

Overview

Shape the Future of QuickSpecs – Your Input Matters

E-T-A -48VDC Power Distribution Infrastructure for HPE Equipment

E-T-A Breaker Panels are designed for power distribution cabinet and IT equipment rack installation. Each breaker panel is designed for redundant and independent 2 x 8 DC power outputs in groups A and B, total 16 individual outputs per panel. One HPE G2H95A product contains two breaker panels, providing 32 individual or 16 redundant power outputs.

Removable one-piece front plate provides access to circuit breakers, which are plug-in type hydraulic-magnetic devices rated from 0.1A to 80A. Breakers available with HPE product numbers are from 6 amps to 80 amps. Unused circuit breaker slots in the front plate to be covered with included plastic covers. Plastic snap-in label holder for individual marking attached below circuit breakers. Each Breaker Panel is delivered with 24 blank labels.

Input (supply) terminals are labeled A+/A- and B+/B-. Output terminals are labeled A1+/A1- ... A8+/A8- and B1+/B1- ... B8+/B8-, with corresponding circuit breaker numbering in front. All cables connect to the rear of the unit, with screw type terminal block connectors for inputs and outputs as shown below.

Negative pole protected, positive pole grounded solution. M8 grounding bolts for each group on the right and left side panels. Internal grounding bridge providing option for positive supply pole to earth connection when used. Units are delivered with grounding bridge disconnected (see the “ground jumper” in above the internal wiring diagram).

Integrated group signaling for each supply group. Connection through 3-pole Phoenix connectors located in the rear section of the unit.

Installation depth 310 mm (including cable strain relief). Top and bottom covers made of perforated sheet metal for enhanced air circulation. Circuit breaker removal tool located on the PDU's front panel reverse side.

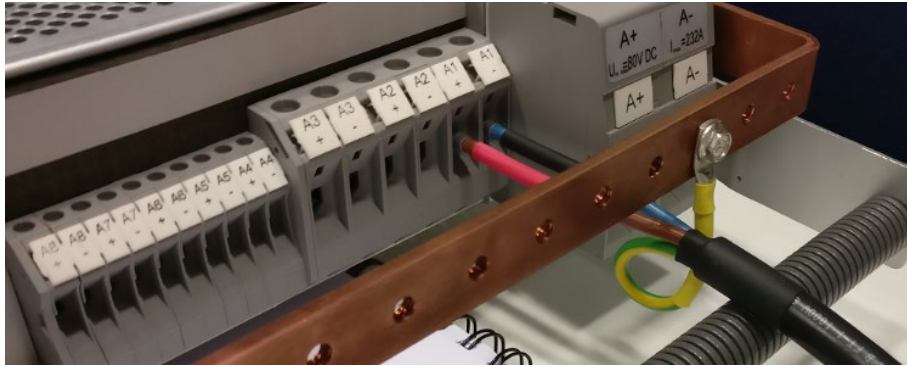
Notes: Circuit breakers are not included in breaker panel kit, they have to be selected depending on the electrical load connected to each breaker panel output. Circuit breaker size recommendations provided with later on in this document.

For -48V DC power distribution, the following elements are required:

- DC Breaker Panels, serving the same function as PDUs in AC setups – power distribution. Additionally, breaker panels host all circuit breakers protecting each output and device connected to it.
- Circuit Breakers to be inserted into Breaker Panels, rating to be selected according to the load connected to each output.
- Matching power cables, ideally in
- optimal length to avoid excess as DC cables are thicker and excess consumes more space than on AC side. Best cable length depends on rack position of the breaker panel and the device connected to it
- Grounding cables to connect the rack to the breaker panels grounding points
- Grounding bar where all rack equipment are grounded, and which is connected to Data Center ground by local electrician

Hewlett Packard Enterprise has two different DC power distribution solutions, which do not share the same components. Either use all HPE DC power distribution components, or use the E-T-A partner products, but do not mix the two. The main difference is that E-T-A portfolio is richer, covers more deployment scenarios, and can be delivered pre-integrated in racks via Factory Express services.

