Data Sheet
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tyco Electronics

CPS4024+
24V Cabinet Power System
3600W (150A) Temperature Hardened System
Input: 85 Vac to 264 Vac (Autoranging)
Output: 24 Vdc and Optional Ringing Generator

H569-424 Battery Plant
Model J85500N-1

The low-maintenance CPS4024+ (24V Cabinet Power System) integrates state-of-the-art technology into a space-efficient modular design, capable of a variety of combinations in either stand-alone or multiple shelf configurations. The CPS4000 family also offers a 48V Version.

Dual-Power Design
To accommodate dual-output applications, the CPS4024+ is available in a flexible, two-power bus shelf design with as many as five plug-in power modules per shelf. The system is characterized by low weight, high power density, and convenient front-access shelves measuring just 8.75 inches (222mm) high and 12 inches (305mm) deep.

Wide Temperature Range
The CPS4024+ incorporates temperature-hardened electronics, and is suitable for use in ourdoor cabinet applications at a wide operating temperature range, –40°C to +65°C (–40°F to +149°F), with excursions to 75°C. Vertical airflow simplifies cabinet thermal design.

Multiple Configurations
A single CPS4024+ shelf measures 23 in. (584mm) across, 5U (8.75inches, 222mm) high and 12 inches (305mm) deep and has convenient front access. It is available in the following configurations:

- A single-shelf rectifier plant, equipped with an alarm unit, battery thermal compensation, and low-voltage battery disconnect; capable of providing 24V power for loads up to 150A
- A multiple-shelf rectifier plant in which the low-voltage battery disconnect contactor is located in an external distribution panel; capable of providing loads up to 300A
- A rectifier/converter plant in which 24V rectifiers provide power to the load as well as to converters having 50V at 8.5A capabilities
- A converter plant in which 24V input is converted to 50V for loads up to 42.5A

These plants can be expanded in capacity and functionality to satisfy a broad range of applications.

Power Systems

Benefits

- Maximum Design Efficiency
  - o The CPS4024+ increases power density and flexibility by incorporating up to five power modules in one 23 in. (584mm) shelf measuring 8.75 in. (5U, 222mm) high by 12 in. (305mm) deep.
  - o Power modules, alarm module, low-voltage battery disconnect, and battery thermal compensation functions are all housed in one compact shelf.
  - o Modular growth capabilities of the CPS and distribution system means the initial system can be engineered to meet immediate power requirements and grow incrementally as system power demand increases.
  - o All equipment is front-accessible, ideally suited for use in cabinets and other space-restrictive environments.
- Cost Efficiency
  - o Unique, lightweight components and front-access system architecture reduce installation and maintenance expenses.
  - o Near-unity power factor corrected rectifiers can result in lower utility costs.
  - o Incremental system expansion can minimize initial purchase outlay.
- Enhanced Reliability
  - o The CPS4024+ has been designed using switchmode technology, strictly controlled manufacturing processes, and the highest quality standards to ensure excellent performance and superior reliability with an extended service life.
- The ac input range for the rectifiers is 85 Vac to 264 Vac with automatic discrimination between high-line (200 Vac to 240 Vac) and low-line (100 Vac to 120 Vac) inputs. The units operate on standard 50 Hz or 60 Hz utility service.
- Continuous Operation
  - o Hot-pluggable rectifiers or converters can be easily added to the system without any interruption of service.
- System Safeguards
  - o Low-voltage battery disconnect and thermal management options provide protection for using equipment and batteries.
  - o All equipment is qualified to withstand Telcordia NEBS Zone 4 earthquake conditions (except the IR30C and IR40C battery trays).
- EMI Performance
  - o The power systems EMI performance is CISPR Class B.
  - o The CPS4024+ can be deployed in EMI-sensitive sites such as customer premise cabinets.
- Safety/Standards Compliance
  - o Meets all applicable UL*, CSA†, and VDE‡ standards.
  - o CE Marked.
  - o Meets all applicable sections of NEBS.

Features

CPS4024+ Shelf

- Complete plant in one, two, or three shelves
- Temperature hardened for harsh environments
- Available with one, two, or five ac feeds per shelf
- True n+1 redundancy, with five ac feeds per shelf
- Low-voltage battery disconnect option
- Thermal management options
- Field-replaceable fans integrated into modules

Rectifier

- Model ES661C rectifier operates from a nominal 100 Vac to 120 Vac / 200 Vac to 240 Vac source to provide up to 30A output.
- Rectifier typical efficiency is 87%.
- 24V rectifier provides adjustable output voltage from 24V to 28V over the operating temperature range of -40°C (-40°F) to +75°C (+167°F).

