Power Supply Modules

Cat. No. 1771–P3, –P4, –P5 and –P5E

Contents

Use this document as a guide when installing the catalog number 1771-P3, -P4, -P5 or -P5E power supplies.

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 Allen–Bradley 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, Allen–Bradley 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 Application, Installation, and Maintenance of Solid–State Control (available from your local Allen–Bradley 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.

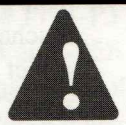
ATTENTION

Identifies information about practices or circumstances that may 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.

ATTENTION



Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664–1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present, and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures. Also, see the appropriate sections in this publication, as well as the Allen–Bradley publication 1770–4.1, ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

ATTENTION

Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static–safe workstation.
- When not in use, keep modules in appropriate static–safe packaging.

Preinstallation Considerations

Chassis Compatibility

The 1771-P3 power supply is a single-slot module, and the 1771-P4, -P5 and -P5E power supplies are 2-slot modules. These power supply modules can be used in both series A and B 1771 I/O chassis, as shown below.

Table A
1771 I/O Chassis Power Supply Placement Requirements

Chassis			Primary Supply	Secondary Supply
1771-A4	Series A	Without Integral supply	1771-P3 (Group 0, Slot 1)	1771-P3 (Group 5, Slot 1)
			1771-P4 (Slots 0-1)	1771-P4 (Slots 8-9)
			1771-P5, -P5E (Slots 0-1	1771-P5, -P5E (Slots 8-9)
		With integral supply	Not applicable	1771-P3 (Group 4, Slot 1)
				1771-P4 (Group 4, Slot 0-1)
1771-A2	Series A	With integral supply	Not applicable	1771-P3 (Group 3, Slot 1)
				1771-P4 (Group 3, Slot 0-1)
1771	All Series B	Not applicable	1772-P3 (Any slot except 0)	1771-P3 (Any slot except 0) or 1771-P4 (Any 2 slots excluding 0)
			1771-P4 (Any 2 slots excluding 0)	1771-P3 (Any slot except 0) or 1771-P4 (Any 2 slots excluding 0)
			1771-P5, -P5E (Any 2 slots excluding 0)	1771-P5, P5E (Any 2 slots excluding 0)

ATTENTION

The 1771–P5 and –P5E are designed to operate in parallel with another 1771–P5 or –P5E. Do not parallel 1771–P5 or –P5E with other ac power supplies. Limit adjacent slot module power dissipation for all supplies to 10W maximum.

Processor Compatibility

Compatibility of power supplies with selected processors is shown below. Processors with an integrated power supply as shown below can support only one additional ac power supply.

Table B
Power Supply and Processor Compatibility

Power Supply Cat. No.	1772-LSP[1] 1772-LWP[1] 1772-LXP[1]	1771-AL 1771-AR[2] 1771-ASB	1771-AS	1772-LN1, -LN2, -LN3, -LV	1772-LS 1772-LW 1772-LX
1771-P3	Compatible	Compatible	Series B Chassis only	Not compatilbe	Compatible
1771-P4					
1771-P5, -P5E	Not Compatible				

Where:

1 Power supply and backup battery included
2 Switch 7 of I/O chassis must be turned on. Refer to Remote I/O Adapter Module publication 1771-2.17.

ATTENTION

Do not parallel 1771–P5 or –P5E with other ac power supplies. Limit adjacent slot module power dissipation for all supplies to 10W maximum.

Power Supply Current Capacity

Table C shows the current capacity of various configurations of power supplies When paralleling power supplies, use the power supply paralleling cable, cat. no. 1771–CT.

Table C
Power Supply Module Current Capabilities

Power Supply/Processor	Total Available Backplane Current for I/O Modules				
	None	1771-P3	1771-P4	1771-P5	1771-P5E
1771-P3	3A	6A	11A		
1771-P4	8A	11A	16A		
1771-P5, -P5E[1]	8A			16A	16A
1772-LSP	2A	5A	10A		
1772-LXP	4A	7A	12A		
1772-LWP	4A	7A	12A		

1 The 1771-P5 or -P5E power supply is designed to operate in parallel only with another 1771-P5 power supply. The total current capability would be 16A.