Overview



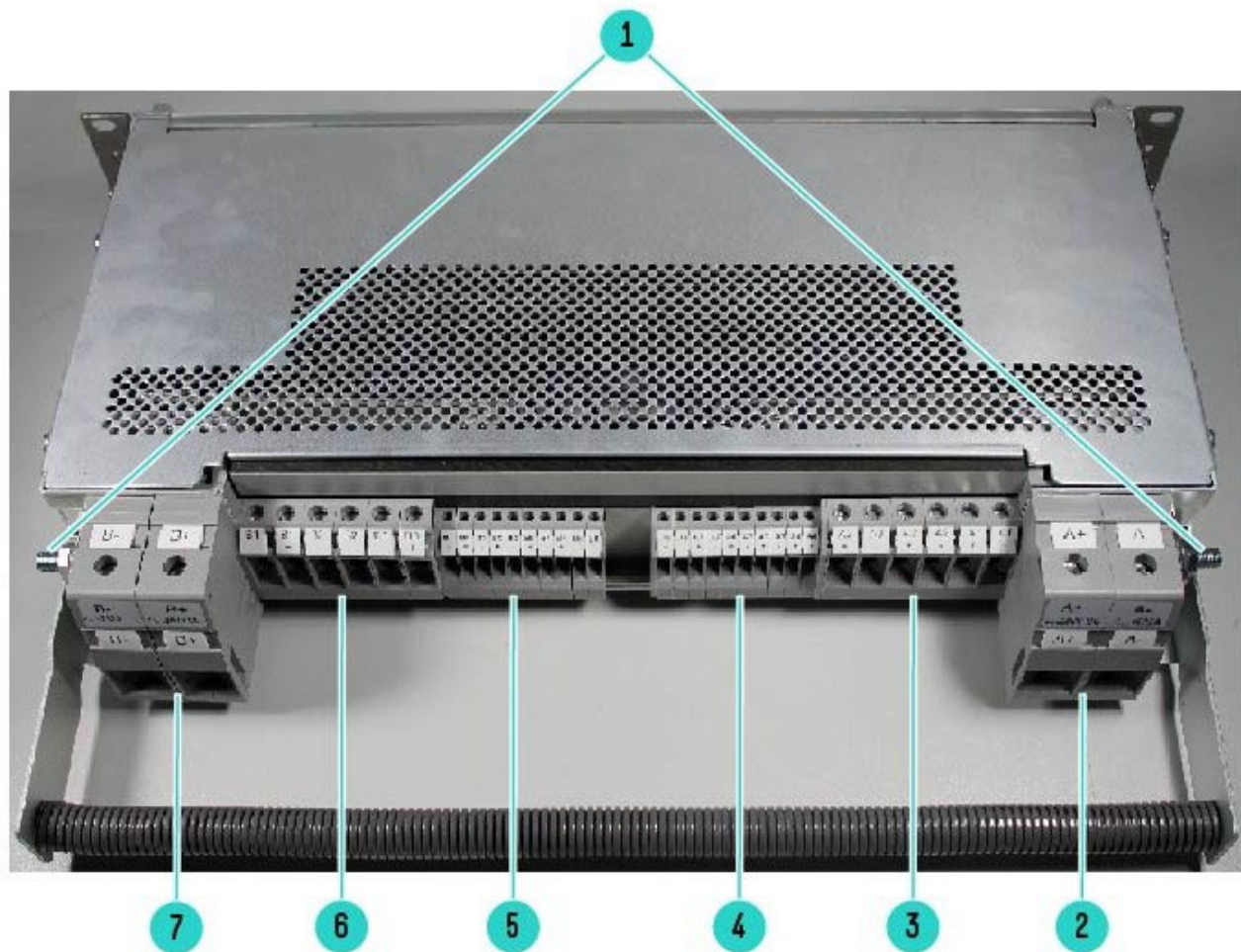
Breaker Panel rear view with 3PAR power cable shown connected to output terminals and grounding bar



Two breaker panels with A and B side circuit breaker slots- Front View

1. 1st breaker panel
2. 2nd breaker panel
3. Group A circuit breakers
4. Group B circuit breakers

