution module with 6 plug-in load positions, and three battery connections. The LORAIN® CIP 4890 consists of a 19" shelf that incorporates up to three 750W or 1500W plug-in rectifiers and a Multi Function Unit that contains a basic or advanced controller and a distribution module with 6 plug-in load positions and three battery connections. Each of the 6 load positions in the distribution module accommodates bullet nose plug-in circuit breakers rated 1 to 100 amps or bullet nose plug-in fuse holders for TPS fuses rated 1 to 50 amps. For smaller loads, an optional plug-in 10 position fuse module is available occupying 3 mounting position, offering fuses rated 0.18 to 20 amps.

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Application

The LORAIN® CIP power system is designed to be mounted in standard 19" or 23" frames, or used in embedded applications with standard 19" or 23" mounting, with or without batteries. The system is rated for full continuous operation from -40°C to +65°C and is NEBS™ Level 3 certified and UL(60950 & 1801).

The system is designed to supply a filtered and regulated -48Vdc source to any telecommunication equipment requiring up to 80 amps redundant capacity in a 23" shelf or up to 54 amps redundant capacity in a 19" shelf, such as POP sites, customer premises, outdoor cabinets, CEVs, vaults or shelters. Specific applications include: DLC, xDSL, DSLAM, broadband communications, multiplexers, microwave and PBX.

LORAIN® CIP 4890 System Shelf

System Shelf

The LORAIN® CIP shelves are 5.25" (3U) high, 13" deep and 23" or 19" wide. The 23" wide shelf mounts four rectifier modules and a Multi-Function Module. The 19" wide shelf mounts three rectifier modules and a Multi-Function Module. The shelves provide front to back ventilation with zero clearance required above or below.

Each rectifier position provides interconnection points for the AC input, the DC output, and the control and alarm data bus (CAN protocol). Each shelf provides a variety of connectivity options for single phase 110/120 and 208/240VAC feeds. The AC supply can be connected to the shelf through IEC320 AC receptacles at rear side of the shelf, or through an AC interface box with IEC320 AC receptacles at the front left of the shelf for front access applications. The 23" wide shelf can also be configured with four connections for conduits at the rear or with dual or single connectivity at the front for conduit(s). The 19" wide shelf offers a single AC rear access connectivity, with conduit.

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Rectifier Modules

The LORAIN® CIP system uses 1500W or 750W constant power switch mode rectifier modules. Both rectifiers have a DC operating range of -43.0 to -58.5VDC. The 1500W module provides 1500W from 200 to 300VAC with current limiting at 34 amps. Output power is de-rated to 90% from 176 to 200VAC, to 60% at 120VAC, and to 50% at 100VAC. The 750W module provides 750W from 100 to 300VAC with current limiting at 17 amps. Both rectifiers provide up to 100% of rated output up to 75°C.

In the typical operating range, the rectifiers have a power factor greater than .99, total harmonic distortion less than 5% and efficiencies of 91%. The rectifiers are hot swappable and have an integrated speed controlled field replaceable fan. Each rectifier can optionally be equipped with a field replaceable air filter. Three LED indicators provide visual status of normal operation, alarm, rectifier failure alarm, and fan failure alarm.

1500W Rectifier Module

Controller IP

System Manager IP

Controller Modules

Two controller modules are available for use in the LORAIN® CIP system – a basic controller and an advanced controller. The System Manager IP is the advanced controller. It has a graphical LCD display with four navigation keys. The local alarm display uses LED indicators for controller status and system major and minor alarms. Eight user programmable input ports and eight user programmable output ports with form C contacts are included. In addition to traditional system alarms and controls, the System Manager IP provides event and alarm history logs, an inventory log, and delivered DC power calculation. The System Manager IP can be accessed locally or remotely using a built-in web based Graphical User Interface. Local connection is made through the Ethernet port using a computer equipped with a web browser and crossover cable. Remote connection is made through a dial up network connection with a modem connected to the system's RS-232 port, or through a network LAN connection to the TCP/IP port (RJ45 jack). The following battery management capabilities are provided: battery database, temperature compensation, equalize, battery discharge test, and charge control.

The Controller IP is the basic controller available with the LORAIN® CIP system. The operational features of the Controller IP are as follows: local alarm display by means of three LED indicators, three alarm outputs (dry C contacts), and two sets of local test points for the measurement of the system's voltage and current. DIP switches are used to adjust float voltage, temperature compensation, and the optional low voltage disconnect.

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Multi-Functional Unit

Single-position TPS Fuse

Single-position Circuit Breaker

3-position Block for 10 SAN-O Fuses

Multi-Functional Unit

The Multi-Functional Unit located at the right side of the shelf contains a controller position and a distribution unit.

