



Allen-Bradley Redundant Power Supplies

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

Installation Data

To the Installer

This document provides you with the following information:

- what this package contains
- tasks on installing your power supply module
- how to interpret indicators
- flow charts for troubleshooting your power supply module

What This Power Supply 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

Installing the Power Supply Module

To install your power supply module you need to know how to perform the following tasks:

- set the jumpers
- set the I.D. selection and configuration switches
- place the power supplies
- connect the redundancy cables
- wire the alarm relay
- connect input power

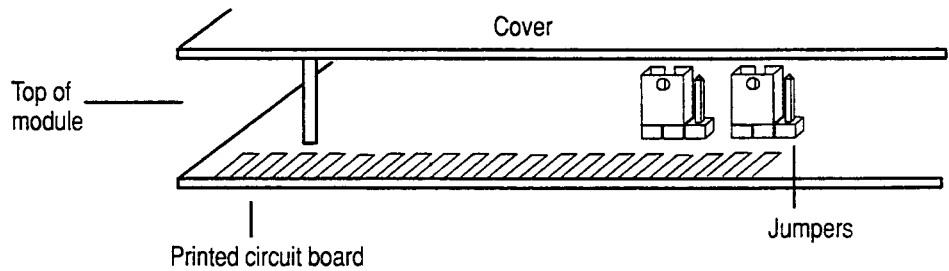
Set the Jumpers

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.

To configure the supply:

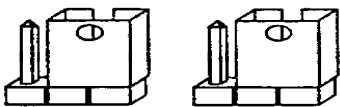
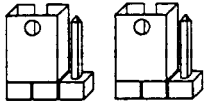
1. Position the power supply module so that the jumpers and pins are facing **upward** (as shown in figure 1).

Figure 1
Power Supply Jumpers



2. Set the jumpers as shown in table A. Use needle nose pliers to position the jumpers.

Table A
Jumper Settings

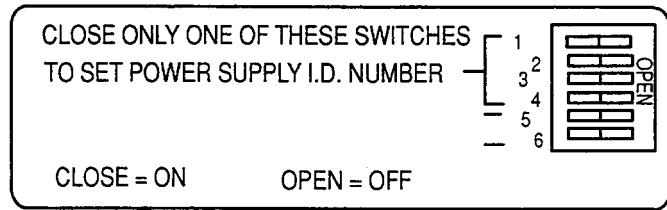
For this configuration	Set jumpers to:
A power supplies in a power-supply chassis (1771-PSC) connected to an I/O chassis.	right position 
All other configurations. (These power supplies are shipped with jumpers set to the left.)	left position 

Important: If the power supplies are located in a 1771 I/O chassis, the jumpers **must** be set to the left position. System malfunction may otherwise occur.

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 (figure 2). A cutout in the metal cover of the module provides access to these switches.

Figure 2
I.D. Selection Switch



Switches 1 through 4 are for the power supply identification number. Switches 5 and 6 are set based on the configuration zone.

To set the switches, follow this procedure:

1. Close the I.D selection switch (1 through 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. Refer to table B.

Table B
Configuration Zones A, B, and C

Maximum Current Draw in Amps	Ambient Temperatures	
	60°C	55°C
0-8	A	A
8-14	B	B
14-16	C	C
16-20		
20-24	Not permitted	

3. Position switches 5 and 6 based on the configuration zone you determined. Table C shows switch positions for configuration zones.

Table C
Switch Positions

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



WARNING: 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: Series A I/O chassis **CANNOT** be used with 1771-P4R, -P6R modules.