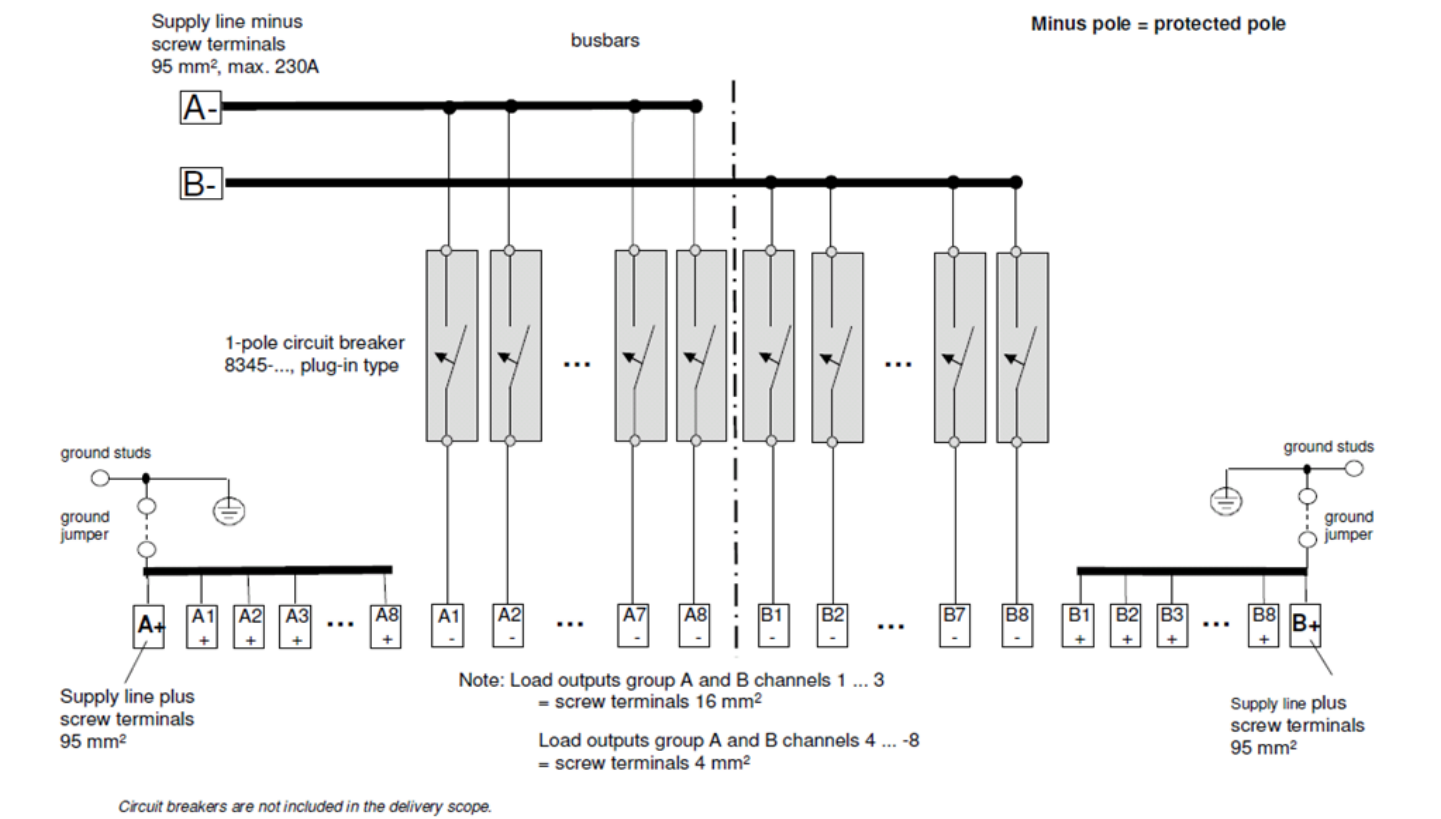
Overview



Breaker Panel input and output block connectors - Rear top view

- | | |
|--|--|
| 1. Ground connection (M8) | 5. Group B output terminals B4...B8 0.2 - 4 mm ² |
| 2. Group A input terminals 35 - 95 mm ² | 6. Group B output terminals B1...B3 1.5 - 16 mm ² |
| 3. Group A output terminals A1...A3 1.5 - 16 mm ² | 7. Group B input terminals 35 - 95 mm ² |
| 4. Group A output terminals A4...A8 0.2 - 4 mm ² | |

