



Allen-Bradley Redundant Power Supplies

(Cat. No. 1771-P4R and 1771-P6R)

To the Installer

This document provides you with the following information:

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what this package contains	1
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What This Package Contains

When you receive your 1771-P4R or -P6R power supply, you should see the following in the box:

- one 1771-P4R or 1771-P6R power-supply module
- one 3-position terminal block (attached to module)
- one 5-position terminal block (attached to module)
- one redundant cable

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Compliance to European Union Directives

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) and the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2
EMC – Generic Emission Standard, Part 2 – Industrial Environment
- EN 50082-2
EMC – Generic Immunity Standard, Part 2 – Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is also tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 – Equipment Requirements and Tests.

For specific information that the above EN requires, see the appropriate sections in this publication, as well as the following Allen-Bradley publications:

- *Industrial Automation Wiring and Grounding Guidelines* (for noise immunity), publication 1770-4.1
- *Guidelines for Handling Lithium Batteries*, publication AG-5.4
- *Automation Systems Catalog*, publication B111

Installing the Power-supply Module

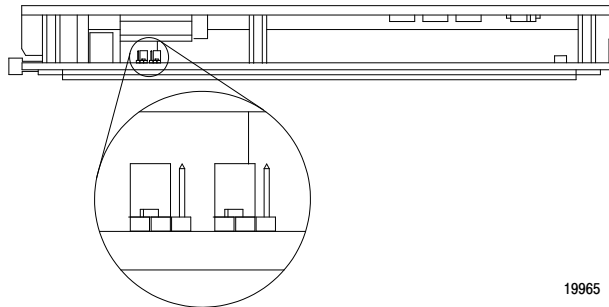
To install your power supply module you perform these tasks:

To perform this task	See page
set the jumpers	3
set the I.D. selection and configuration switches	4
place the power supplies	5
connect the redundancy cables	5
wire the alarm relay	6
connect input power	7

Set the Jumpers

Each power supply module has two jumpers located at the back of the power supply near the edge connectors. The jumper selection provides the proper voltage regulation for the different power supply configurations. The power supply can be configured to support local or remote sensing by setting the jumpers.

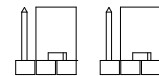
1. Locate the power supply jumpers on the back edge of the module near the gold-plated edge connectors:



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2. Position the power supply module so that the jumpers and pins are facing **upward**.
3. Use needle nose pliers to position the jumpers as shown in this table.

For this configuration	Set jumpers to
A power supplies in a power-supply chassis (1771-PSC) connected to an I/O chassis.	right position 
All other configurations. (These power supplies are shipped with jumpers set to the left.)	



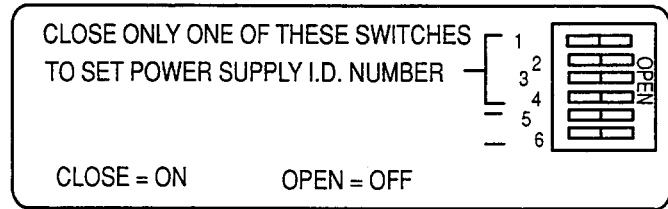
Important: To avoid system malfunctions, set the jumpers of power supplies in 1771 I/O chassis to the left position.

Set the I.D. Selection and Configuration Switches

Each power supply in a redundant system must be assigned a different identification number. To do this, you must set the I.D. selection switches located on the left side of the module (shown below). A cutout in the metal cover of the module provides access to these switches.

I.D. Selection Switch

Switches	Are set
1, 2, 3, 4	for the power supply identification number
5, 6	based on the configuration zone



To set the switches:

1. Close the I.D. selection switch (1, 2, 3, or 4) that represents the number you selected for that power supply.
2. Determine the configuration zone being used so you can set switches 5 and 6.