ATTENTION

The 1771–P5 and –P5E are designed to operate in parallel with another 1771–P5 or –P5E. Do not parallel 1771–P5 or –P5E with other ac power supplies. Limit adjacent slot module power dissipation for all supplies to 10W maximum.

ATTENTION

Power supply modules have a controlled "soft-start" feature to enhance power supply reliability. During power-up or power-down periods, outputs of certain discrete modules may momentarily change operating state. These modules are:

- Isolated AC (120V) Output Module, cat. no. 1771-OD series A or B
- Isolated AC (220V) Output Module, cat. no. 1771-OR series A
- Contact Output Module cat. no. 1771-OY series A or B
- Contact Output Module cat. no. 1771-OZ series A or B
- DC (5V) Multiplexer Input Module cat no. 1771-IS

Later series of these modules do not change state during power-up or power-down.

Connecting Input Power

The 1771-P3, -P4, -P5 and -P5E power supply modules require power from an external power source. Refer to Table D for input voltage requirements and output current capability for the individual power supply modules.

Table D
Power Supply Module Input Voltage Requirements

Power Supply Module	Input Current and Voltage Requirements	Output Current
1771-P3	0.42A, 120V ac (97–132V ac)	3A @ 5V
1771-P4	0.88A, 120V ac (97–132V ac)	up to 8A @ 5V
1771-P5	3A, 24V dc (20.5–30V dc)	up to 8A @ 5V
1771-P5E	3A, 24V dc (20.5–30V dc)	up to 8A @ 5V

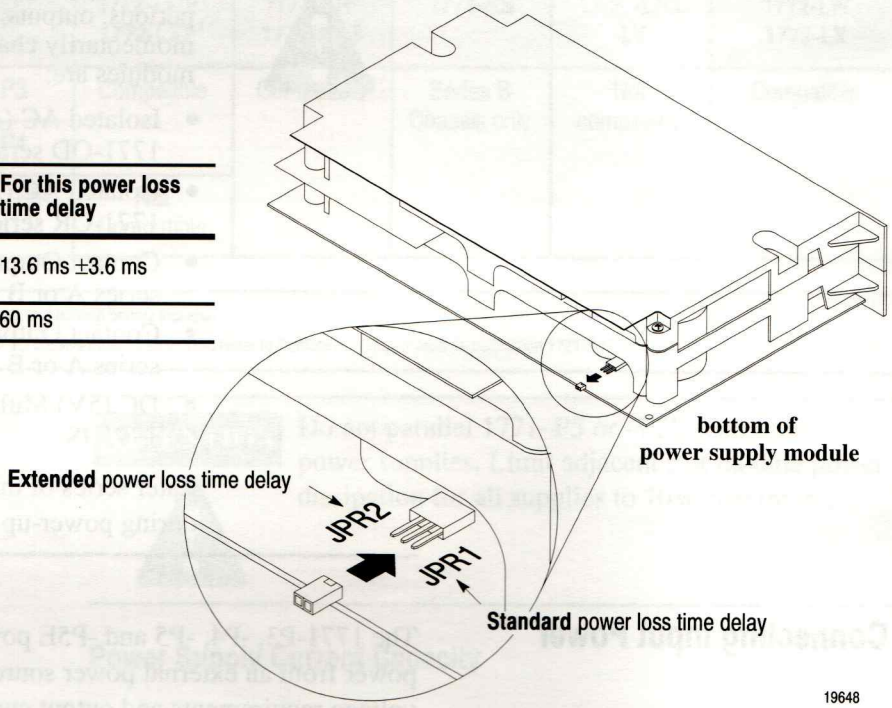
Refer to the following pages for input power connections.

Setting the Power Loss Time Delay (1771-P5E only)

Power loss time delay is the time period from when the power supply input voltage drops below 20.5V dc to when the power supply resets the processor enable signal on the I/O backplane. When this signal is reset, the resident PLC® processor or adapter module stops processing data to/from the modules in the I/O chassis.

