



FLEX Ex 85-250V AC In/Quad-Ex DC Out Power Supply

(Cat. Nos. 1797-PS1N)

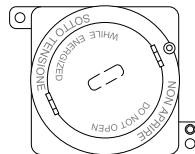
About the Power Supplies

The power supply is an essential component in the operation of an intrinsically safe system. It must isolate the unsafe incoming power from the control system and limit the available energy to IS-safe levels.

No other power sources are needed to operate any components attached to the FLEX Ex™ system in the hazardous area. Power for valves, actuators, or transmitters come from the FLEX Ex modules.

- The 1797-PS1N is a 85-250V ac in/quad-Ex dc out power supply in an explosion-proof enclosure with 1 inch conduit pipe-thread input/output terminations.

1797-PS1N



40468

Features include:

- 85-250V ac supply source
- four channels, 8.5W output each channel
- outputs are IS galvanically isolated from the source
- all channels are independently IS limited

Allen-Bradley HMIs

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

WARNING



Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Understanding System Planning

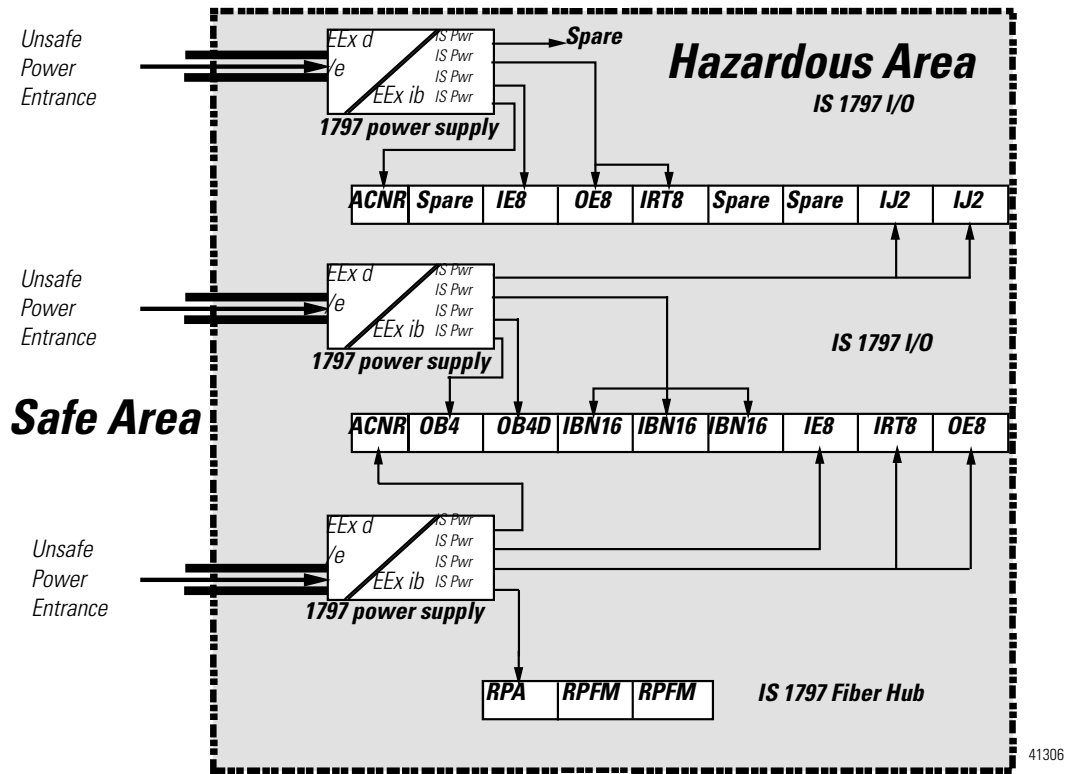
Part of system planning is determining what modules are needed for the application, how many power supplies are needed, how to best partition the system, and where to locate the system cabinets.

A key task in the development cycle is determining the number of power supply outputs (thus power supplies) you will need. In the following example, you will need eleven power outputs if you are using the fiber hub, which requires 8.5W:

Modules	Requires
Fiber Hub	8.5W
Two ControlNet Adapters	8.5W each
Two Analog Inputs	7.5W each
Two Analog Outputs	6.3W each
Two Thermocouple Inputs	1.6W each
Two Digital Outputs	7.5W each
Three NAMUR Digital Inputs	2.8W each
Two Counter Inputs	4.25W each

Each power supply has four independent IS power outputs capable of 8.5W each. In the above example, we required eleven IS power outputs so three power supplies were sufficient.

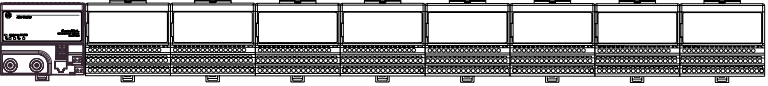
The total number of power supplies needed depends on the modules used and the total system configuration. The following illustration shows how this example may be configured.