Overview



Breaker Panel internal wiring diagram – separate A and B groups for redundant power

Form Factor

- E-T-A breaker panels are 2U form factor rack mounted DC power distribution units.
- HPE product G2H95A contains two 19", 2U power distribution units, total rack space consumed 4U

Models

E-T-A Breaker panels and compatible power distribution components

Breaker Panels & grounding bars

Description

E-T-A S541 2x16 Output DC Breaker Panels	SKU G2H95A
E-T-A 6401 Two Grounding Bars w/screws	Q9N54A

HPE c7000 BladeSystem chassis and Synergy frame grounding cables

E-T-A Grounding Cable Set	G2H96A
E-T-A Grounding Cable Chassis II Set	G2H97A

HPE Synergy 48VDC power cables

E-T-A 7501 12x1.5m Synergy 48VDC Cables	Q9Y43A
E-T-A 7502 12x2.3m Synergy 48VDC Cables	Q9Y44A
E-T-A 7503 12x3.0m Synergy 48VDC Cables	Q9Y45A



Overview

HPE ProLiant/Apollo servers Flex Slot 48VDC power supply cables

Description	SKU
E-T-A 6101 2x1.5m ProLiant 48VDC cables	Q9N58A
E-T-A 6111 2x2.3m ProLiant 48VDC cables	Q9N59A
E-T-A 6121 2x3.0m ProLiant 48VDC cables	Q9N60A
E-T-A 6131 2x3.9m ProLiant 48VDC Cable	R0K18A

HPE Networking Comware 57xx, 58xx, 59xx series 48VDC power cables

E-T-A 7801 2x3.9m FF-5xxx 48VDC cables	G2H98A
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-48VDC circuit breakers (one circuit breaker per SKU)

E-T-A 6A Circuit Breaker	L2Y46A
E-T-A 10A Circuit Breaker	F5V79A
E-T-A 15A Circuit Breaker	K8E32A
E-T-A 20A Circuit Breaker	F5V83A
E-T-A 30A Circuit Breaker	P9J62A
E-T-A 80A Circuit Breaker	F5V84A



Service and Support

Warranty

E-T-A guarantees all E-T-A parts to be free of any manufacturing defects and functioning according to E-T-A specifications. Should any part fail to meet E-T-A specification when used within rated workload, E-T-A will replace such part free of charge during warranty period. Overloading any component voids the warranty. Please contact your authorized E-T-A distributor in your area.

Limitations and Restrictions

The terms of the warranty are limited to the remedies as set forth in this warranty. This warranty is provided in lieu of all other rights, conditions and warranties, express or implied, in fact or by operation of law. E-T-A makes no other express or implied warranty with respect to the software, hardware, other products, services, documentation or E-T-A support, including, without limitation, any warranty of merchantability, fitness for a particular purpose lack of viruses and non-infringement of third party rights.

In no event shall E-T-A, or its licensors, be liable for cost of procurement of substitute products or services, lost profits or any other special, indirect, consequential or incidental damages (including but not limited to lost information or data), however caused whether or not E-T-A has been advised of the possibility of such damages. Some jurisdictions do not allow limitation or exclusion of liability for consequential or incidental damages, so that limitation or exclusion may not apply. In the event that E-T-A, or its licensors, are subject to any liability in connection with the products or services, for any reason whatsoever, their liability shall not exceed the amount paid by the customer for the products or services, respectively, which gave rise to the liability. This limitation shall apply even if E-T-A has been advised of the possibility of such damages.

Return Policy for Resellers

The purchase of E-T-A products is final and non-refundable. Stocking of E-T-A products is not recommended. Please purchase accurate quantities required to fulfill the customer order.

HPE Services

No matter where you are in your digital transformation journey, you can count on HPE Services to deliver the expertise you need when, where and how you need it. From planning to deployment, ongoing operations and beyond, our experts can help you realize your digital ambitions.

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E-T-A Service and support

Service and Support for E-T-A products is provided directly by E-T-A and distributors. For any support and generic queries please visit the E-T-A website at https://www.e-t-a.com/contact/authorized_distributors. E-T-A's customer support organization will be responsible for responding to a call and working with the customer to assign a severity level to the call.