You set the configuration jumper as follows:

Set the jumper to this position	For this power loss time delay
JPR1 — Standard (factory default position)	13.6 ms ±3.6 ms
JPR2 — Extended	60 ms

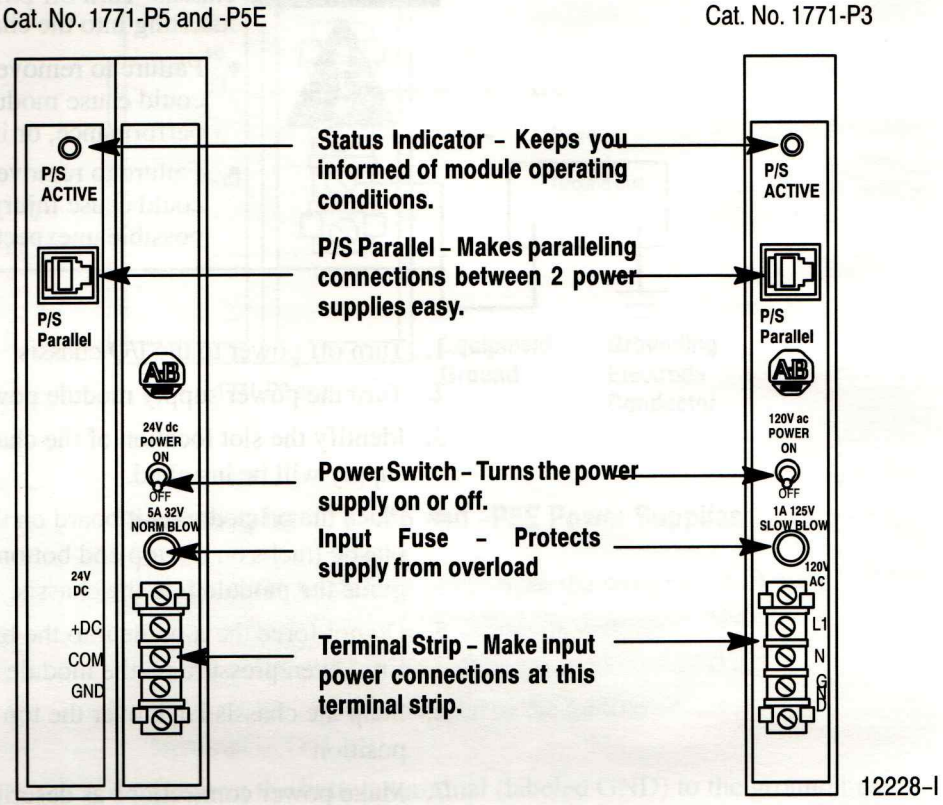


If your input modules and power supply use power from the same source and the input module time delay is greater than the power loss time delay of the power supply module, input module data integrity is preserved. If using 2 power supplies, do not exceed the specified isolation voltage (see Specifications).

ATTENTION Exercise care when you configure your system for possible power loss. You should consider:

- input module time delay
- power loss time delay
- incoming power quality
- control system response to input information

Figure 1
Features of the Power Supply Modules



Installing the Power Supply

The power supplies are modular components of the 1771 I/O system. They must be properly installed in a system chassis. Refer to publication 1771–IN075 for information on acceptable chassis installation and proper grounding requirements.

To install the power supply module in the I/O chassis, proceed as follows:

WARNING

If you insert or remove the module while backplane power is on or attach or remove wiring to the terminal block, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION

Turn the power supply off before inserting into the chassis. Turn off power to the I/O chassis before inserting into the chassis.

- Failure to remove power from the backplane could cause module damage, degradation of performance, or injury.
- Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.