► *To determine the configuration zone, you must know the maximum chassis current draw and the ambient air temperature of the chassis.*

Maximum Current Draw (A)	Ambient Temperature	Configuration Zone
0-8	55°C	A
	60°C	
8-14	55°C	B
	60°C	
14-16	55°C	B
	60°C	C
16-20	55°C	C
	60°C	
20-24	55°C	C
	60°C	

3. Use the following table to position switches 5 and 6 based on the configuration zone you determined.

If Configuration Zone Is	Set Switches
A	5 and 6 OPEN
B	5 CLOSED and 6 OPEN
C	5 OPEN and 6 CLOSED

Place the Power Supplies



ATTENTION: Turn off the power supply module before removing it from or inserting it into a chassis. Failure to observe this warning could alter processor memory, damage module circuitry, and cause unintended operation which could possibly cause injury to personnel.

You can place these power supply modules into any I/O module slot in any current chassis (1771-A1B, -A2B, -A3B, -A3B1, -A4B, -PSC).

The primary requirement for placing redundant power supplies is the need to allocate 2 to 4 adjacent slots in your 1771 I/O chassis for the modules.

Important: You cannot use the 1771-P4R, -P6R power supplies with series A 1771 I/O chassis.

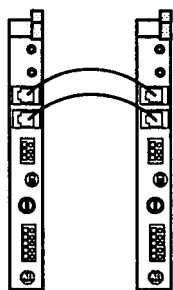
Connect the Redundancy Cables

The power supply redundancy cables allow the power supplies to communicate load-sharing data. The two connectors on each supply are in parallel to permit three or four supplies to be daisy-chained together in a redundant system.

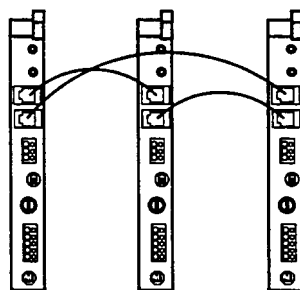
To connect the cables:

1. Connect the redundancy cable between the connectors labeled P/S REDUNDANT on the power supply as shown below.

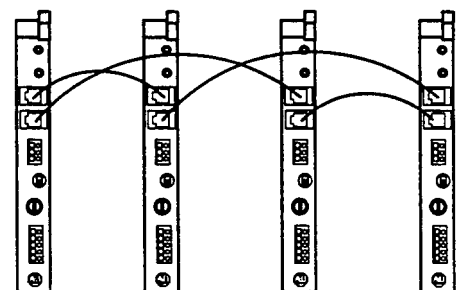
Connecting the Redundancy Cables for a 2, 3, or 4 Supply System



2 power-supply system



3 power-supply system



4 power-supply system

2. Loop the cable over the top of the I/O chassis to avoid picking up signals induced from I/O wiring.

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Wire the Alarm Relay

A 3-position terminal block labeled RELAY on the front panel of the module provides you with a means of communicating the status of the power supply to some alarm device. The contacts on the relay are rated at 1 Amp, 250V ac maximum.

The relay energizes within 0.5 seconds after sufficient input power is applied and no error conditions have been encountered. The error conditions include 5V output overvoltage, undervoltage, or overcurrent and internal reference error. The relay de-energizes within 10 seconds following detection of an error condition or loss of power. Contact bounce may occur for 100 ms.