Consulting Services

No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should live where, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.

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HPE Managed Services

HPE runs your IT operations, providing services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

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Service and Support

Operational services

Optimize your entire IT environment and drive innovation. Manage day-to-day IT operational tasks while freeing up valuable time and resources. Meet service-level targets and business objectives with features designed to drive better business outcomes.

<https://www.hpe.com/services/operational>

HPE Complete Care Service

HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. All delivered by an assigned team of HPE Services experts. HPE Complete Care Service provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

<https://www.hpe.com/services/complecare>

HPE Tech Care Service

HPE Tech Care Service is the operational support service experience for HPE products. The service goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Tech Care Service delivers a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Tech Care Service is available in three response levels. Basic, which provides 9x5 business hour availability and a 2-hour response time. Essential which provides a 15-minute response time 24x7 for most enterprise level customers, and Critical which includes a 6-hour repair commitment where available and outage management response for severity 1 incidents.

<https://www.hpe.com/services/techcare>

HPE Lifecycle Services

HPE Lifecycle Services provide a variety of options to help maintain your HPE systems and solutions at all stages of the product lifecycle. A few popular examples include:

- Lifecycle Install and Startup Services: Various levels for physical installation and power on, remote access setup, installation and startup, and enhanced installation services with the operating system.
- HPE Firmware Update Analysis Service: Recommendations for firmware revision levels for selected HPE products, taking into account the relevant revision dependencies within your IT environment.
- HPE Firmware Update Implementation Service: Implementation of firmware updates for selected HPE server, storage, and solution products, taking into account the relevant revision dependencies within your IT environment.
- Implementation assistance services: Highly trained technical service specialists to assist you with a variety of activities, ranging from design, implementation, and platform deployment to consolidation, migration, project management, and onsite technical forums.
- HPE Service Credits: Access to prepaid services for flexibility to choose from a variety of specialized service activities, including assessments, performance maintenance reviews, firmware management, professional services, and operational best practices.

Notes: To review the list of Lifecycle Services available for your product go to:

<https://www.hpe.com/services/lifecycle>

For a list of the most frequently purchased services using service credits, see the [HPE Service Credits Menu](#)



Service and Support

Other Related Services from HPE Services:

HPE Education Services

Training and certification designed for IT and business professionals across all industries. Broad catalogue of course offerings to expand skills and proficiencies in topics ranging from cloud and cybersecurity to AI and DevOps. Create learning paths to expand proficiency in a specific subject. Schedule training in a way that works best for your business with flexible continuous learning options.

<https://www.hpe.com/services/training>

Defective Media Retention

An option available with HPE Complete Care Service and HPE Tech Care Service and applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

Consult your HPE Sales Representative or Authorized Channel Partner of choice for any additional questions and services options.

Parts and Materials

HPE will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

How to Purchase Services

Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find services at <https://ssc.hpe.com/portal/site/ssc/>

AI Powered and Digitally Enabled Support Experience

Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data driven customer experience

Sign into the HPE Support Center experience, featuring streamlined self-serve case creation and management capabilities with inline knowledge recommendations. You will also find personalized task alerts and powerful troubleshooting support through an intelligent virtual agent with seamless transition when needed to a live support agent.

<https://support.hpe.com/hpesc/public/home/signin>

Consume IT On Your Terms

HPE GreenLake edge-to-cloud platform brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake edge-to-cloud platform accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

To learn more about HPE Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Contact information for a representative in your area can be found at "Contact HPE"

<https://www.hpe.com/us/en/contact-hpe.html>

For more information

<http://www.hpe.com/services>



Configuration Information

E-T-A power distribution components are compatible with select HPE equipment equipped with -48VDC power supplies. Please note that E-T-A cables cannot be used with HPE BladeSystem Breaker Panel (AH355A) and vice versa, as HPE DC power cables are not compatible with E-T-A breaker panel, because breaker panel side connectors are physically different between the two breaker panel types.

Factory integration of complete racks of DC powered equipment is only available with E-T-A DC components.