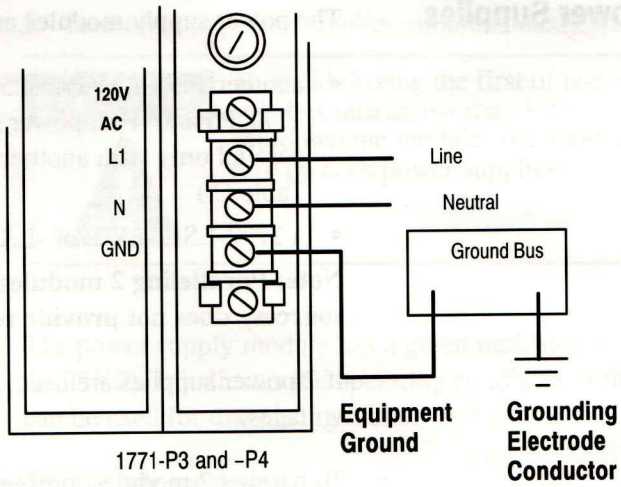
1. Turn off power to the I/O chassis
2. Turn the power supply module power switch OFF.
3. Identify the slot location of the chassis into which the power supply will be installed.
4. Place the printed circuit board on the rear of the module into the plastic tracks on the top and bottom of the I/O chassis which guide the module into the chassis.
5. Do not force the module into the backplane connectors. Apply firm, even pressure on the module to seat it properly.
6. Snap the chassis latch over the top of the module to secure its position.
7. Make power connections as described in "Making Input Power Connections" below.

Making Input Power Connections

When making input power connections, use 14AWG, 75°C copper wire.

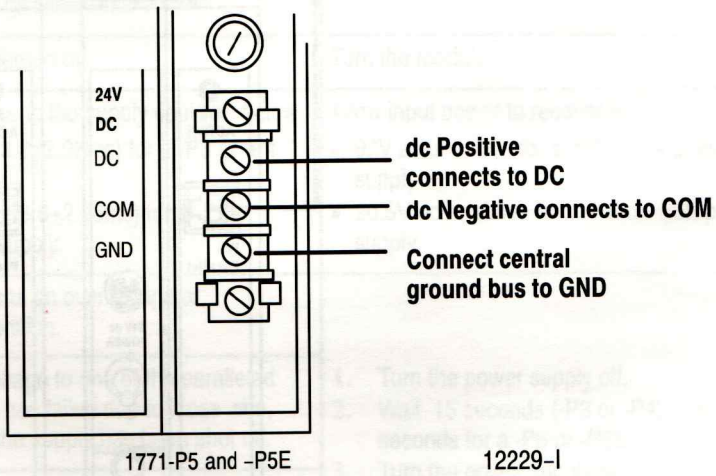
Connecting the 1771-P3 and -P4 Power Supplies

1. Remove the protective cover from the terminal block by squeezing the prongs and lifting the protective cover.
2. Connect the L1 (high) line to the top (L1) connection on the terminal block.
3. Connect the neutral (low) line to the middle (N) connection on the terminal block.
4. Connect the bottom terminal labeled GND to the ground bus (equipment ground).
5. Tighten terminal block screws to 7 pound–inches (0.5Nm).
6. Replace the protective cover on the terminal block.



Connecting the 1771-P5 and -P5E Power Supplies

1. Remove the protective cover from the terminal block by squeezing the prongs and lifting the protective cover.
2. Connect the positive dc line to the top terminal (DC).
3. Connect the negative dc line to the middle terminal (COM).
4. Connect the bottom terminal (labeled GND) to the ground bus.
5. Tighten terminal block screws to 7 pound–inches (0.5Nm).
6. Replace the protective cover on the terminal block.



Paralleling Power Supplies

The power supply modules are designed to operate in parallel with:

- another 1771-P3, -P4, -P5 or -P5E power supply (**Note:** The 1771-P5 and -P5E power supplies are designed to operate in parallel **only** with another 1771-P5.) (Refer to Table A and Table C.)
- a 1772-LSP, -LWP or -LXP processor (Refer to Table B.)