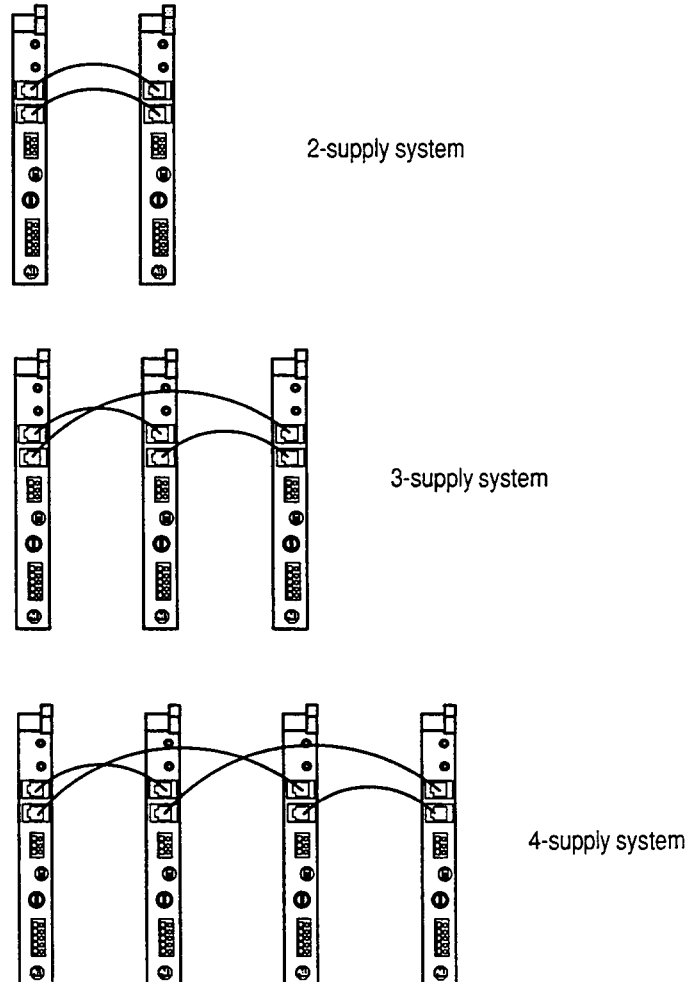
Connect the Redundancy Cables

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 in figure 3.
2. Loop the cable over the top of the I/O chassis to avoid picking up signals induced from I/O wiring.

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



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.

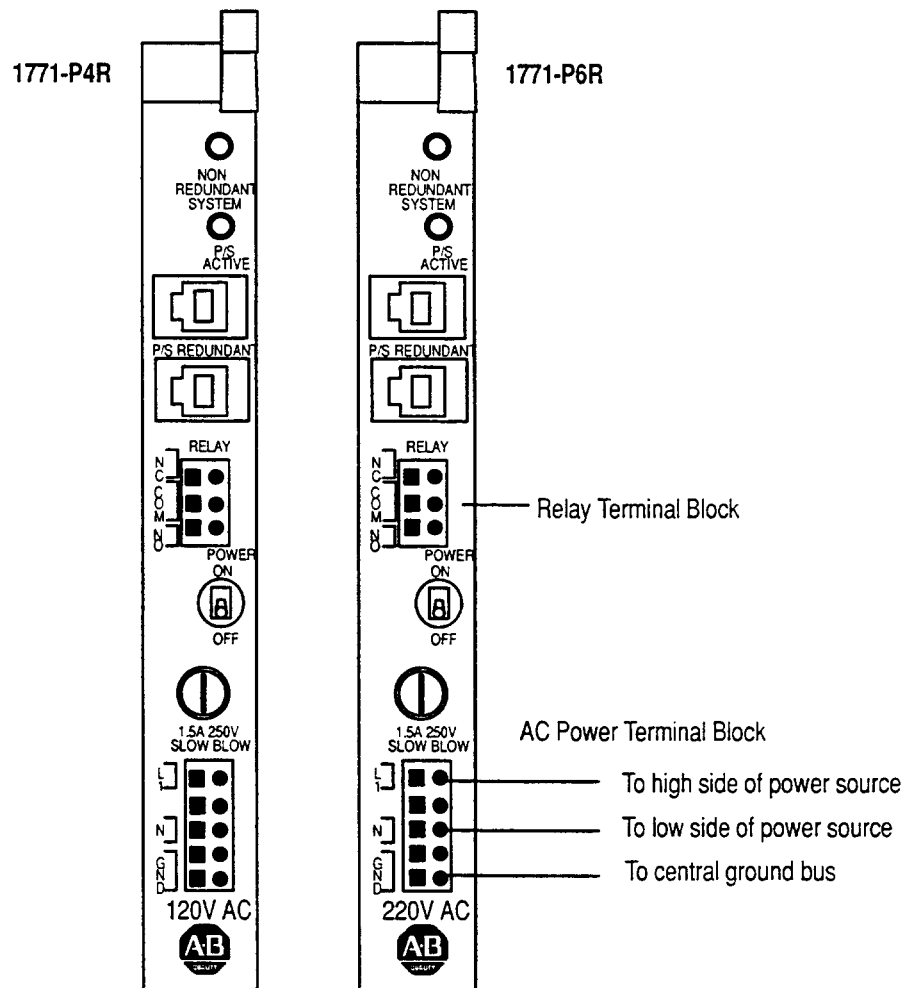
The terminal block has three lines (figure 4):

- 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.

