



 **CAUTION**

**EQUIPMENT DAMAGE HAZARD**

**To avoid improper handling of equipment:**

- 1. Never remove this device while power is ON. Turn power supply switch to OFF and wait until all indicating lights are off before removing.**
- 2. Do not subject to static discharge. This module contains electronic components that are very susceptible to damage from electrostatic discharge.**

Failure to observe this precaution can result in equipment damage.

 **WARNING**

**HAZARDOUS VOLTAGE**

**Do not touch the terminal block or the circuit board while power input wiring is connected.**

Failure to observe this precaution can result in severe personal injury or death!

**PLEASE NOTE**

Electrical equipment should be serviced only by qualified electrical maintenance personnel, and this document should not be viewed as sufficient instruction for those who are not otherwise qualified to operate, service or maintain the equipment discussed. Although reasonable care has been taken to provide accurate and authoritative information in this document, no responsibility is assumed by Square D for any consequences arising out of the use of this material.

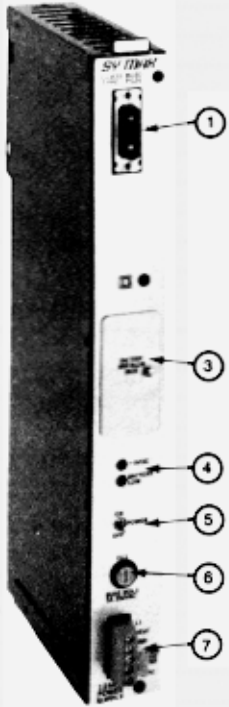
**TRADEMARK NOTICE**

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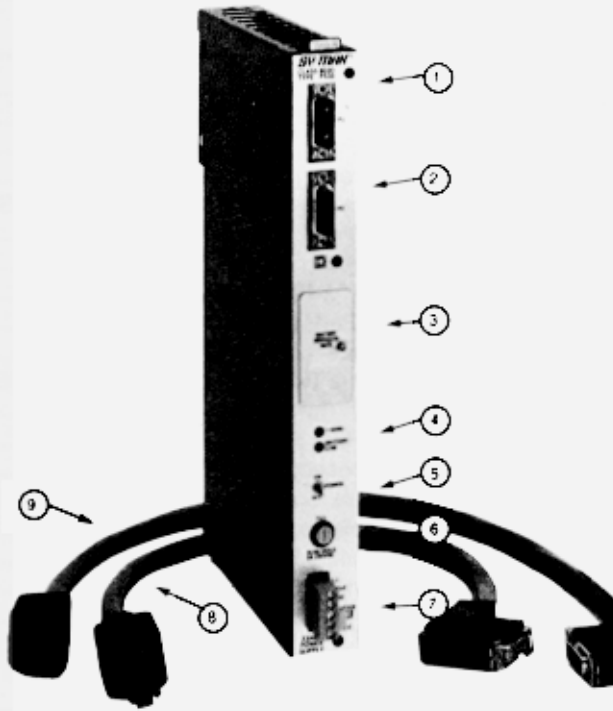
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PS25 Power Supply



- ① Power Supply Connector P1 (male)
- ② Power Supply Connector P2 (female)  
(PS35 only)
- ③ Battery Access Door
- ④ LED Indicators
- ⑤ ON/OFF Power Switch  
(not included on PS25F or  
PS35F Models)
- ⑥ Fuse Holder
- ⑦ Input Power Terminals
- ⑧ CC15 Cable
- ⑨ CC25 Cable

PS35 Power Supply



# 1 INTRODUCTION

## 1.1 GENERAL INFORMATION

The Class 8030 Type PS25 and PS35 Power Supplies provide +5 VDC power to SY/MAX<sup>®</sup> programmable controller system components. The power supplies have incoming power terminals, connectors (P1, P2) for I/O rack cables when side mounting or independent mounting is used, LED indicators, and a front-accessible fuse. Each SY/MAX power supply also contains a Lithium battery providing backup power for random access memory (RAM) in the processor and for other modules in the rack.

### 1.1.1 The PS25 Power Supply

The PS25 module can be installed in any of the following ways:

- In any **register** slot of a SY/MAX rack
- On the side of a SY/MAX rack, using the ADP100 Adapter Plate and CC15 Power Supply Cable
- In a standalone configuration, using the Adapter Plate and CC15 Power Supply Cable.