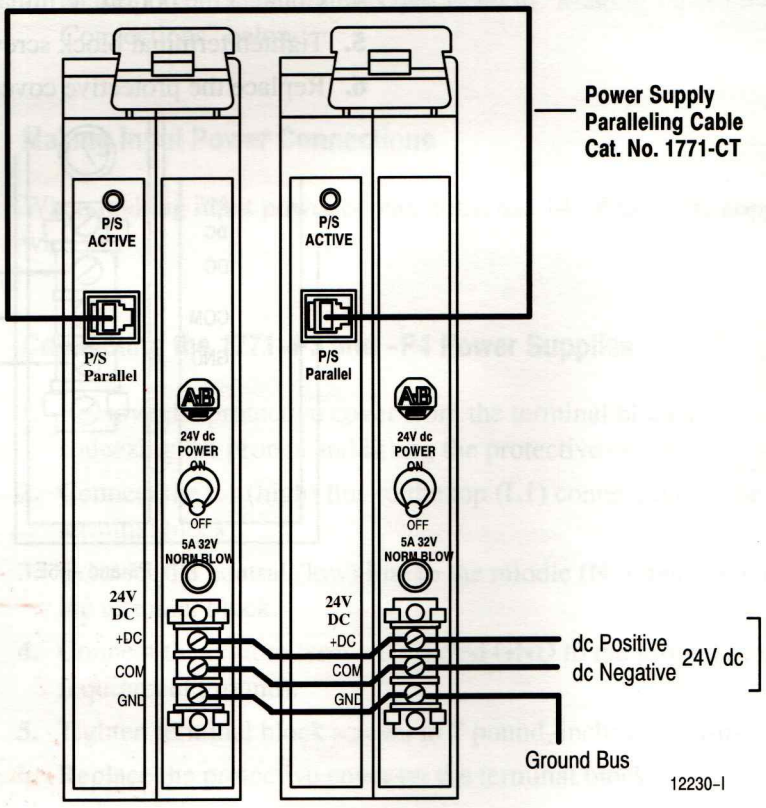
Note: Paralleling 2 modules, even when using different power sources, does not provide redundancy.

If 2 power supplies are used, do not exceed specified isolation voltages.

To parallel 2 modules, proceed as follows:

1. Make certain that both power supply module power switches are off.
2. Connect the power supply paralleling cable (cat. no. 1771-CT) from the P/S Parallel port on the first power supply module to the P/S Parallel port on the second module as shown below. **Note:** Route the cable around the top of the I/O chassis to avoid induced voltages.

Paralleling Two Power Supply Modules



3. Turn on both power supplies simultaneously.

ATTENTION

To avoid driving the first of two paralleled power supplies into an overcurrent condition that would shutdown the module, you must simultaneously turn on both power supplies.

Module Indicators

The power supply module has a green indicator light (labeled P/S ACTIVE). It indicates the operating condition of the module, and can be used for diagnosing faults.

The module monitors itself for:

- overvoltage
- undervoltage
- overcurrent

Any of these conditions will shut down the power supply. Following a shutdown, turn the power supply off for at least 15 seconds (-P3 and -P4) or 45 seconds (-P5 and -P5E) before you turn it on again.

If the P/S ACTIVE Indicator	Then:	Corrective Action
is on	Normal operation. The indicator lights as long as the module is supplied with power even if it is not seated in its chassis slot.	None required.
is off	The module is turned off.	Turn the module on.
turns off	The input voltage to the supply could be below: • 97V ac (for 13.6±2.96ms) for a -P3 or -P4 power supply. • 20.5V dc (for 13.6±2.96ms) for a -P5 or -P5E power supply.	Allow input power to recover to: • 97V ac or above for a -P3 or -P4 power supply • 20.5V dc or above for a -P5 or -P5E power supply
turns off and shuts down	The dc output has an overvoltage or overcurrent condition.	1. Turn the power supply off. 2. Wait 15 seconds (-P3 or -P4) or 45 seconds for a -P5 or -P5E. 3. Turn the power supply on.
turns off and a paralleled power supply shuts down	The ac input voltage to one of the paralleled power supplies has failed due to loose wire, blown fuse, or the supply has been shut off.	
remains off and at least one power supply shuts down	The 2 supplies were not turned on simultaneously.	