IMPORTANT

Even though modules may be supplied with power from the same power supply output channel, galvanic isolation in the module provides module to module galvanic isolation. Depending upon the module-type, galvanic isolation (channel-to-channel within the module) may or may not be provided. See the module’s specifications for more information.

Make certain that you only connect intrinsically safe power supplies to other intrinsically safe system modules or adapters to maintain the integrity of the intrinsically safe backplane.



Installation in Zone 1

The 1797-PS1N power supply has a protection factor of IP66. Refer to the specifications table for the IS module type.

ATTENTION

The power supply cannot be used in an intrinsically safe environment after its outputs have been exposed to non-intrinsically safe signals.

Outputs

When using an intrinsically safe electrical apparatus according to NEC 2002 or CEC 2002, the appropriate USA or Canadian codes must be followed.

The channels in the power supply are electrically connected to each other and have a common +V line.

IMPORTANT

You cannot interconnect lines because of the intrinsic safety requirements.

Mounting the 1797-PS1N Power Supply

The 1797-PS1N power supply provides pre-tapped 1" NPT (National Pipe Thread) conduit entrance and exit holes. Depending on your local requirements, the hazardous conduit entrance could be through hard conduit or semi-flexible continuous conduit with poured seals, etc., from the safe area.

ATTENTION

- Conduit seals must be installed within 6 in (150 mm) of the enclosure (UL).
 - Use star washers and nuts to make sure you have a good electrical connection. Scrape the paint off the back panel in those areas where grounding bolts will be located.
 - Once power has been applied, wait 15 minutes after disconnecting before opening the cover.
-

Similarly, the IS power exit could be through poured seals, etc. The power supply output wires are IS and only require normal IS treatment once they are sealed at the power supply exit.

1. Unscrew the cover of the power supply to access the input and output terminals.

2. Thread the blue IS-safe output power wiring through the IS power exit seal.
3. Connect the blue IS-safe output power wiring to the output terminals making sure all connections are tight.

These power supply outputs provide the input power to the FLEX Ex modules.

4. Thread the hazardous incoming power wiring through the conduit, etc., and the hazardous power entrance seal.
5. Connect the hazardous incoming power wiring to the input terminals making sure all connections are tight.

You can daisy chain the hazardous incoming power wiring to further supplies to simplify system wiring.

ATTENTION

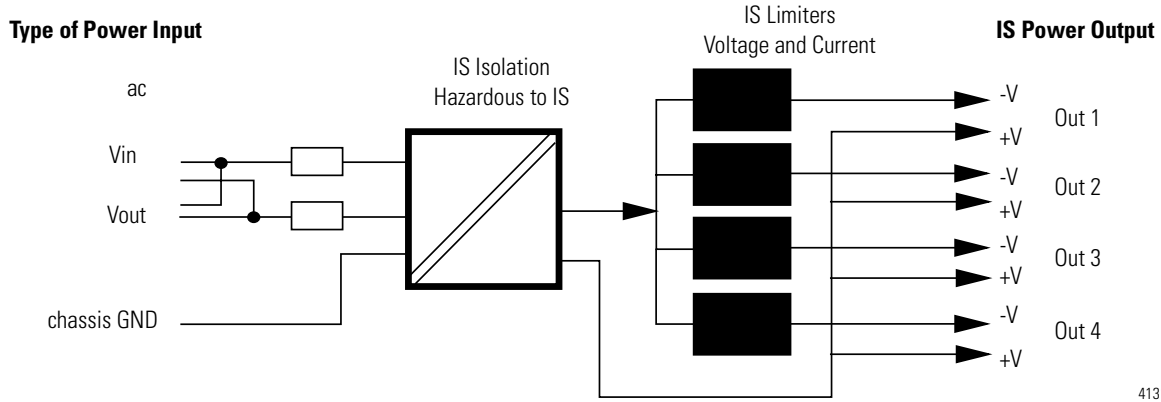


Keep hazardous and IS-safe wiring separated in a suitable fashion. Do not leave long, excess wiring that could bridge between hazardous and safe areas as the power supply is closed.

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6. Pour the seals and inspect them, as necessary.
 7. Screw the lid back into place until tight.
 8. Lock the lid by screwing the small set screw located in the bump on the circumference of the lid.

The set screw prevents the lid from rotating more than half a turn.