Figure 4
Alarm Relay and AC Power Connections



Connect Input Power

Figure 4 shows the overall configuration of the ac power connections. To correctly connect the wire to the terminal:

1. Connect the high side of the power source to the L1 terminal of the power supply.
2. Connect the low side of the power source to the L2 or N (neutral) terminal of the power supply.
3. Connect the GND (ground) terminal of the power supply to the central ground bus in the enclosure.



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



WARNING: 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.

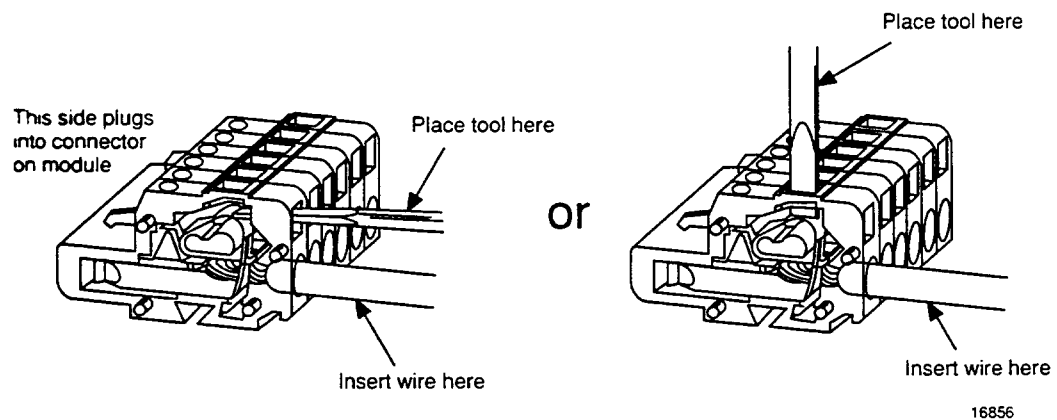
Figure 5 shows details of how to connect a wire to a terminal on the terminal block. You can connect these wires while the terminal block is plugged into the supply, or you can remove the terminal block to lay it on a flat surface to connect these wires. To remove the terminal block, pull it straight out out from the receptacle on the module.

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 connect a wire to a terminal:

1. Strip 0.35 inches of insulation off the wire.
2. Spring the clip open to insert the wire, using a wedge-tipped tool such as a small screw driver. 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).
3. After making the wiring connections, re-insert the terminal block into the front plate if you removed it. Be sure that the plug is completely inserted and that the locking prongs are engaged.

Figure 5
Connecting a Wire to a Terminal



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. Table D shows how to interpret the P/S ACTIVE indicator.

Table D
Interpreting the P/S ACTIVE Indicator

If the 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. The following procedures describe the correct way to remove and insert your power supplies.