Troubleshooting

Follow the procedure below to isolate and correct possible faults.

1. Turn the power supply off and wait at least 15 seconds (-P3 and -P4) or 45 seconds (-P5 and -P5E) before you turn it on again.
2. Turn the power supply on.
3. If the system operates properly, you are finished. If the indicator does not turn on, turn the power supply off and wait 15 seconds (-P3 and -P4) or 45 seconds (-P5 and -P5E).
4. Remove the paralleling cable (if equipped) to verify independent operation of each power supply.

ATTENTION

Remove input power to the I/O chassis before removing the power supply module from the chassis. Failure to do this may result in injury to personnel and/or damage to equipment.

5. Pull the power supplies halfway out of the chassis to test them under no load conditions.
6. Turn on **one** power supply.

If the P/S ACTIVE indicator is:	Then:
On	One or more of the following has occurred: - Input voltage was not within acceptable limits - Backplane is overloaded or has a short circuit. Add up the backplane currents of all modules. Verify power supply limits have not been exceeded. - Check for fault in paralleling cable (if used). - Internal power supply could have faulted.
Off	Verify that input voltage is within acceptable limits. If input voltage is correct, replace the power supply.

7. If you have two power supplies in your chassis, repeat step 6 for the other power supply.

8. If you have only one power supply in your chassis and it passed step 7 (the P/S ACTIVE light turned on), verify that the power supply is not overloaded by performing steps 9 through 11.
9. Turn the power supply off and wait 15 seconds (-P3 and -P4) or 45 seconds (-P5 and -P5E).
10. Firmly seat the power supply in the chassis.
11. Restore power to the I/O chassis, and turn the power supply module on.

If the P/S ACTIVE indicator is:	Then:
On	The power supply is operating correctly and the system should operate normally.
Off	Replace the power supply module with a known good operating supply. The system should operate normally.

Checking for Open or Shorted Paralleling Cable

Important: Continue with this procedure only if you are using two power supply modules in the same chassis. This procedure checks for an open or shorted 1771-CT paralleling cable.

Before you begin, turn I/O chassis power off. Both power supply modules should be turned off and partially pulled out of the chassis.

ATTENTION

Remove input power to the I/O chassis before removing the power supply module from the chassis. Failure to do this may result in injury to personnel and/or damage to equipment.

1. Test the 1771-CT paralleling cable by verifying the ground connection between power supplies.
2. Test for a short circuit by performing steps 3 through 5.
3. Plug one end of the paralleling cable into one of the power supply modules (the other end should not be connected).
4. Turn the power supply on. If the P/S ACTIVE indicator turns on this end of the cable is okay.
5. Unplug the cable, and plug the other end of the cable into the power supply.

If the P/S ACTIVE indicator :	Then:
Turns On	This end of the cable is all right.
Does not turn On	The paralleling cable has a short circuit. Replace the cable.

6. Perform steps 7 through 9 to test for an open circuit in the paralleling cable.
7. Turn both power supply modules off. Connect the paralleling cable to each supply.
8. Turn one power supply module on. The P/S ACTIVE indicators on both supplies should **not** turn on.
9. Turn the first power supply off and the other power supply module on. The P/S ACTIVE indicators on both supplies should **not** turn on.

   If either of the P/S ACTIVE indicators turn on, the paralleling cable has an open circuit. Replace the cable.
10. To test for a paralleling fault, turn both power supply modules off and wait 15 seconds (-P3 and -P4) or 45 seconds (-P5 and -P5E).
11. Verify that the paralleling cable is properly connected, and then turn both power supplies on simultaneously. The P/S ACTIVE indicators on both supplies should turn on.
12. If the P/S ACTIVE indicators on both supplies do not turn on, replace both supplies, one at a time, with known good power supplies in order to isolate the faulty power supply module.
13. If all tests have passed up to this point, turn both power supply modules off simultaneously and wait 15 seconds (-P3 and -P4) or 45 seconds (-P5 and -P5E). Check for backplane loading by performing steps 14, 15 and 16.
14. Firmly seat the power supplies in the chassis.
15. Restore power to the I/O chassis, and turn both power supply modules on simultaneously.