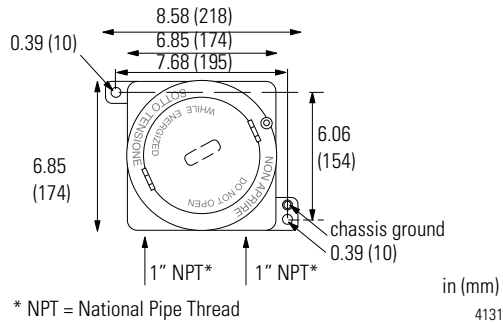
Customer Connections



1797-PS1N Mounting Dimensions and Terminal Base Assignments

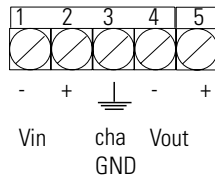
Mounting Dimensions

Height
5.04 (128)

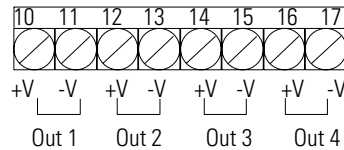


Terminal Base Assignments

North America AC Power Input



IS Power Output




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Repair

The power supply is not field-repairable. Any attempt to open this module will void the warranty and IS certification. If repair is necessary, return this module to the factory.

Specifications

Specifications - 1797-PS1N	
IS Module Mounting Location	Class I Division 1 Groups A-D T4 (UL and C-UL) Class II Division 1 Groups E-G (UL and C-UL) Class III (UL and C-UL)
IS Output Type	Class I, II, III Division 1 & 2 Groups A-G (UL and C-UL)
Input Connectors	85-250V ac Terminals 1,2, 4, 5
Voltage Range	85-250V ac or 120-250V dc
Input Frequency	47-63Hz
Current Consumption	0.9A - 0.35A
Ripple	n/a
Input Power Entrance	1" NPT, $\leq 6"$ conduit allowed between power supply and seal (UL and C-UL)
Output Connectors	Terminals 10-17
Output Power	4x8.5W
Voltage U_0 , V_{oc}	$\leq 9.5V$
Current I_0 , I_{sc}	$\leq 1A$
C_o (IIC), C_a	≤ 500 nF
L_o (IIC), L_a	≤ 8 μH
Maximum Output Cable Resistance (both directions)	$\leq 0.1\Omega$
Isolation Path	Galvanic to UL913 and CSA157
Input Power to Output Power	
Output to Output	None
Input Power	55W
Power Dissipation	21W
Thermal Dissipation	71.67 BTU/hr
Conductors Wire Size	12 gauge (4mm ²) stranded maximum 1.2mm (3/64in) insulation maximum Use wire rated for 100°C operation
Dimensions	174mm x 174mm x 128mm (6.9in x 6.9in x 5.04in)
Protections Class	IP 66/NEMA 7B
Weight (approximately)	7.3kg (16lbs)

Specifications Continued	
Environmental Conditions	
Operational Temperature	-20 to 70°C (-4 to 158°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	5 to 95% noncondensing
Shock Operating	Tested 15g peak acceleration, 11 (±1)ms pulse width
Non-Operating	Tested 15g peak acceleration, 11 (±1)ms pulse width
Vibration	Tested 2g @ 10-500Hz per IEC 68-2-6
Agency Certification	
UL, C-UL	Class I Division 1 Groups A-D T4 Class II Division 1 Groups E-G Class III
Certificates	
UL, C-UL	UL File Number E197983 

UL, C-UL I/O Entity Parameters

If this product has the UL/C-UL mark, it has been designed, evaluated, tested, and certified to meet the following standards:

- UL 913, 1988, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III Division 1, Hazardous (Classified) Locations
- UL 1203, Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations
- UL 2279, Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations
- UL 508, Industrial Control Equipment
- CSA C22.2 No. 157-92, Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations
- CSA C22.2 No. 30-M1986, Explosion-Proof Enclosures for Use in Class I Hazardous Locations
- CSA-E79-0-95, Electrical Apparatus for Explosive Gas Atmospheres, Part 0: General Requirements
- CSA-E79-11-95, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety “i”
- CSA C22.2 No. 14-95, Industrial Control Equipment