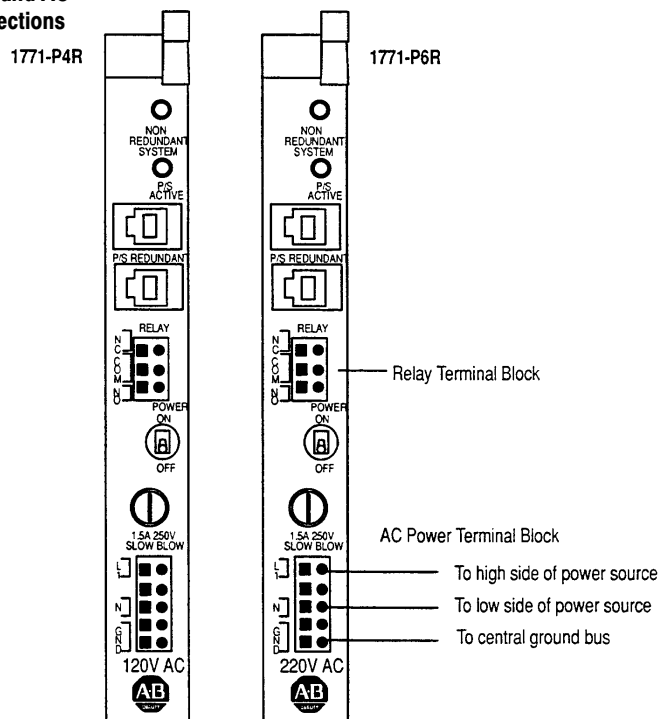
The terminal block has three lines:

- NC (Normally Closed)
- COM (Common)
- NO (Normally Open)

Using the normally closed side of the block will keep the relay contacts open until unit failure (when it will close). Using the normally open side of the relay will keep the relay contacts closed until unit failure (when it will open).

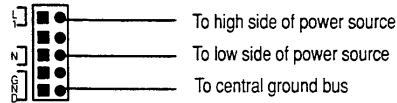
To wire the relay, place the incoming line in the NC or NO position and out the COM position to the load. Any spare point on an input module can be connected and used for signaling by the relay.

Alarm Relay and AC Power Connections



Connect Input Power

The following figure shows the overall configuration of the ac power connections.



- ▶ *The two undesignated terminals do not connect to any electrical circuit on the module. Each of the three functional terminals accepts a single 14-AWG wire max.*

To correctly connect the wire to the terminal you connect the wires to the terminal in this order:

- connect the high side of the power source to the L1 terminal of the power supply
- connect the low side of the power source to the L2 or N (neutral) terminal of the power supply
- connect the GND (ground) terminal of the power supply to the central ground bus in the enclosure



ATTENTION: Pay close attention to the ac GND and L1 connections when wiring the terminal block. An error here could cause the ac power to be applied to the chassis.

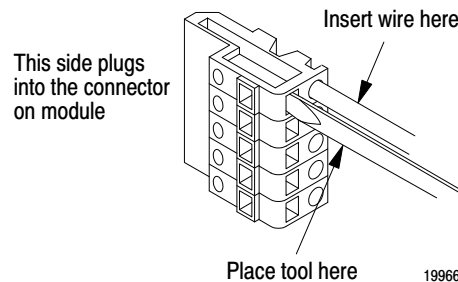


ATTENTION: Check that the input voltage rating on the power supply front panel agrees with the available power source. Application of the incorrect line voltage can cause severe power supply damage.

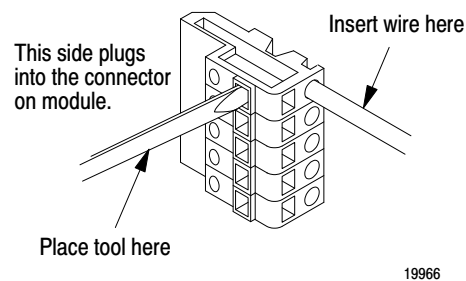
- ▶ *You can connect these wires while the terminal block is plugged into the supply, or you can remove the terminal block to lay it on a flat surface to connect these wires. To remove the terminal block, pull it straight out out from the receptacle on the module.*

To connect a wire to a terminal:

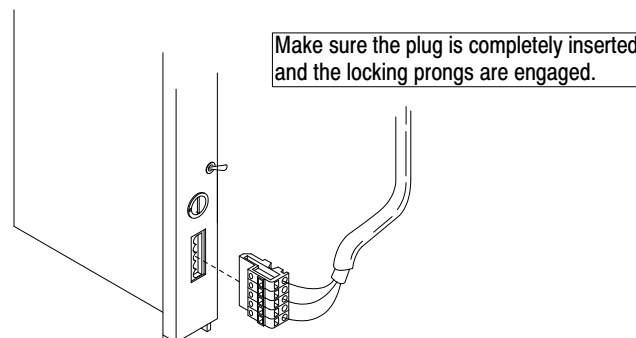
1. Connect the power cord to the ac connector (120V or 220V) of the power supply module.
 - A. Strip 0.35 inches of insulation off the wire.
 - B. Spring the clip open to insert the wire, using a wedge-tipped tool, such as a small screwdriver.
 - If you leave the terminal block plugged into the supply, insert the tool parallel to the wire (push straight in).



- If you remove the terminal block and lay it on a flat surface, insert the tool perpendicular to the wire (push straight down).



- C. After making the wiring connections, re-insert the terminal block into the front plate on each processor.



Once you have completed the tasks up to this point, you can turn the power switches ON. Turn all the power switches on at the same time. If everything is set up correctly, all P/S ACTIVE (green) indicators will be on and all NON REDUNDANT SYSTEM (yellow) indicators will be off.

Interpreting the Power Supply Indicators

Your power supply has two indicators located in the upper half of the module front panel.

The top indicator is yellow and is labeled NON REDUNDANT SYSTEM. This indicator tells you that the number of supplies in operation is below the number required for redundant operation. The yellow indicators in a redundant system operate together; they are either all on or all off.

The lower indicator is green and is labeled P/S ACTIVE. The following table shows how to interpret this indicator.

If P/S ACTIVE indicator is	Then
On	This power supply is operating normally and a sufficient number of power supplies is operational for the system configuration.
Off	<p>The supply has detected one of the following conditions:</p> <ul style="list-style-type: none"> • dc overvoltage (the supply shuts down) • dc undervoltage (the supply shuts down) • dc overcurrent (the supply shuts down) • power switch turned off (the supply is turned off) • ac undervoltage • insufficient number of operational power supplies for the system configuration <p>When the P/S ACTIVE indicator is off because of an ac undervoltage or because an insufficient number of supplies is operational, the power supply may continue to deliver output power.</p>

Troubleshooting Your Power Supplies

When you troubleshoot your power supplies, you may be required to remove and replace the power supply while power is still applied to the chassis.

For information on	See page
Removing the power supply	10
Inserting the power supply	10
Troubleshooting a single power supply	11
Troubleshooting multiple power supplies	11

Removing the Power Supply

1. Flip the POWER switch on the front panel to the Off position, **only on the unit to be removed.**
2. Remove the ac input terminal block, the alarm relay terminal block, and the redundant cables **only from the unit to be removed.**
3. Slide the unit out of the chassis and note the following settings:
 - I.D selection switch setting (1 through 4)
 - configuration switch setting (5 and 6)
 - jumper setting (local or remote sensing)
 - input voltage rating on the front panel near the ac input connector