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

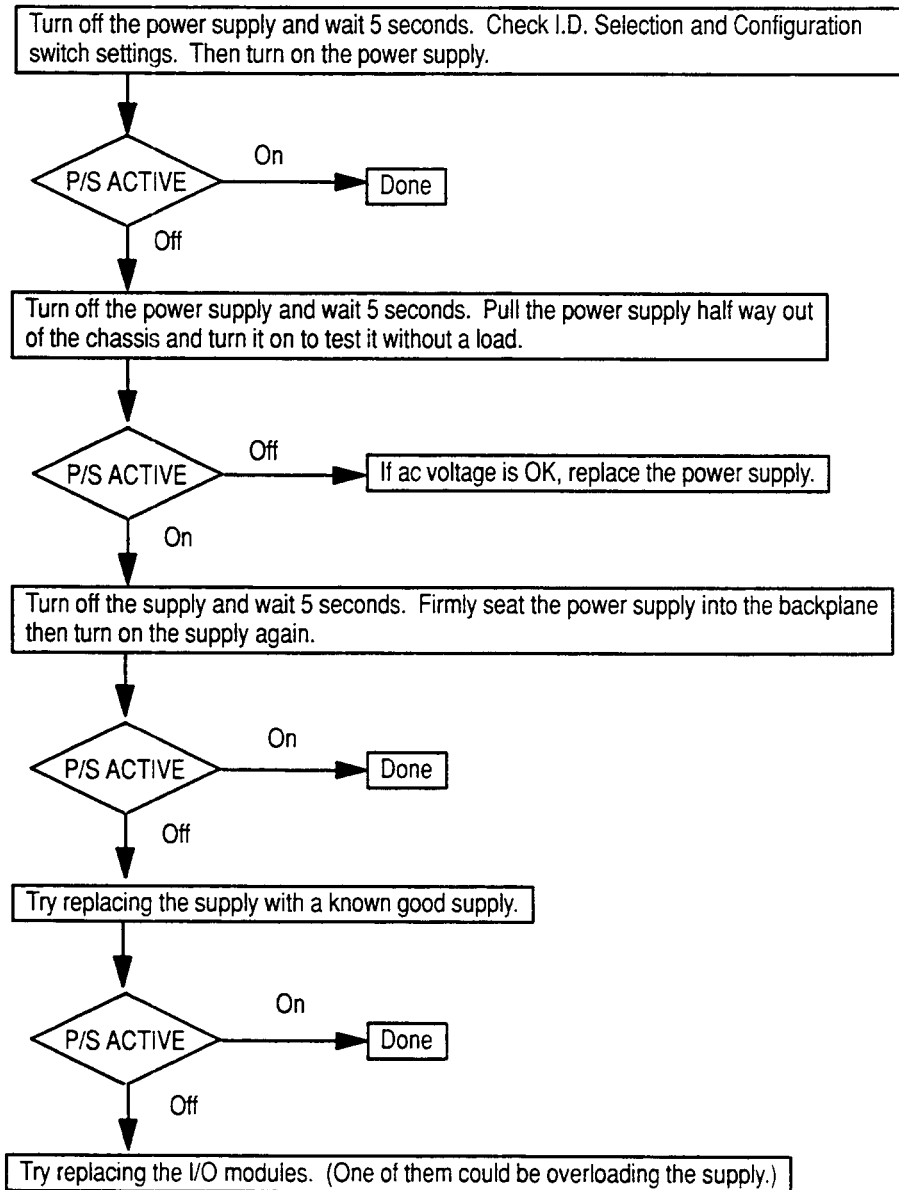
You will set the replacement unit to the same settings.

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.