The PS25 module has one P1 connector and one register slot SY/MAX edge connector.

The edge connector is used when the power supply module is rack mounted; the module supplies power up to its rated value through the edge connector. This connection also transmits a BATTERY LOW signal from the power supply to the processor when the backup battery in the power supply is getting weak. **No cables can be used when the edge connector is used.**

The P1 connector is used only when the PS25 power supply is side or panel mounted. The P1 connector must not be used when the module is rack mounted. The ADP100 Adapter Plate and the CC15 Power Supply Cable must be purchased separately for this configuration. On the PS25 power supply, the P1 connector, combined with the CC15 cable, can carry a maximum of 12 Amps at 40° C and can be used to power a SY/MAX processor. **Only the CC15 cable can be used with the P1 connector.**

### 1.1.2 The PS35 Power Supply

The PS35 module is designed for side or standalone mounting only, using the ADP100 Adapter Plate. The module has a P1 and a P2 connector that supply a maximum of 23 Amps.<sup>1</sup>

The P1 connector can be used to power rack assemblies containing a SY/MAX processor (Model 300, 400, 600,

650, or 700<sup>2</sup>). On the PS35 power supply, the P1 connector, combined with the CC15 cable, can carry a maximum of 23 Amps at 40° C when the P2 connector is not being used. **Only the CC15 cable should be used with the P1 connector.**

The P2 connector can power a separate rack that must be located directly below the power supply and not draw more than 8 Amps of current when no more than 15 Amps is used on the P1 connector. The P1 and P2 connectors combined can provide no more than 23 Amps. The P2 connector, combined with the CC25 cable, must not be used to power a rack containing a SY/MAX processor and should only be used to power a rack containing auxiliary I/O. **The CC25 cable should be used with the P2 connector.**

Both the PS25 and PS35 power supplies are illustrated in Figure 1-1 on the facing page.

### 1.1.3 Parts List

Table 1-1 lists the parts associated with the PS25 and PS35 power supplies, and their part numbers.

Table 1-1: PS25 and PS35 Parts List

Square D Part Number	Product Name
Class 8030 PS25	128 I/O Capacity with 120/240 VAC Incoming Power Rack Mount Power Supply (12 Amps)
Class 8030 PS35	512 I/O Capacity with 120/240 VAC Incoming Power Rack, Side, or Standalone Mount Power Supply (23 Amps) * ADP100 Panel Mount Adapter Plate and hardware kit * CC15 Power Supply Cable
Class 8030 ADP100	Panel Mount Adapter Plate and hardware kit
Class 8030 CC15	Power Supply Cable 21" (53 cm) P1 Connector
Class 8030 CC25	Power Supply Cable 25" (64 cm) P2 Connector (for PS35 Power Supply only)

<sup>1</sup> Throughout this manual, these figures assume 40° C. See "Specifications," page A-3.

<sup>2</sup> The PS25 and PS35 power supplies do not provide the 12VDC output required to run bubble memory modules (SMM710, SMM720, MCM701, MCM702).

### 1.1.4 PS25F and PS35F Power Supplies

The PS25F and PS35F power supplies are identical in function to the PS25 and PS35 modules, except that they do not have an ON/OFF switch located on the front of the module. A separate main disconnect switch or circuit breaker must be installed to shut off power to the programmable controller system. See Section 3, "Installing the Power Supply," for more information about using the PS25F or PS35F power supplies.

## 1.2 POWER SUPPLY CONFIGURATIONS

This section describes how the PS25 and PS35 power supplies might be used in different configurations.

### NOTE

As of July 1992, all new HRK100, HRK150, HRK200, RRK100, RRK200, and RRK300 rack assemblies have the 6 holes in the left side necessary to side-mount the power supply. Earlier revisions of the racks may not have these mounting holes. If you have a rack assembly that does not have the required mounting holes, please review your planned configuration to see if the power supply can be panel-mounted.