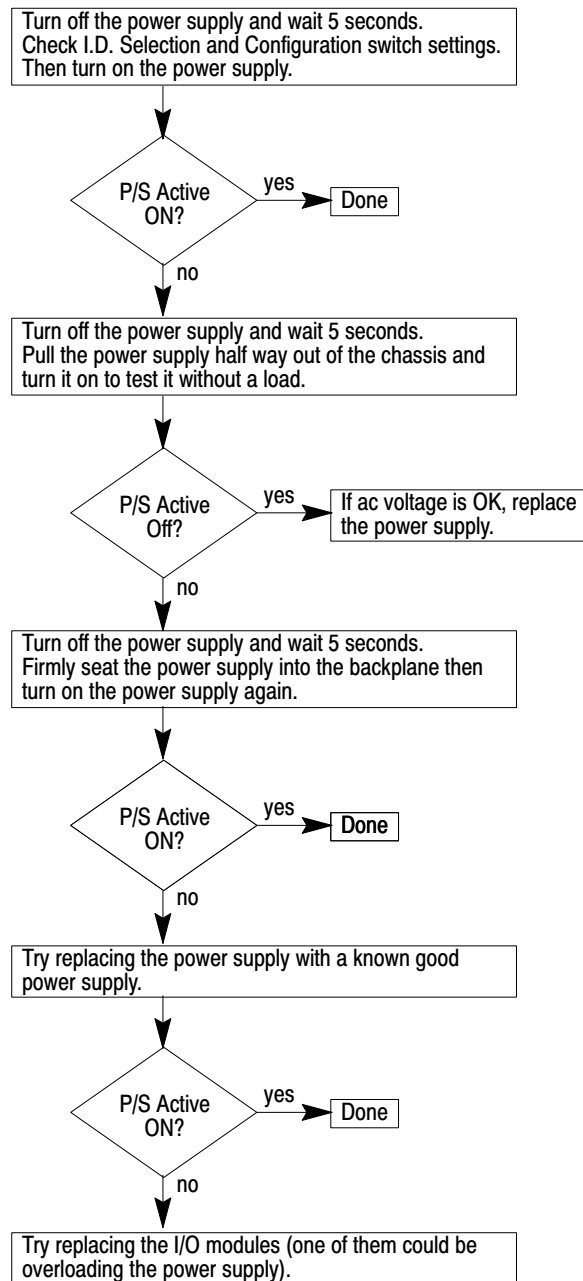
You will set the replacement unit to the same settings.

Inserting the Power Supply

1. Configure the supply to the same settings as the unit removed.
2. Flip the POWER switch on the front panel to the Off position.
3. Insert the module completely into the slot in the chassis.
4. Connect redundant cables, alarm relay terminal block, and ac input terminal block.
5. Flip the POWER switch to the On position.

Troubleshooting a Single Power Supply

If you have a single power supply installed in an I/O chassis and its P/S ACTIVE indicator is off, follow the troubleshooting flowchart below.