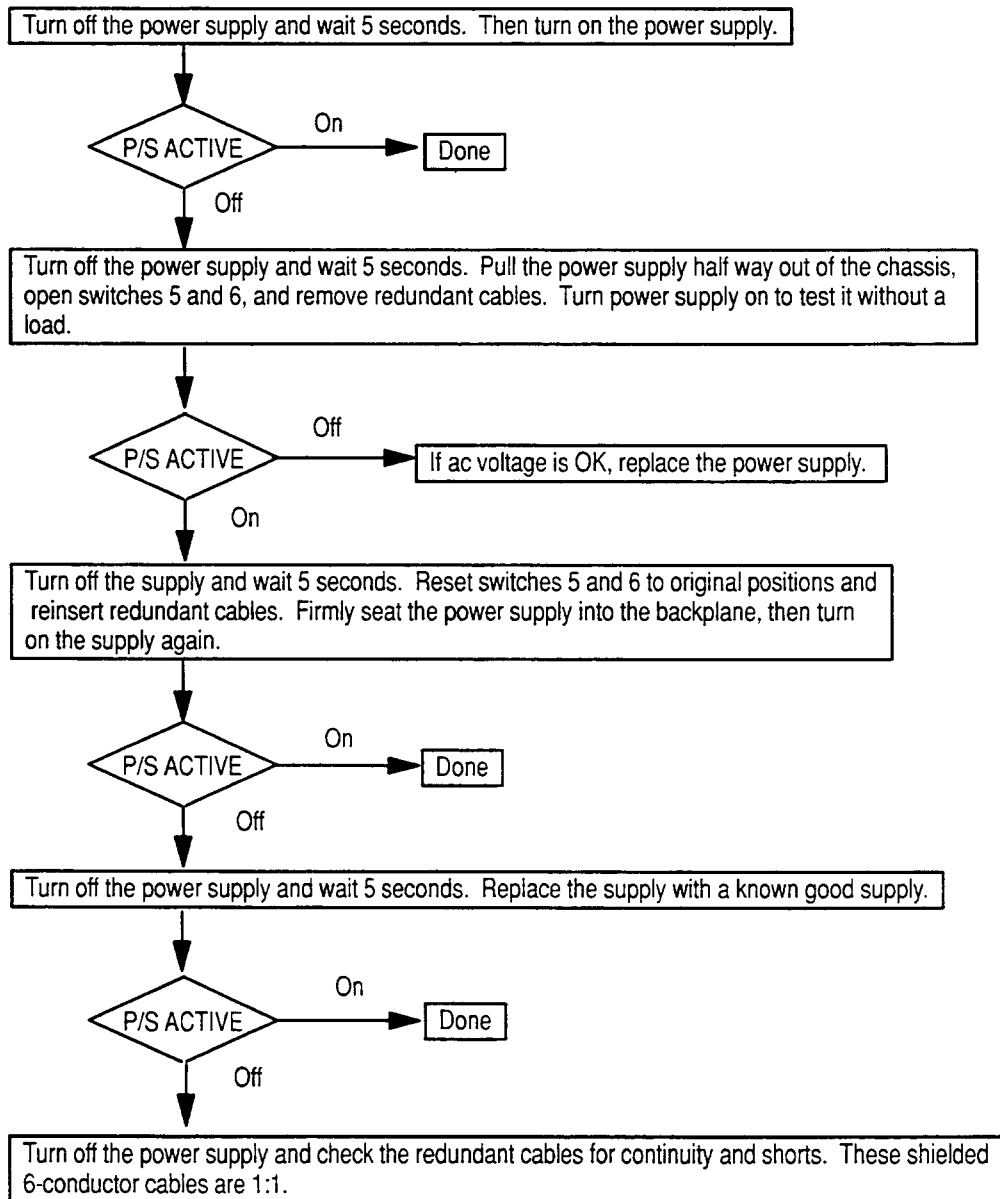


Troubleshooting Multiple Power Supplies

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

Problem 1.

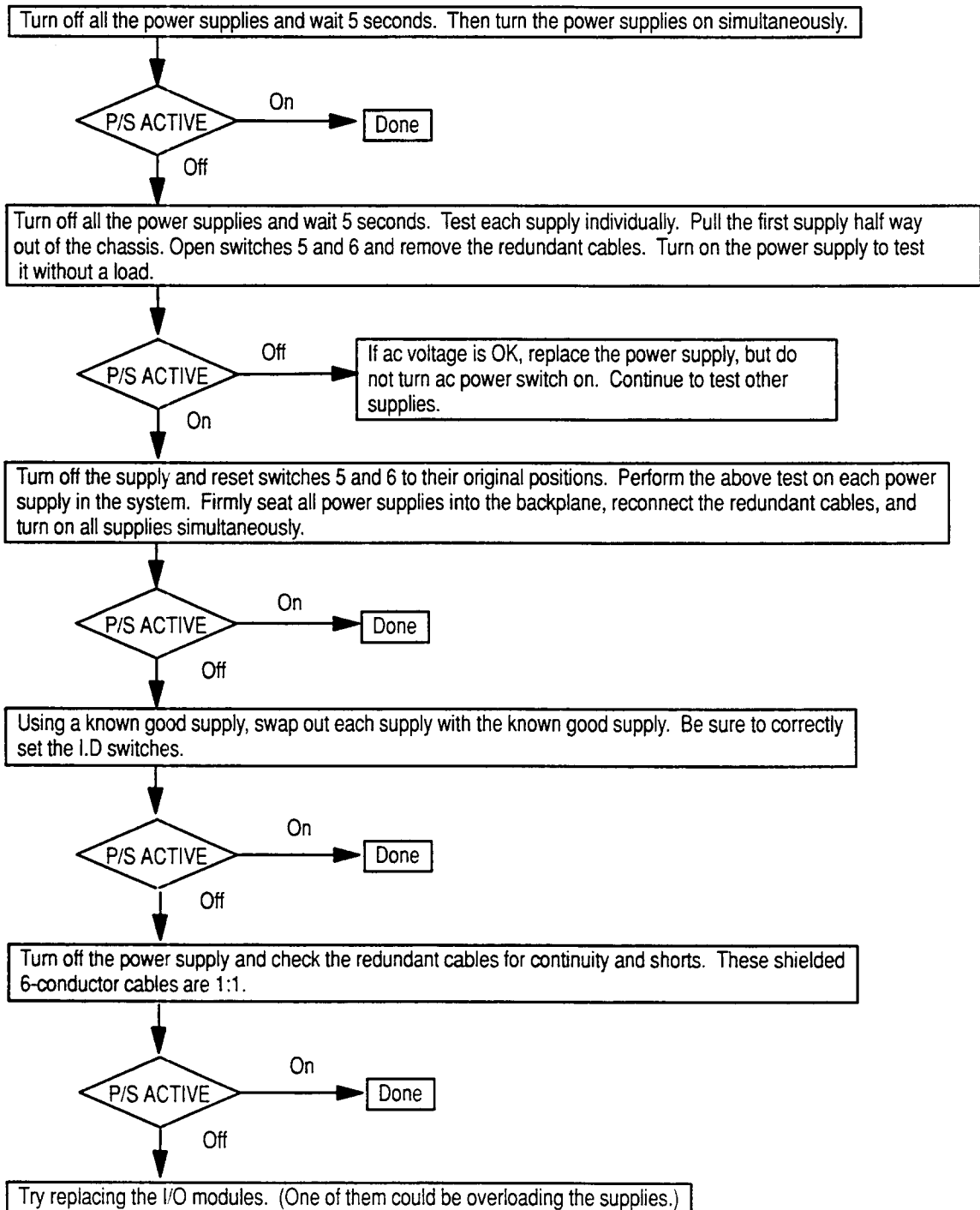
One or more (but not all) of the supplies in the redundant system has its P/S ACTIVE indicator off. (Depending on the system configuration, NON REDUNDANT SYSTEM indicators may or may not be on.)