### 1.2.1 Rack Mounting the PS25

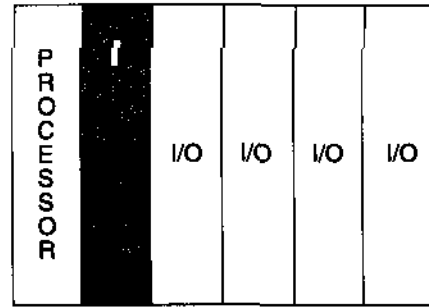


Figure 1-2 Rack Mounted Power Supply

- Only the PS25 power supply can be used in a rack. The PS35 must be side- or panel-mounted.
- Do not use the P1 connector with any cable when the PS25 is mounted in a rack.
- Two power supplies are needed for the RRK300 rack assembly. One must be mounted in slots 1-9. The other must be mounted in slots 10-18.

### 1.2.2 Side Mounting the PS25 or PS35

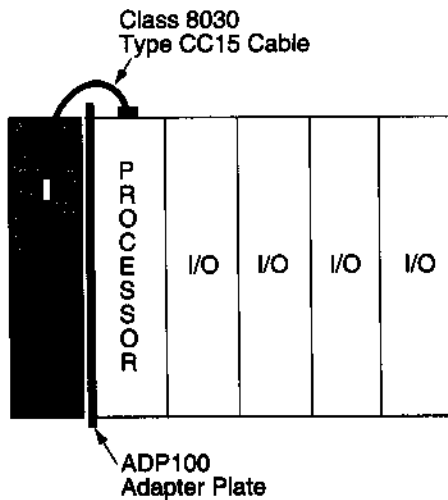


Figure 1-3 Side Mounted Power Supply

- Either the PS25 or the PS35 can be mounted on the side of a SY/MAX rack assembly.
- The ADP100 Adapter Plate and the CC15 cable are used when the power supply is mounted on the side of a rack. (These are included with the PS35 power supply; however, they must be purchased separately for the PS25 power supply.)
- Because of cable length, the power supply must be mounted on the left side of the rack.
- Section 3, "Installing the Power Supply," describes how to use the ADP100 Adapter Plate to mount the power supply module on the side of the rack assembly and how to connect the cable.

### 1.2.3 Panel Mounting the PS25 or PS35

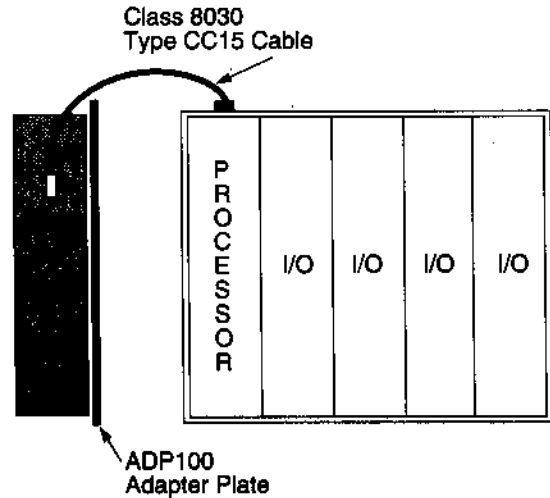


Figure 1-4 Panel Mounted Power Supply

- Either the PS25 or the PS35 can be mounted onto an enclosure panel using the two mounting holes at the back of the ADP100 Adapter Plate.
- The PS35 comes with the ADP100 Adapter Plate and the CC15 cable, for use when the power supply is mounted onto an enclosure panel. (These are included with the PS35 power supply; however, they must be purchased separately for the PS25 power supply.)
- Because of cable length, the power supply must be mounted to the left of the rack.
- Section 3, "Installing the Power Supply," describes how to use the ADP100 Adapter Plate to mount the power supply module on a panel.