Step 1: Select Required number of Breaker Panel kits

One Breaker Panel kit (G2H95A) contains two breaker panels and provides redundant 48V DC power for up to 16 dual power supply devices (total 32 individual DC outputs). Each breaker panel has 16 outputs arranged in two independent blocks of eight outputs for redundancy. Each block of 8 outputs has 3x85 amps high power outputs and 5x30 amps outputs. Those 85 amps outputs can be used to feed high power PSUs used in c7000 BladeSystem enclosures and Synergy frames, but can be used for smaller loads also in case no Synergy or c7000 enclosures connected.

While E-T-A components (excluding circuit breakers) are “sets” so that generally one set is enough for one device (examples: one ProLiant cable set is required for DL360 or 380 server; one 3PAR cable set is required per enclosure; one Synergy cable set is required for one Synergy frame), there are few exceptions. Consider for example HPE Networking Comware switches or Apollo servers, many of them can run with two power supplies, yet some models can have more.

Step 2: Select required number of grounding bars

Add one grounding bar kit (Q9N54A) for each breaker panel kit (G2H92A). The grounding bar attaches to the back of the E-T-A breaker panel, and does not consume rack space. It is the central grounding point where all equipment connected to the breaker panel will have their ground wires connected, and which will be further on connected to the Data Center ground at installation location.

Step 3: Select required grounding cables

This step applies to c7000 blade enclosures only, for which there are two different E-T-A grounding cable kits. All other E-T-A power cables (for equipment with less power draw) are 3-wire cables where the ground wire is within in the same cable than the 48V DC plus and minus conductors. Synergy frames have their own HPE Synergy DC Power Grounding Kit (872034-B21), which contains grounding cable to be connected to rack frame.

Step 4: Select the required number of DC power cables

Select required number of optimal length cables, depends on the exact rack layout planned. Choosing right length of cables is more important in DC powered racks than in AC powered ones, because DC cables need to be thicker, and excess length is harder to fit into the rack.

Step 5: Select the required quantity of circuit breakers of each rating needed in your configuration

Select circuit breaker of correct rating for each power supply to be connected. Recommendations for the right sizes are after the circuit breakers listing..



Configuration Information

Factory Express Rack Integration

Ordering your choice of E-T-A power products pre integrated into racks at HPE prior to shipping, is possible only by utilizing HPE Factory Express services.

For more than ten years, HP and latterly Hewlett Packard Enterprise, has been building, testing and deploying fully integrated, high quality datacenter, branch office and OEM solutions from its manufacturing facilities across the globe. Based on a robust portfolio of flexible, prepriced, integration modules, we are able to tailor a quality solution based on your requirements. Specifically, our factory in EMEA has developed capabilities for pre integrated DC solutions including E-T-A DC Power products.

Build information such as product placement and DC cable connection plan must be supplied with each order and is mandatory for all E-T-A DC products in order for integration to take place

Factory Express Ordering & Configuring Information Services

The relevant services to select for rack integration of E-T-A DC components are based on the Factory Express Racking & Third party Integration portfolio of services, services to attach in OCA are as follows:

- Base Racking should be added to your choice of Shock pallet rack , i.e.
P9K08A #001 - HPE 42U 600x1075mm Adv G2 Kit Shck Rack HPE Factory Express Base Racking Service
- Third Party Hardware integration HA844A1 is required, Qty x1 per E-T-A Product to be integrated.
Labelling is highly recommended for-48v DC Cables , order Qty x1 HA850A1 Rack Cable Labelling Service, per rack
- HPE Base Racking XXXXXX #001
Third Party Hardware integration HA844A1
Rack Cable Labelling Service HA850A1

Notes: Factory integration services included in this solution require a Customer Intent Document (CID) to assist with the configuration and successful installation and implementation of the solution. The CID is required to be in place prior to sale. Before issuing a purchase order against this solution, please contact

- EMEA Region CSEP@hpe.com
- AMS region easy.solutions.americas@hpe.com
- APJ region EMAP.issfe@hpe.com

Details to include in your CID document are

- Placement of Hardware (rack position of each equipment),
- Cable layout plan (point to point),
- Cable Labeling information

For additional information please visit:

Rack Customization Services <https://psnow.ext.hpe.com/doc/4AA5-5954EEE?from=app4AA5-5954EEE>