Distribution Unit

The distribution unit can be equipped either with:

- up to six bullet-type single-pole circuit breakers in capacities from 1 to 100 A or fuses in capacities from 1 to 50 A, or
- up to three bullet-type single-pole circuit breakers in capacities from 1 to 100 A or fuses in capacities from 1 to 50 A, and one 10-position fuse kit for fuses in capacities from 0.180 to 20 A, or
- two 10-position fuse kits for fuses in capacities from 0.180 to 20 A.

Load clips are used to accommodate the bullet-type single-pole circuit breakers or fuse blocks, as well as 1-hole lugs with anti-rotation device for cable sizes up to No. 6 AWG. The circuit breakers are of the mid-trip type. Breaker guards are also available (optional) to prevent accidental tripping of the circuit breakers.

The distribution unit contains a battery shunt and an optional battery or load LVD.

Batteries

The LORAIN® CIP system can be configured with a wide range of batteries to suit specific load and reserve requirements. Battery connections are made to the distribution unit through three Anderson type connectors.

Temperature Probe Interface (TPI)

The Temperature Probe Interface is a module that can monitor an ambient temperature probe and up to eight battery temperature probes, then retransmit the ambient temperature and the highest battery temperature measurements to the controller. The added number of measuring points improves the accuracy of the temperature compensation function and the precision of the high battery temperature. The TPI has two visual indications, Power ON (green) and Probe Fail alarm (yellow), as well as one set of “fail safe” output relay contacts for the Probe Fail alarm.

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LORAIN® CIP 4890/48120
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LORAIN® CIP 4890/120 General Specifications

System Characteristics	
Nominal system voltage	-48Vdc
Rated output capacity	
LORAIN® CIP 4890	90 amps
LORAIN® CIP 48120	120 amps
Rectifiers	Rectifier -48Vdc, 1500W or Rectifier -48Vdc, 750W
Controller	
Basic	Controller IP
Advanced	System Manager IP
Distribution	Bullet nose type circuit breakers or fuse, and/or SAN-O type fuses
Environmental	
Operating temperature	-40°F to 149°F (-40°C to 65°C) continuous operation
Storage and transportation	-40°F to 167°F (-40°C to 75°C) Relative humidity below 95% (non-condensing)
Seismic rating	Telcordia GR-63-CORE, zone 4
NEBS™	Level 3 certified
Safety	UL per subject letter 1801, UL60950, CE marked, FCC part 15, subpart B and Telcordia GR-1089-CORE & Emissions for Class B , EN 300 386

System Shelf Specifications

Capacity	
LORAIN® CIP 4890	90 amps
LORAIN® CIP 48120	120 amps
Dimensions (H x W x D)	
LORAIN® CIP 4890	5.25" (133mm) x 19" (483mm) x 12" (308mm)
LORAIN® CIP 48120	5.25" (133mm) x 23" (584mm) x 12" (308mm)
Weight	
LORAIN® CIP 4890	19.8 lbs. (9 kg)
LORAIN® CIP 48120	22 lbs. (10 kg)
AC connections	
LORAIN® CIP 4890	Individual connections per rectifier with IEC connectors, rear and front access Single AC Rear access with conduit
LORAIN® CIP 48120	Individual connections per rectifier with IEC connectors, rear and front access Individual connections per rectifier with conduit, rear access Single and Dual AC front access, with conduit(s)
Recommended AC	15 amp, 2-pole AC breaker per rectifier per 208/240V or 110/120V feed for individual feed 20 amp, 2-pole AC breaker per conduit per 208/240V or 110/120V feed for LORAIN® CIP 48120 Dual AC front access 30 amp, 2-pole AC breaker for 208/240V or 110/120V feed for LORAIN® CIP 4890 Single AC rear access 40 amp, 2-pole AC breaker for 208/240V or 110/120V feed for LORAIN® CIP 48120 Single AC front access

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Rectifier -48Vdc, 1500W Specifications