Repeat this procedure as necessary for other supplies

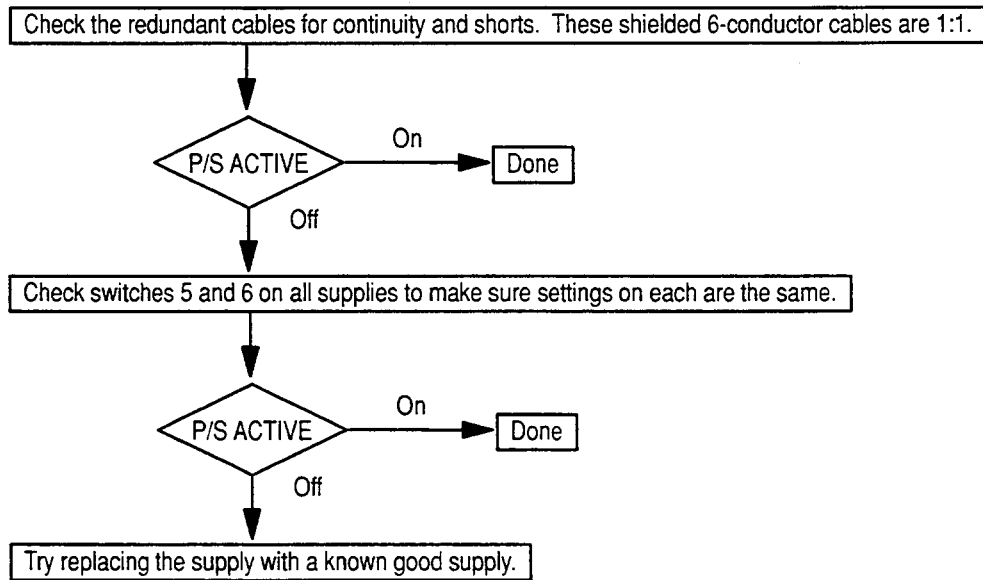
Problem 2.

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.



Installation Data
Power Supply Modules
(Cat. No. 1771-P4R and -P6R)

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	
Output Current	8A	
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 Operating Storage 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 part number 941274-05 (Wago PN 231-205/000-008) A-B part number 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)	

¹ Refer to publication 1770-4.1 Programmable Controller Wiring and Grounding Guidelines



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