Converter

- ES682 converter operates from the output of the shelf rectifiers and delivers 50V at 8.5A output.
- It is compatible with external 24V sources

Controllers

- The ES643 Alarm and Control Unit (ACU) provide alarm LEDs, office alarm outputs, plant voltage control, and battery thermal management.
- The ES648B Enhanced Monitor and Control Unit (MCU) provides alarm LEDs, office alarm outputs, plant voltage control, and battery thermal management. It also has a digital plant meter for local display of plant voltage and current and supports adjustment of various alarm set points. A remote monitoring and control option is available with the ES648BZ MCU via a modem in the system controller. This option supports remote access to plant voltage and current, status alarms, remote boost initialization, and remote adjustment of plant voltage. The plant can be programmed to “call-out” on specified alarm conditions.

* UL is a registered trademark of Underwriters Laboratories, Inc.

† CSA is a registered trademark of the Canadian Standards Association, Inc.

‡ VDE is a registered trademark of Verband Deutscher Elektrotechniker E.V.

Distribution Module

- ES612 module provides four plug-in circuit breakers and two GMT type fuse protected outputs.
- The ES612 module takes one full power module slot.

DistributionPanels

Three different application-dependent distribution panels—H569-424 Group 15, 16, or 17—are available for use with the following CPS4024+ configurations:

- One CPS shelf with LVD or two CPS shelves without LVD (Group 15)
  - Group 15 distribution panel is a 7 in. (178mm) unit that accepts up to 22 plug-in style circuit breakers or fuses
  - Panel rating: 300A
  - Breaker or fuse position rating: 50A maximum (Double-pole breakers up to 100A are also accepted.)
- Two CPS shelves with LVD (Group 16)
  - Group 16 distribution panel is a 10 in. (254mm) unit (panel height is 7.5 in. (191mm) with an additional 2.5 in.(64mm) required for cabling) that accepts up to 22 plug-in style circuit breakers or fuses
  - Panel rating: 300A
  - Breaker or fuse position rating: 50A maximum (Double-pole breakers up to 100A are also accepted.)
  - Includes a 400A LVD contactor
  - Includes a 300A shunt with test points
- Three CPS shelves with LVD (Group 17)
  - The Group 17 distribution panel is a 10 in. (254mm) panel (the panel height is 7.1 in. (180mm) with an additional 2.9 in. (74mm) required for cabling) that accepts up to 22 plug-in style circuit breakers or fuses.
- Panel rating: 415A
- Breaker or fuse position rating: 50A maximum (Double-pole breakers up to 100A are also accepted.)
- Includes a 600 A LVD contactor
- Includes 500A shunt with test points

All distribution panels accept both circuit breakers and fuses in a range of sizes from 3A to 100A.

Each panel provides an LED indication and a contact closure to the CPS controller for a tripped breaker or blown fuse.

Battery

- Accepts up to four strings of Tyco IR or VR batteries. The CPS4024+ can be configured to work with most other vendors' VRLA batteries.
- Extended range thermal compensation is being offered as an option to improve the available battery capacity at temperatures below 25°C. by boosting the float voltage as battery temperatures decline, the capacity reduction at low temperatures can be minimized.

Battery Stands and Trays

- A 7 ft. (2.11m) high, seismic network bay frame can be used for applications that do not require batteries, where the batteries are located elsewhere, or where additional CPS shelves are required.
- In non-seismic applications, trays can be mounted in the 7 ft. (2.11m) frame to accommodate up to eight strings of IR30C or IR40C batteries or four strings of 12IR125 batteries.
- A 42 in. (1067mm) frame or a 39.25 in. (997mm) frame is available for applications where the CPS shelves and distribution will be mounted on top of battery stands.
- Battery stands are available to hold two strings of 2VR250E batteries, two strings of 2VR375E batteries, or eight strings of 12IR125 batteries.

Lightning Protection

The plant withstands, without damage, repeated exposure to the waveforms defined in ANSI C62.41-1991 for location category B and high system exposures. In cabinet applications, and in most huts or vaults, additional surge protection should be provided that can withstand surges defined for location category C and high system exposures.