If the P/S ACTIVE indicator :	Then:
Turns On	The power supply modules are operating correctly and the system should operate normally.
Does not turn On	Recheck backplane loading.

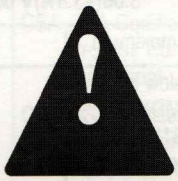
16. Check for proper dual power supply module operation. If backplane loading is within acceptable limits and the P/S ACTIVE indicators do not turn on, replace both power supply modules, one at a time, with known good power supply modules in order to isolate the faulty module. The system should operate normally.

Safety Approvals

The following information applies when operating this equipment in hazardous locations:

Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, and D Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

WARNING



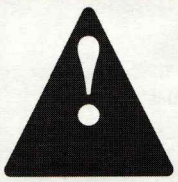
EXPLOSION HAZARD -

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

Informations sur l'utilisation de cet équipement en environnements dangereux:

Les produits marqués CL I, DIV 2, GP A, B, C, D ne conviennent que une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un systéme, le code de température le plus défavorable (code de température le plus faible) peut eatre utilisé pour déterminer le code de température global du systéme. Les combinaisons d'equipements dans le systéme sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

AVERTISSEMENT



RISQUE D'EXPLOSION -

- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.
- La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe 1, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

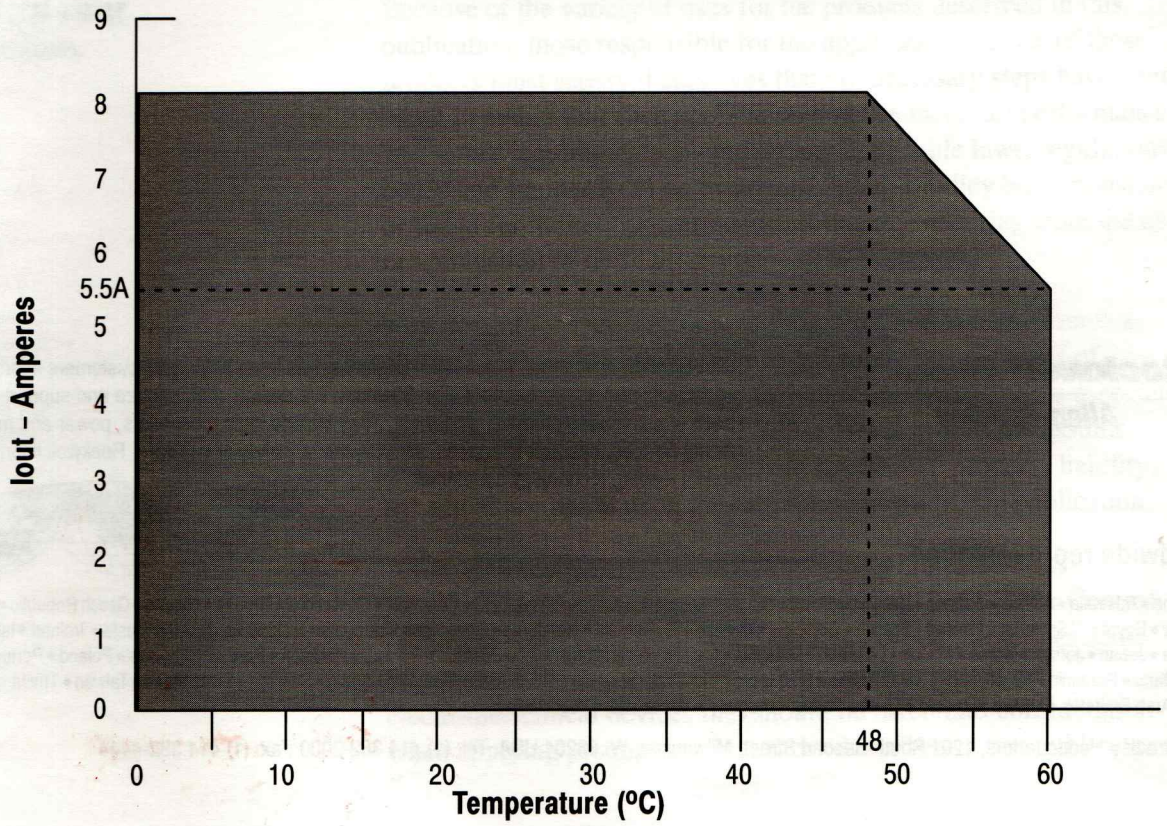
Specifications

	1771-P3	1771-P4	1771-P5	1771-P5E
Module Location	1 slot in a 1771 I/O chassis	2 adjacent slots in a 1771 I/O chassis		
Nominal Input Voltage/Current	0.42A, 120V ac	0.88A, 120V ac	3.0A, 24V dc	
Input Voltage Range	97 to 132V ac rms		20.5 to 30V dc	
Input Power	23 Watts	57 Watts	57 Watts	
Frequency Range	50/60Hz		Not applicable	
Isolation Voltage	Tested to 2160V dc for 1s			
Output Voltage	5.06(±3.8%)V dc			
Output Current	3A @ 5V dc maximum	8A @ 5V dc maximum	8A @ 5V dc maximum	
Fuse	1A 125V slow blow Bussman MDL1.0 Littelfuse 313001 IEC 127 Type T (blue)	1.5A 125V slow blow Bussman MDX1.5 Littelfuse 31301.5 IEC 127 Type T (blue)	5A 32V normal blow Bussman MTH5 Littelfuse 312005 IEC 127 Type M (yellow)	