Electrical Specifications

AC input	
Nominal Voltage	Single phase, 110/120VAC or 208/240VAC Can be used in the following AC configurations: • phase-to-phase to 120/240V single phase AC source • phase-to-phase to a 120/208V 3-phase AC source • phase-to-neutral to a 220/380V, 230/400V, 240/415V, or 277/480V 3-phase AC source • phase-to-neutral to a 120/240V single phase AC source • phase-to-neutral to a 120/208V 3-phase AC source
Operating Voltage Range	85VAC to 300VAC
Frequency	47 Hz to 63 Hz
Power factor (PF)	>0.99 from 80% to 100% load at 208 & 240VAC >0.97 from 50% to 80% load at 208 & 240VAC
Total Harmonic Distortion	<5% from 70% to 100% load at 208 & 240VAC Meets IEC 1000-3-2
Input Current	7.0 amp at 240VAC (Max 9.0 amp) 8.7 amp at 120VAC (Max 9.0 amp)
Inrush Current	Peak does not exceed 2.5 times the RMS input at any load under input voltage within rated input voltage range.
Input Protection	If the input voltage decreases or increases beyond a non-adjustable predetermined value, the rectifier circuitry inhibits, disabling the output. The rectifier will recover automatically when the AC input is re-established within specification limits. Over current is protected by an internal fuse
Operating Efficiency	91.5% at 80% load and 240VAC >90% from 40% to 100% load at 240VAC
DC Output	
Output Voltage Range	-43.0Vdc to -58.5Vdc
Output Power	Constant power limiting operation 1500W maximum from 200VAC to 300VAC 900W @ 120VAC 600W @ 85VAC
Output Current	25 to 34 amps
Regulation	Voltage is regulated within ±0.5% for all specified input and load variations Voltage drift ±0.2% in any eight-hour period, with constant input voltage, constant load, and less than –5 °C change in ambient temperature
Voice Band Noise	The voice-frequency noise generated by a rectifier does not exceed 38dBrnC output noise
Wide Band Noise	Wide band noise generated by a rectifier is less than 100mVrms in any 3 kHz band between 10kHz and 20MHz and less than 50mVrms over 20Mhz Peak to peak ripple voltage is less than 125mV from dc up to 100Mhz
Psophometric Noise	Does not exceed 1 mV
Protection	
Current Limiting	The output current is limited to 34 amp
Over current	Internal fuse
High Voltage Shutdown	If rectifier detects over voltage, it will turn off. After 10 seconds, it will restart and if it encounters an over voltage within 5 minutes it will turn off and remain off until reset.

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Rectifier -48Vdc, 1500W Specifications (continued)

Operating Specifications		
Temperature	-40°F to 167°F (-40°C to 75°C) at full rated output	
Altitude	-200 ft to 13,000 ft (-60 m to 4000 m)	
Humidity	0 to 95% relative humidity (non-condensing)	
Storage conditions	-40°F to 167°F (-40°C to 75°C) Relative humidity below 95% (non-condensing)	
Ventilation	Front to back speed-controlled fan (field replaceable)	
Seismic	Telcordia GR-63-CORE for Zone 4	
Electromagnetic Interference (EMI) and compatibility (EMC)	FCC part 15, subpart B, class B EN 300 386-2, class B	
Audible noise	The rectifier does not produce sound levels above 60dBA, measured 1.5m above the floor and 0.5m from the equipment	
Operation without batteries	Yes	
Status / Alarm Indicators and Monitoring		
Visual indicators	*Status* Normal operation Alarm Rectifier failure alarm Fan failure alarm	*Visual indicator color* Green Yellow Red Flashing red
Rectifier alarms & Status Settings	Transmitted to System Manager IP or Controller IP on the communication bus using the CAN protocol The Controller IP or System Manager IP establishes all rectifier settings	
Miscellaneous data	Each rectifier provides the System Manager IP a complete set of identification information about itself (product code, serial number, alarm history, etc.)	
Rectifier Physical Specifications		
Mounting	Plug-in installation	
Dimensions (H x W x D)	5.25" (133mm) x 3.35" (85mm) x 11.00" (279mm)	
Weight	5.5 lbs. (2.5kg)	
Fire Resistance	All materials have flammability rating -UL 94 V0 or better All electrical components meet the Needle Flame Test per IEC 695-2-2	
Safety	The rectifier is UL recognized (UL60950) for USA & Canada and is CE marked	