Safety Requirements
Shelves equipped with rectifiers and/or converters are UL*-Listed per Subject Letter 1801: Power Distribution Center for Communication Equipment.

Rectifiers (see Note) and converters are recognized per UL* 60950 and CSA† 22.2 60950 Certified and VDE‡ Licensed to IEC 60950. The plant output voltages meet SELV requirements.

Product must be installed only in restricted-access areas in accordance with Articles 110- 16, 110-17, and 110-18 of the National Electric Code§, ANSI/NFPA Number 70, or per applicable local codes.

Shelves are rated for continuous operation in environments up to +65°C (+149°F) with excursions up to +75°C (+167°F). Converters are rated for continuous operation up to +65°C (+149°F). Rectifiers are rated for continuous operation up to +75°C (+167°F).

The CPS4024+ is CE Marked to show conformance to the requirements outlined in the European Union's Low Voltage Directive (72/73/EEC) and EMC requirements Directive (93/336/EEC), both as amended by the CE Marking

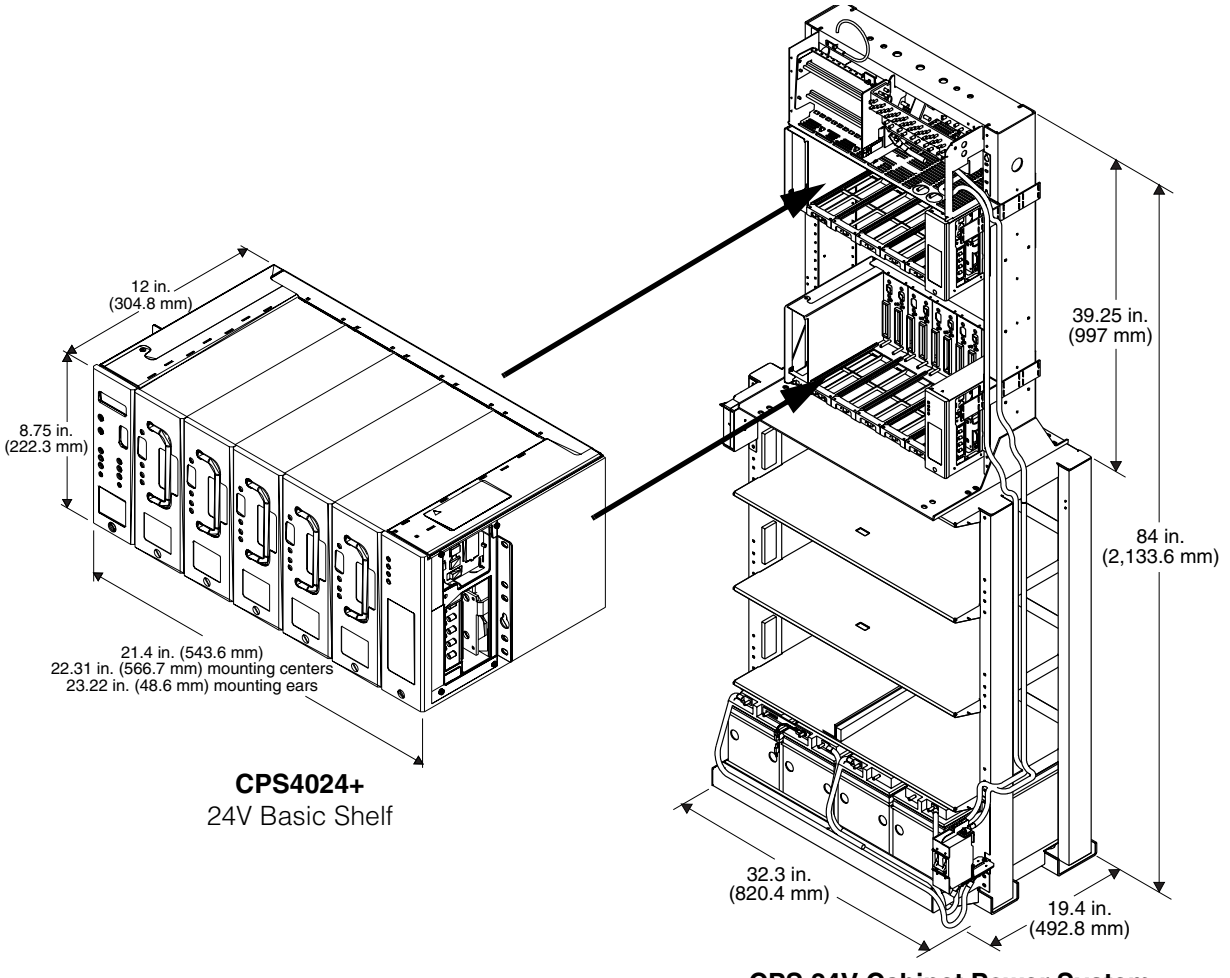
Directive (93/68/EEC).