Third Party Hardware Integration and Management Services

<https://psnow.ext.hpe.com/doc/4AA5-5955EEE?from=app4AA5-5955EEE>



Technical Specifications

Circuit Breaker Recommendations for HPE Equipment

Circuit breaker	Recommendation
E-T-A 6A Circuit Breaker	Use with <250W loads
E-T-A 10A Circuit Breaker	Use with <400W loads, for example Brocade SAN switch power supplies
E-T-A 15A Circuit Breaker	Use with <600W loads
E-T-A 20A Circuit Breaker	Use with <700W loads, for example HPE Networking Comware series switches power supplies
E-T-A 30A Circuit Breaker	Use with >700W loads, for example ProLiant, Apollo and 3PAR power supplies
E-T-A 80A Circuit Breaker	Use with >1200W loads, for example Synergy and c7000 power supplies

Electrical Data

Nominal Operating Voltage	Max. DC 80 V per group
Protected Pole	Negative pole protected
Supply Current per Group	Max. 232 A (UL60950-1 Max. 230 A per group)
Load Current per Channel	Max. 85 A for channels 1-3 and max. 30 A for channels 4-8 each group
Number of Circuit Breakers	2 x 8 pcs per breaker panel
Redundant System	Dual feed A and B
Circuit Breakers	0,1 A to max. 80 A
Operating Ambient Temperature	-30 °C ... +60 °C
Operating Ambient Temperature UL 60950-1	-30 °C ... +55 °C
Storage Temperature	-30 °C ... +85 °C

Mechanical Data

Dimensions	H x W x D / 88,9 mm x 482,6 mm (without mounting brackets) x 310 mm (installation depth including cable strain relief)
Materials	Chassis and front plate: Aluminium
Net Weight	6,46 Kg (per Power Distribution Unit) 12,92 Kg (Power Distribution System consisting of 2 units)
Rack Mounting	4 pcs. M6 x 16 mm screws for 19" rack mounting (not included) Tightening torque 5,3 ... 5,7 Nm

Supply

Supply Connection	Screw terminals with 35 to 95 mm ² (AWG 2 - AWG 3/0) cables Tightening torque 15 ... 20 Nm
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Loads

Load Connections Channels 1-3	Screw terminals with 1,5 to 16 mm ² (AWG 16 - AWG 6) cables Tightening torque 2,5 ... 3,0 Nm
Load Connections Channels 4-8	Screw terminals with 0,2 to 4 mm ² (AWG 24 - AWG 12) cables Tightening torque 0,6 ... 0,8 Nm

Grounding

Grounding Connection	2 x M8 grounding bolts Tightening torque max. 6 Nm
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Cables

Recommended	JL compliant, min 95° C, high flex cables
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Approvals

UL	JI 60950-1
CSA	C22.2 No. 60950-1 07



Technical Specifications



Table above valid as of December 2018.

For latest information, see the E-T-A breaker panel installation guide
(QR code on the left, URL <https://www.e-t-a.de/X21279922.pdf>)



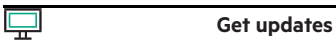
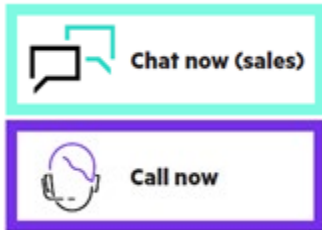
Summary of Changes

Date	Version History	Action	Description of Change
28-Jul-2025	<u>Version 9</u>	Changed	Update survey link.
07-Apr-2025	<u>Version 8</u>	Changed	Obsolete SKUs were removed
19-Feb-2024	<u>Version 7</u>	Changed	Networking product names were updated
04-Dec-2023	<u>Version 6</u>	Changed	HPE Services Rebranding
01-Nov-2021	<u>Version 5</u>	Changed	Service and Support Section was updated.
06-Jul-2020	<u>Version 4</u>	Changed	QuickSpecs layout was updated and Branding Refresh was applied.
06-Apr-2020	<u>Version 3</u>	Changed	QuickSpecs layout was updated
04-Mar-2019	<u>Version 2</u>	Changed	Grounding cable for Synergy – added missing text Typographical error corrections and formatting changes.
03-Dec-2018	<u>Version 1</u>	New	New QuickSpecs.



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Shape the Future of QuickSpecs – Your Input Matters

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