Allen-Bradley 1769-PB4

01 Product architecture

Product role

Allen-Bradley 1769-PB4 is a 24 V DC Compact I/O power supply that delivers regulated 5 V and 24 V backplane power to a 1769 module bank.

Operating context

Backplane power is separate from externally supplied field-load power. A bank with an acceptable module count can still overload one rail; both electrical consumption and physical placement therefore govern selection.

Additional engineering data

Item	Value or condition
Input conductor	14 AWG (2.5 mm²) solid copper, 90 °C or greater
Panel screw torque	1.16 N·m
Operating vibration	5 g, 10–500 Hz
Operating shock	20 g DIN rail; 30 g panel
Nonoperating shock	30 g DIN rail; 40 g panel
Equipment style	Open type

Key capabilities

Capability 1
Accepts a 19.2–31.2 V DC input supply.

Capability 2
Provides up to 4 A on the 5 V backplane rail.

Capability 3
Supports up to eight I/O modules on each side of the supply.

Capability 4
Attaches to a DIN rail or a grounded panel.

System integration

The module bank must satisfy both individual rail-current limits and the combined output-power limit. Ambient temperature changes the available 24 V output capacity, so bank loading should be calculated at the highest enclosure temperature.

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02 Technical data and interfaces

Principal technical data

Parameter	Value
Nominal input	24 V DC
Input voltage range	19.2–31.2 V DC
5 V output current	4 A maximum
24 V output current	2 A maximum; at 60 °C, 1.7 A with a 4 A load on the 5 V rail
Combined output power	68 W through 55 °C; 61 W at 60 °C
Power consumption	100 VA at 24 V DC
Maximum inrush	30 A at 31.2 V DC
Power dissipation	14.5 W at 60 °C
Continuous isolation	75 V; reinforced insulation
I/O bank capacity	Up to 8 modules per side, 16 total
Operating temperature	0–60 °C
Storage temperature	−40–85 °C
Relative humidity	5–95%, noncondensing
Mounting	DIN rail or panel

How to apply these data

A 4 A demand on the 5 V rail represents 20 W. At 60 °C, adding 1.7 A on the 24 V rail gives 40.8 W, bringing the combined load close to the 61 W ceiling. Using 2 A on the 24 V rail instead leaves 13 W, or 2.6 A, available on the 5 V rail. This is a load-budget illustration, not permission to exceed any individual module or conductor rating.

Technical basis

1769-TD008C-EN-P, November 2023; 1769-IN028J-EN-P, August 2022.

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03 Integration and application

Interface map

Interface	Purpose	Engineering note
DC input	Source energy for conversion	Check polarity and voltage under load, not only at open circuit.
5 V rail	Backplane electronics	Add the 5 V demand of every connected module.
24 V rail	Backplane module circuitry	Apply the ambient-temperature derating.
Bus connectors	Electrical connection between modules	Lock every lever before applying power.
Protective earth	Class I grounding	Use the designated earth connection and grounded mounting system.

Application contexts

Compact I/O expansion
Provides backplane energy for a 1769 I/O bank assembled within module-count and distance constraints.

DC-fed control panels
Uses an existing nominal 24 V control-power source without an AC-input supply at the bank.

Mixed I/O banks
Supports separate current accounting for digital and analog modules drawing different proportions from the two rails.

Distributed I/O cabinets
Supplies a local Compact I/O bank where the selected controller or communication adapter supports that architecture.

Integration constraint

Budget the 5 V and 24 V rails separately, then verify their combined load against the temperature-dependent power curve. Protective earth must remain continuous through the mounted assembly.

Commissioning record

Retain the two rail totals, combined watts, ambient-temperature assumption and final I/O position list. A changed bank configuration requires a new load calculation.

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04 Engineering decisions

Diagnostic decisions

Power indication absent
Check upstream source, polarity and protection Do not condemn the supply before verifying its input.

Dropout during startup
Compare inrush capability with source and protection Correct source coordination before repeating startup.

Only distant modules unavailable
Review bus locks, end termination and distance ratings Correct the physical bus arrangement before changing software.

Product precautions

01
Isolate and verify the upstream DC supply before touching the terminals.

02
Check DC polarity and confirm the input remains within 19.2–31.2 V.

03
Keep protective earth connected to the grounded mounting system.

04
Position every I/O module within its own power-supply distance rating.

05
Lock the bus levers and fit the required bank end cap.

06
Calculate rail currents and combined power at the maximum ambient temperature.

07
Use the specified copper conductors and tighten connections to their designated torque.

08
Check supply indication and I/O operation under normal bank load before release.

Important notice

Remove upstream power before assembling the bus connectors. Recheck every module distance rating and the bank current budget before energizing.

Related catalogue pages

Allen-Bradley 1769-OF4VI

Allen-Bradley 1769-ECR

Allen-Bradley 1769-OB16

Allen-Bradley 1769-PB4

05 Questions and functional acceptance

Product-specific engineering questions

How does ambient temperature change the 24 V output capacity of 1769-PB4?
At 60 °C, a full 4 A load on the 5 V rail limits the 24 V rail to 1.7 A. A 2 A load on the 24 V rail is possible only with the 5 V load reduced to 2.6 A or less, within the 61 W combined limit.

Can 1769-PB4 deliver its full 5 V and 24 V ratings simultaneously?
Both rail-current limits and the combined output-power ceiling apply. Add the power consumed on each rail and keep the total within 68 W through 55 °C or 61 W at 60 °C.

Where can I/O modules be positioned relative to 1769-PB4?
Up to eight modules may be installed on each side, with no more than sixteen total. An individual module with a shorter power-supply distance rating must remain within that shorter distance.

Which DC input limits must the upstream supply meet for 1769-PB4?
The input must remain between 19.2 and 31.2 V DC. A nominal 24 V source must also accommodate the connected bank load and startup demand.

Why should a 1769-PB4 power circuit be checked for startup inrush?
The maximum inrush is 30 A at 31.2 V DC. Source capacity and protective-device characteristics must accommodate this transient without causing an unintended dropout.

Does 1769-PB4 provide an enclosure for the complete I/O assembly?
The supply is open-style equipment. It must be installed within an enclosure suitable for the operating environment and protected against accidental contact.

What grounding arrangement is needed when 1769-PB4 is panel mounted?
Use a properly grounded metal mounting surface and maintain the protective-earth connection. The power supply requires a Class I protective-earth installation.

How much heat does 1769-PB4 contribute at its upper ambient rating?
Power dissipation is 14.5 W at 60 °C. Enclosure thermal design must include this heat together with the dissipation of the installed I/O modules.

Functional acceptance

Test	Action	Expected result
Input stability	Observe DC input while the bank starts	Voltage remains inside the permitted range.
Bank recognition	Compare detected modules with the intended positions	All positions are recognized without a bus connection fault.
Thermal loading	Review the maximum enclosure ambient and dissipation	Rail and combined limits remain satisfied.