This CE Mark is required for European power system deployment.

Note
ES661C rectifiers are intended for integration into end-user equipment. All the required procedures for CE Marking of end-user equipment should be followed.

§ National Electrical Code is a registered trademark of the National Fire Protection Association.

Outline Drawing



CPS4024+
24V Basic Shelf

CPS 24V Cabinet Power System

Specifications

System	
Plant	One, two, or three shelf plants
Power Slots	Five power slots per shelf to accommodate either rectifiers, converters, or distribution modules.
Power Units	One rectifier, one converter, or one distribution module per power slot; maximum of five per shelf
Plant Architecture	One primary output power bus per shelf; maximum of 150A, per shelf One secondary output power bus per shelf, maximum of 50A, per shelf
Input Distribution:	
Primary Bus	Single ac feed Dual ac feed: one for slots 1 and 3; the other for slots 2, 4, and 5 Separate ac feed provided to each rectifier slot
Secondary Bus	Primary bus provides dc input power to converter
Output Distribution:	
Primary Bus	Bulk power outputs (to loads or distribution and protection panels): double-hole lugs Battery inputs: double-hole lugs to terminate four battery strings
Secondary Bus	Panel-mounted mate-n-lock connector
Protection and Distribution:	
Primary Bus	Remote protection and distribution modules; fuses or circuit breakers
Secondary Bus	ES612 provides 48 Vdc secondary bus protection and distribution: fourn circuit breakers available from 3A to 30A, and two GMT-type fuses; module output limited to 30A Remote protection and distribution modules; fuses or circuit breakers
Maximum Recharge Current	Installed plant 24V rectifier capacity minus plant 24V load
Low-Voltage Disconnect	20V or 21V (selectable)
Frame Options	7-ft. (2.1m) seismic frame 42-in. (1067mm) for mounting on battery stands 39.25-in. (997mm) frame for mounting on battery stands
Battery Tray with Stand Options	2VR375E Battery Stand 12IR125 Battery Stand IR30C Battery Tray IR40C/12IR125 Battery Tray
Distribution Options H569-424	
Group 15	Panel with 22 positions for plug-in circuit breakers and/or fuse holders, available in 3A to 100A sizes, rated at 300A maximum
Group 16	Panel with 22 positions for plug-in circuit breakers and/or fuse holders, available in 3A to 100A sizes, rated at 300A maximum, with 400A LVD contactor
Group 17	Panel with 22 positions for plug-in circuit breakers and/or fuse holders, available in 3A to 50A sizes, rated at 415A maximum, with 600A LVD contactor

Electrical and Thermal	
Rectifier Input (ES661C)	85 Vac to 264Vac at 47 Hz to 60 Hz
AC Drain (ES661C)	1.1A at 85 Vac, 7.8A at 120 Vac 5.2A at 180 Vac, 3.9A at 240 Vac
Rectifier Output (ES661C)	24 Vdc to 28 Vdc at 0A to 30A
Efficiency (Rectifier)	87.1% typical at nominal input
Power Factor	>0.98 for loads >60% full load
Regulation	±0.5%
Temperature Range	-40°C to +75°C (-40°C to +167°F)

Specifications (continued)