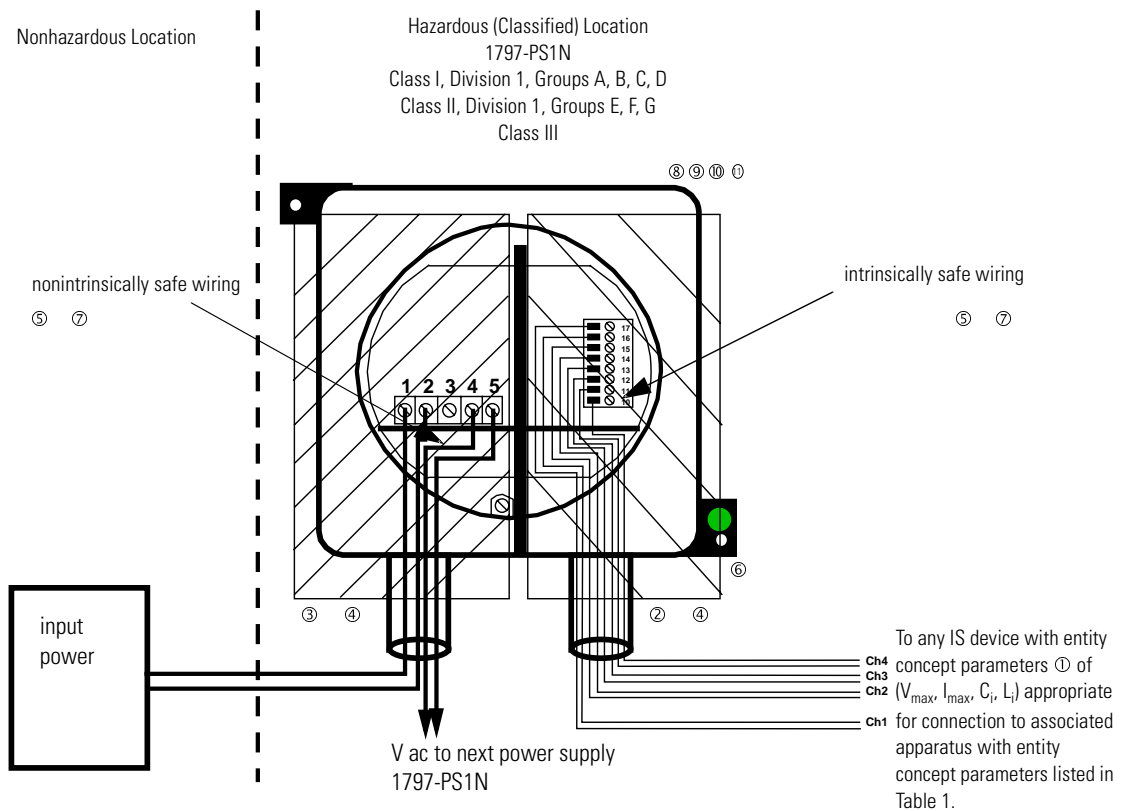
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Wiring Methods

- Wiring method 1 - Each channel is wired separately.
- Wiring method 2 - Multiple channels in one cable, providing each channel is separated in accordance with the National Electrical Code (NEC) or Canadian Electric Code (CEC).

Table 1

1797-PS1N							
Wiring Method	Channel	Terminals	V _{oc} (V)	I _{sc} (A)	Groups	C _a (μF)	L _a (μH)
1 and 2	Any one channel e.g. ch1	11(+), 10(-)	9.5	1.0	A, B, IIC	0.5	8
					C, E, IIB	1.5	32
					D, F, G, IIA	4.0	64

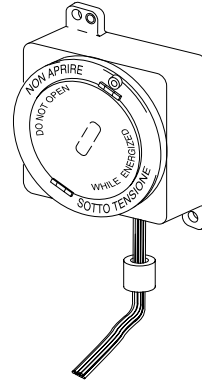


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- ① The entity concept allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of V_{oc} and I_{sc} of the associated apparatus are less than or equal to V_{max} and I_{max} of the intrinsically safe apparatus and the approved values of C_a and L_a of the associated apparatus are greater than $C_i + C_{cable}$ and $L_i + L_{cable}$ respectively for the intrinsically safe apparatus.
- ② Wiring methods must be in accordance with the NEC, ANSI/NFPA 70, Article 504 or the CEC CSA C22.1, Part 1, Appendix F. For additional information refer to ANSI/ISA RP12.6.
- ③ Wiring methods must be in accordance with the NEC, ANSI/NFPA 70, Article 501 or the CEC CSA C22.1, Part 1, Section 18.
- ④ For mounting of the power supply, conduit runs must have sealing fittings connected within 6 inches of enclosure.
- ⑤ The wiring contained within the nonintrinsically safe wiring compartment and the intrinsically safe wiring compartment shall be separated from each other. Care must be taken to guarantee the separation of nonintrinsically safe and intrinsically safe wiring. The partitions within the power supply provide the necessary isolation for the electronics and the wiring, however, extreme care must be taken to guarantee wires are contained within their appropriate compartment and cannot contact any of the electronics.
- ⑥ **WARNING:** Substitution of components may impair intrinsic safety. **AVERTISSEMENT:** La substitution de composant peut compromettre la securite intrinseque.
- ⑦ Cable must be rated at a minimum of 100°C.
- ⑧ **Warning:** Keep cover tightly closed when circuits are alive.
- ⑨ After disconnecting power supply, wait 15 minutes before removing cover.
- ⑩ No live maintenance.
- ⑪ The ambient operating temperature (T_{AMB}) for this system is -20°C to 70°C.

Ferrite Beads

Pass all IS power supply output wires through the ferrite bead before connecting the cable to the power supply.



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Attention: Avoid electrostatic charge.

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Publication 1797-5.34 - June 2002

PN - 957678-45

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