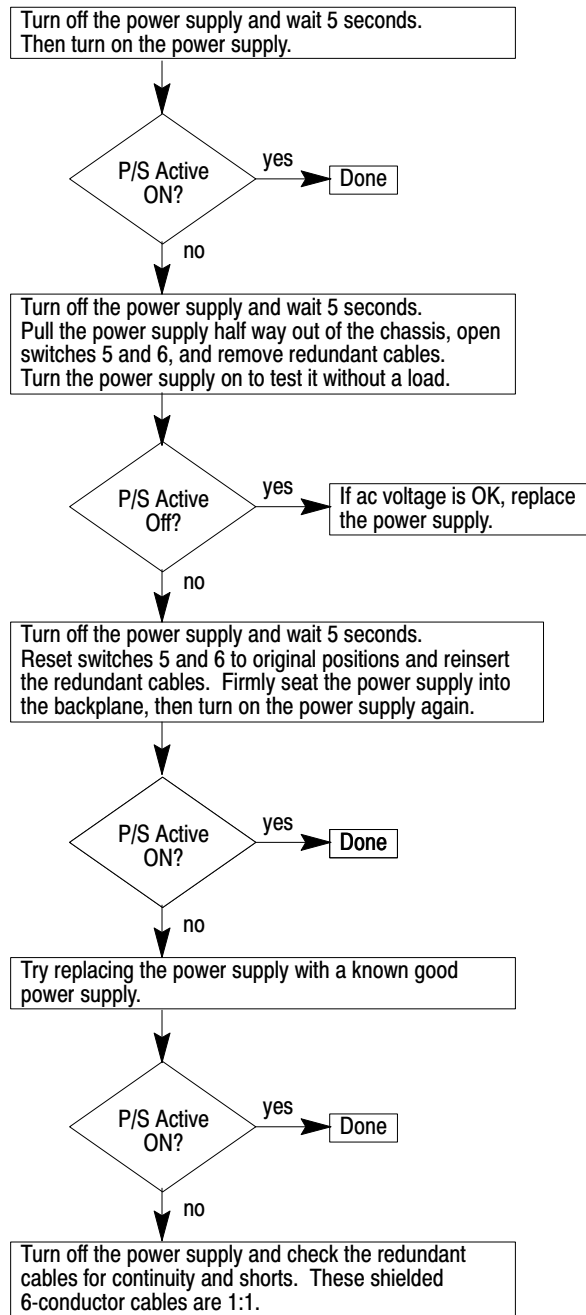
Troubleshooting Multiple Power Supplies

If you have multiple power supplies, refer to the flowcharts on the next three pages to help you troubleshoot when the following problems occur.

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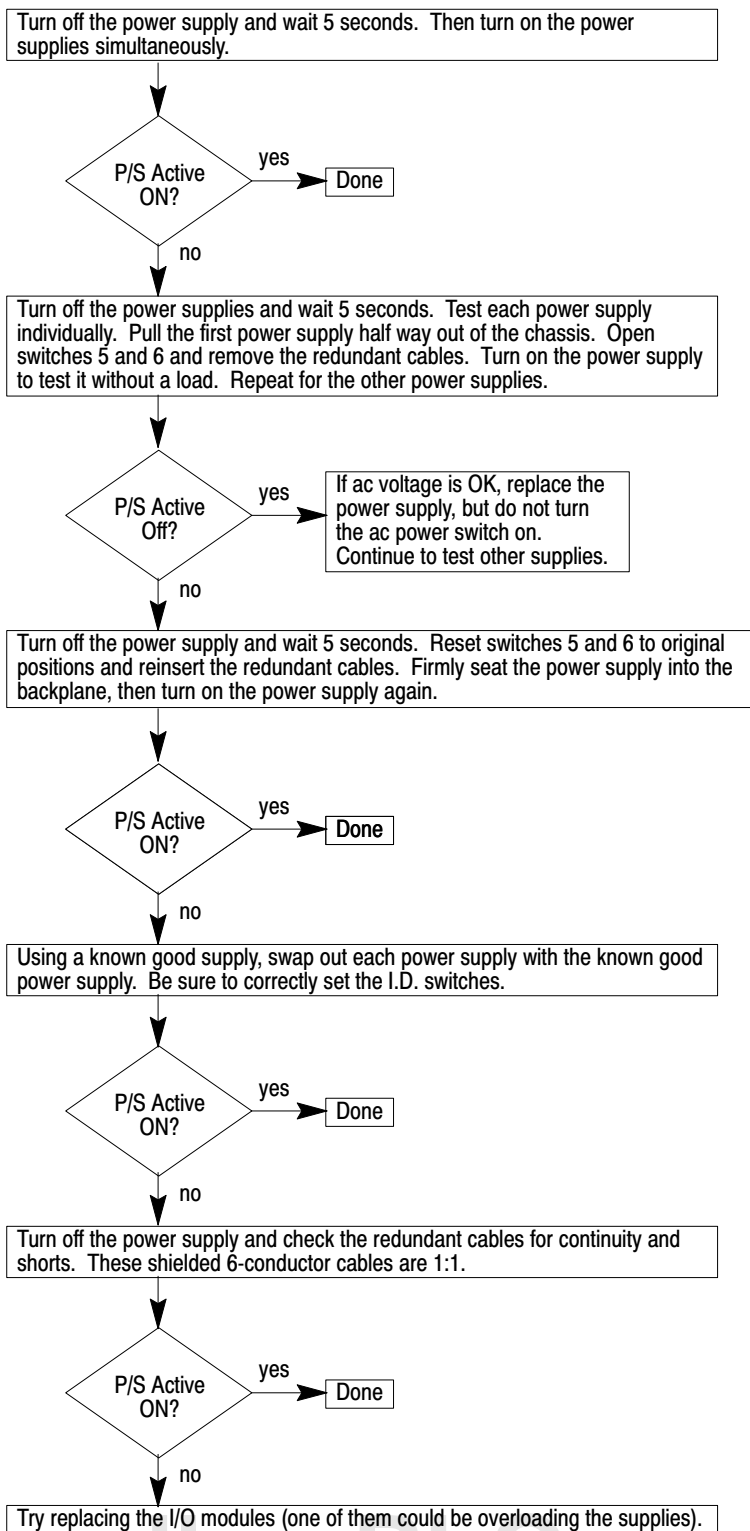
Problem 1