Physical	Depth	Width	Height	Weight
Rectifier/Converter	10.75 in. (27.3 cm)	3.2 in. (8.1 cm)	8.75 in. (22.2 cm)	10 lb. (4.5 kg)
Single-Shelf	12 in. (30.5 cm)	21.4 in. (54.4 cm)	8.75 in. (22.2 cm)	35 lb. (15.8 kg)
Single-Shelf Plant w/Five Rectifiers	12 in. (30.5 cm)	21.4 in. (54.4 cm)	8.75 in. (22.2 cm)	85 lb. (38.5 kg)
Distribution Options				
Group 15	5 in. (12.7 cm)	21.5 in. (54.4 cm)	7 in. (17.8 cm)	14 lb. (6.4 kg)
Group 16	5 in. (12.7 cm)	21.5 in. (54.4 cm)	7 in. (17.8 cm)	19 lb. (8.6 kg)
Group 17	12 in. (30.5 cm)	21.5 in. (54.4 cm)	8.75 in. (22.2 cm)	30 lb. (13.6 kg)
39.25-in. Frame With 12IR125 Battery Stand	19.4 in. (49.28 cm)	32.3 in. (82 cm)	84 in. (213.3 cm)	2251 lb.* (1021.4 kg)
42-in. Frame With 2VR250E Battery Stand	17.5 in. (44.4 cm)	26 in. (66 cm)	84 in. (213.3 cm)	1558.5 lb.* (706.92 kg)
42-in. Frame With 2VR375E Battery Stand	18 in. (45.7 cm)	26 in. (66 cm)	84 in. (213.3 cm)	1275 lb.* (578.3 kg)
42-in. Frame With 12IR125 Battery Stand	16.7 in. (42.4 cm)	32.3 in. (82 cm)	86.5 in. (219.7 cm)	2256 lb.* (1023.3 kg)
7-ft. Frame With Four IR30C Trays	15 in. (38.1 cm)	26 in. (66 cm)	84 in. (213.3 cm)	911 lb.* (413.2 kg)
7-ft. Frame With Four IR40C/12IR125 Trays	18 in. (45.7 cm)	26 in. (66 cm)	84 in. (213.3 cm)	1275 lb.* (578.3 kg)

** Weights assume one group 16 panel, one CPS with five rectifiers, and batteries. For additional CPS shelf, add 85 lbs.*

Environmental	
Altitude	-200 ft. to +13,000 ft. (-61m to +3962m) For altitudes above 5000 ft, derate the temperature by 3.6°F per 1000 ft. For altitudes above 1524m, derate the temperature by 0.656°C per 100m
Humidity	10% - 95% noncondensing
Audible Noise	<65 dBA measured from 2 ft. or 0.6m from one-shelf plants

Safety/Standards Compliance	
Electrostatic Discharge	IEC 801-2 Level 3 (10 kV) at 40% humidity
Radiated and Conducted Emissions	CISPR 22, Class B
Electromagnetic Immunity	Meets Bellcore GR-001089-CORE
Earthquake Rating	Zone 4, upper floors
Rectifier Shelf Equipped with Rectifiers	UL Listed per Subject Letter 1801: “Power Distribution Center for Communications Equipment, VDE Licensed to EN 60950/IEC950
Rectifiers	Recognized per UL1950 and CSA 22.2 950; VDE Licensed to EN 60950/IEC 950 CE Marked (meets 73/23/EEC as amended by 93/68/EEC directives)
System CE Marking	CE Marked per European Union Council Directives: Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC) as amended by CE Marking Directives (93/68/EEC)

Ordering Information

24V / 48V Rectifier/Converter Shelves

Description	J-Code	Comcode
Initial Shelf with 150 A LVD; One ac Feed	J85500N-1 L1, 22, 36	601780190
Initial Shelf without LVD option, One ac Feed	J85500N-1 L1, 26, 31	601803844
Initial Shelf with 150 A LVD, One ac Feed for Conduit	J85500N-1 L1, 26, 36	601787195
Supplemental Shelf;Two ac Feeds	J85500N-1 L1, 25B, 31	601795966

Accessories

Description	J-Code	Comcode
24 V, 30 A Rectifier; Auto-Ranging ac Input	ES661C	108286071
24 V/48 V, 8.5 A Converter	ES682	107306045
Alarm Control Unit	ES643	107318941
Monitor and Control Unit	ES648A ES648B	108344490 108344508
Monitor and Control Unit with Modem	ES648BZ	108344524
Thermistor Kit Assembly	NA	847198751
ACU Slot Cover	NA	847345576
dc Fan Cradle Assembly	NA	847244100
Thermistor Kit for 13 Ah Battery	NA	847494606

Note: For additional ordering information or assistance, please contact your Tyco Electronics Power Systems sales representative.

Related Product Literature

Document Title	Document Number
CPS4048+ Cabinet Power System	DS03-038
CPS4090 Cabinet Power System	DS97-434LIN
CPS4000 Plug-In Distribution Modules	DS03-036

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