Power Dissipation	8W maximum	4W maximum @ 2A 7W maximum @ 4A 12W maximum @ 6A 17W maximum @ 8A		
Adjacent Slot Power Dissipation	10W maximum			
Terminal Block Screw Torque	7 pound-inches (0.5Nm)			
Conductors Wire Size	14AWG (2.5mm^2) copper wire rated at 60°C or greater		14AWG (2.5mm^2) copper wire rated at 60°C or greater	
Insulation Category	3/64 inch (1.2mm) insulation maximum 1[1]		3/64 inch (1.2mm) insulation maximum 2[1]	
Branch Circuit Protection	15A maximum, user supplied			
Power Loss Time Delay - Input Power Loss to Processor Disable	13.6(±3.6ms)ms			Adjustable 13.6(±3.6ms)ms or 60ms
Environmental Conditions Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock) 32 to 140°F (0 to 60°C)			
Storage Temperature	IEC 60068-2-1 (Test Ab, Unpackaged, Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged, Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged, Nonoperating Thermal Shock) -40 to 185°F (-40 to 85°C)			
Relative Humidity	IEC 60068-2-30 (Test Db, Unpackaged, Nonoperating Damp Heat) 5 to 95%, noncondensing			
Enclosure Type Rating	None (open style)			
Weight	1.6 lbs (0.73 kg)	2.3 lbs (1.04 kg)	2.6 lbs (1.18 kg)	
Paralleling Cable	Cat. No. 1771-CT			
Keying - right hand slot	Between 12 and 14 Between 18 and 20	Between 12 and 14 Between 20 and 22	Between 12 and 14 Between 22 and 24	
External Transformer (if used)	60VA	150VA	Not applicable	

Agency Certification (when product is marked)	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, D Hazardous Locations UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, D Hazardous Locations	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, D Hazardous Locations	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, D Hazardous Locations CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2, Industrial Emissions EN 50082-2, Industrial Immunity European Union 73/23/EEC LVD Directive, compliant with: EN 61131-2, Programmable Controllers C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064, Industrial Emissions

1 Refer to Allen-Bradley publication 1770-4.1, Industrial Automation Wiring and Groundlines.
2 See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Derating Curve for the 1771-P5 and -P5E



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