One or more (but not all) of the supplies in the redundant system has its P/S ACTIVE indicator off. (Depending on the system configuration, NON REDUNDANT SYSTEM indicators may or may not be on.)



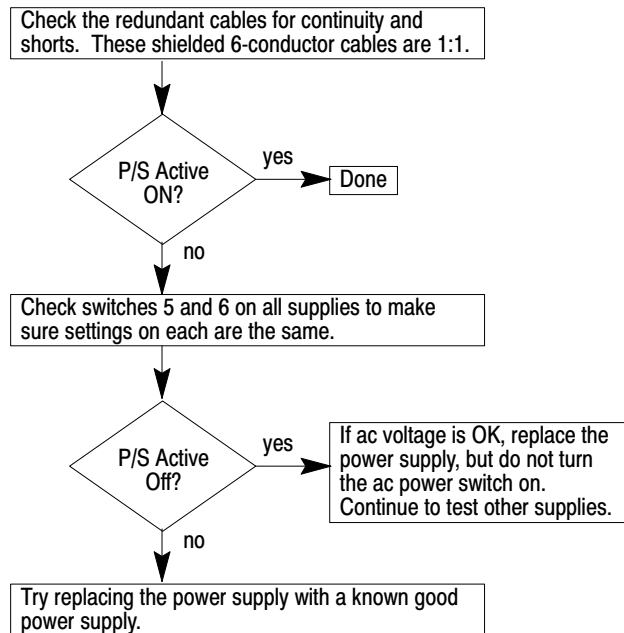
Problem 2

All the supplies in the redundant system have their P/S ACTIVE indicators off. The NON REDUNDANT SYSTEM LED may or may not be on.




Problem 3

All P/S ACTIVE indicators show that the power supplies are OK, but one or more NON REDUNDANT SYSTEM indicators are on, indicating the desired redundancy is not available.



Specifications

		1771-P4R	1771-P6R
Input Voltage		120V ac	220V ac
Input Voltage Range		97-132V ac rms	194-264V ac rms
Weight		2 lbs (0.84 kg)	
Frequency		47-63Hz	
Output Voltage		5V dc	
Fuse		1.5 A 250V Slow-Blow	
Size		1 I/O slot per module	
Conductors		Wire Size Category	14 AWG maximum (single wire only) 2 ^①
Environmental Conditions		Operating Temperature Storage Temperature Relative Humidity	0 to 60°C (32 to 140°F) -40 to 85°C (-40 to 185°F) 5 to 95% (without condensation)
Wiring Blocks		ac Power Relay	A-B PN 941274-05 (Wago PN 231-205/000-008) A-B PN 941274-03 (Wago PN 231-203/000-008)
Alarm Relay Rating		250V ac	
Maximum System Output Current at 60°C using N+1 Redundancy		8A (2 unit system) 14A (3 unit system) 20A (4 unit system)	
Agency Certification (when product or packaging is marked)		 marked for all applicable directives	

^① Refer to *Industrial Automation Wiring and Grounding Guidelines*, publication 1770-4.1 for additional information.

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Allen-Bradley, a Rockwell Automation Business, has been helping its customers improve productivity and quality for more than 90 years. We design, manufacture and support a broad range of automation products worldwide. They include logic processors, power and motion control devices, operator interfaces, sensors and a variety of software. Rockwell is one of the worlds leading technology companies.

Worldwide representation.



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