Rectifier -48Vdc, 750W Specifications

Electrical Specifications

AC Input	
Nominal Voltage	Single phase, 110/120VAC or 208/240VAC Can be used in the following AC configurations: • phase-to-phase to 120/240V single phase AC source • phase-to-phase to a 120/208V 3-phase AC source • phase-to-neutral to a 220/380V, 230/400V, 240/415V, or 277/480V 3-phase AC source • phase-to-neutral to a 120/240V single phase AC source • phase-to-neutral to a 120/208V 3-phase AC source
Operating Voltage Range	85VAC to 300VAC
Frequency	45 Hz to 65 Hz
Power Factor (PF)	>.99 from 40% to 100% load at 120V
Total Harmonic Distortion	<6% from 40% to 100% load at 120V Meets IEC 1000-3-2
Input Current	7.1 amp at 120VAC (Max 9.0 amp) 3.5 amp at 240VAC
Input Protection	If the input voltage decreases or increases beyond a non-adjustable predetermined value, the rectifier circuitry inhibits, disabling the output. The rectifier will recover automatically when the AC input is re-established within specification limits. Over current is protected by an internal fuse
Operating Efficiency	91.5% at 100% load and 240VAC 89% at 100% load and 120VAC
DC Output	
Output Voltage Range	-43.0Vdc to -58.5Vdc
Output Power	Constant power limiting feature 750W maximum from 100VAC to 300VAC 600W at 85VAC
Output Current	12 to 17 amps
Regulation	Voltage is regulated within ±0.5% for all specified input and load variations Voltage drift ±0.2% in any eight-hour period, with constant input voltage, constant load, and less than -5°C change in ambient temperature
Voice-Frequency	The voice-frequency noise generated by a rectifier does not exceed 38dBrnC output noise
High Frequency Output Noise	Wide band noise generated by a rectifier is less than 100mVrms in any 3 kHz band between 10kHz and 20MHz and less than 50mVrms over 20Mhz Peak to peak ripple voltage is less than 200mV from dc up to 100Mhz
Psophometric Noise	Does not exceed 1 mV
Protection	
Current Limiting	The output current is limited to 17 amp
Over current	Internal fuse
High Voltage Shutdown	If rectifier detects over voltage, it will turn off. After 10 seconds, it will restart and if it encounters an over voltage within 5 minutes it will turn off and remain off until reset.

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Rectifier -48Vdc, 750W Specifications (continued)

Operating Specifications		
Temperature	-40°F to 167°F (-40°C to 75°C) at full rated power	
Altitude	-200 ft to 13,000 ft (-60 m to 4000 m)	
Humidity	0 to 95% relative humidity (non-condensing)	
Storage conditions	-40°F to 167°F (-40°C to 75°C) Relative humidity below 95% (non-condensing)	
Ventilation	Front to back speed-controlled fan (field replaceable)	
Seismic Electromagnetic Interference (EMI) and compatibility (EMC)	Telcordia GR-63-CORE for Zone 4 FCC part 15, subpart B, class B EN 300 386-2, class B	
Audible noise	The rectifier does not produce sound levels above 60dBA, measured 1.5 m above the floor and 0.5 m from the equipment	
Operation without batteries	Yes	
Status / Alarm Indicators and Monitoring		
Visual indicators	*Status* Normal operation Alarm Rectifier failure alarm Fan failure alarm	*Visual indicator color* Green Yellow Red Flashing red
Rectifier alarms & Status Settings	Transmitted to System Manager IP or Controller IP on the communication bus using the CAN protocol The Controller IP or System Manager IP establishes all rectifier settings	
Miscellaneous data	Each rectifier provides the System Manager IP a complete set of identification information about itself (product code, serial number, alarm history, etc.)	
Rectifier Physical Specifications		
Mounting	Plug-in installation	
Dimensions (H x W x D)	5.25" (133mm) x 3.35" (85mm) x 11.00" (279mm)	
Weight	5.5 lbs. (2.5 kg)	
Fire Resistance	All materials have flammability rating -UL 94 V0 or better All electrical components meet the Needle Flame Test per IEC 695-2-2	
Safety	The rectifier is UL recognized (UL60950) for USA & Canada and is CE marked	

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Controller Specifications

Controller IP	
Display	LED status interface
Alarm output	3 dry C contacts outputs (Major, Minor, AC failure/BOD)
Alarm input	One external input for distribution and battery fuse alarm
Control of rectifiers	Digital CAN bus
System configuration	Dip switches for: System (float) voltage Temperature compensation battery charging Low voltage disconnect
Battery management	Low Voltage Disconnect (LVLD or LVBD) Temperature compensation battery charging
System Manager IP	
Display	LCD display with four navigation buttons
Alarm output	8 dry C contacts (5 programmable) SNMP & Web (HTML)
Alarm input	8 programmable inputs
Control of rectifiers	Digital CAN bus
Battery management	Battery Discharge Test Charge Control Low Voltage Disconnect (LVLD or LVBD) Temperature compensation battery charging Equalize (boost)
System configuration	Embedded Web Browser (HTTP)
Communications ports	RJ45 jack for Ethernet port (TCP/IP) DB9 connector for RS-232
Remote access	All essential functions and operational parameters through RS-232 modem and TCP/IP Ethernet with password security

Distribution Unit Specifications

Capacity	6 load positions, 3 battery string connections, 120 amp Battery shunt, optional LVD
Protection devices Circuit breaker	Bullet Nose Type –1 to 100 amp
Fuses	Bullet Nose Type –1 to 50 amp SAN-O type 0.18 to 20 amp with 10 Position Fuse Block
Battery connections	3 pairs (- &+) Anderson type connectors

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