### 1.2.4 Using the PS35 to Power Two Racks

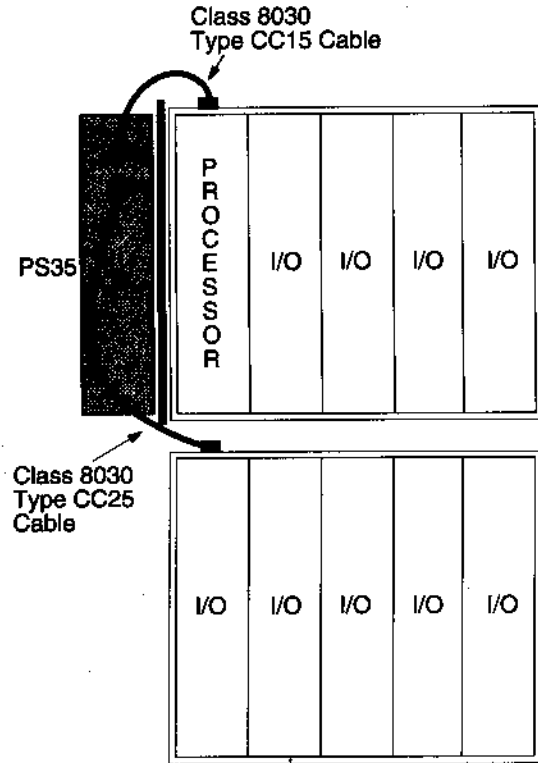


Figure 1-5 Using the PS35 to Power Two Racks

- Only the PS35 power supply can be used to power two racks. The total draw on the power supply must not exceed 23 Amps. Both the CC15 and CC25 power supply cables are needed to supply power for two racks. The cables are included with the PS35 power supply.
- On the PS35 power supply, the P1 connector, combined with the CC15 cable, can carry a maximum of 23 Amps at 40° C. The P1 connector, combined with the CC15 cable, is used to power the SY/MAX rack containing the processor.
- The P2 connector, combined with the CC25 cable, cannot carry a load of more than 8 Amps. It should be used to power a SY/MAX rack that contains only auxiliary I/O. This rack must be located below the power supply so that cables can be routed correctly.
- To maintain memory in a processor or other module that requires battery backup, the cable from the power supply must remain connected to the rack assembly.

### 1.2.5 Selecting Input Voltage

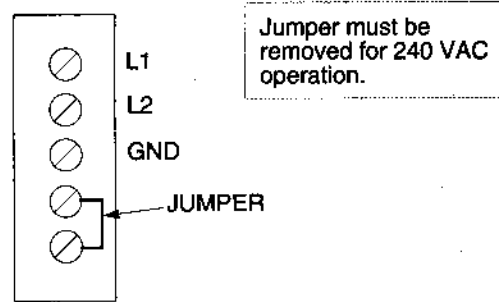


Figure 1-6 Terminal Block Shown with Jumper Attached for 120 VAC Operation

- Either the PS25 or the PS35 can be used for 240 VAC applications.
- The terminal block at the bottom of the power supply front panel governs whether the module operates in 120 or 240 VAC. The bottom two terminals are connected by a jumper wire that must be in place for 120 VAC operation. For 240 VAC operation, the jumper wire must be removed.
- See Section 3, "Installing the Power Supply," for more information about 240 VAC operation.



## 2 PLANNING FOR INSTALLATION

### 2.1 SELECTING A POWER SUPPLY

The PS25 and PS35 power supplies and cables have established current limits. When configuring a system, be sure that the power supply and cable are rated adequately to handle the current draw on the power supply. Table 2-1, “Current Limits,” and Appendix B, “Current Draw for SY/MAX Modules,” should both be given careful consideration before selection of a power supply and cables.

The PS25 and PS35 power supplies cannot provide the 12 VDC output required to run bubble memory modules (SMM710, SMM720, MCM701, MCM702).

Table 2-1 Current Limits

Device	Type	Maximum Current (at 40° C)
Power Supply	PS25, PS25F	12 Amps
	PS35, PS35F	23 Amps
Cable	CC15	23 Amps
	CC25	8 Amps

The rated current draw for many modules is based on a duty cycle of either 75% or 100%. A 75% duty cycle means that the I/O are on 75% of any given time period. A 100% duty cycle means the I/O are on continuously. Most applications for SY/MAX modules fall into the 75% duty cycle category.

Table B-1, “Current Draw for SY/MAX Modules,” in Appendix B gives complete current draw information for SY/MAX processors and I/O modules. Be aware of these values while loading the power supply and cables.

### NOTE

Lengthening the cables may decrease the maximum current capacity of the power supply. For such applications consult Square D Company.

To determine which power supply should be used, follow these steps:

1. List all modules that will be in the SY/MAX rack assembly.
2. Referring to Appendix B, Table B-1, “Current Draw for SY/MAX Modules,” list the current draw (at 75% or 100% duty cycle) for each module.
3. Add up the current draw requirements for all modules.
4. Referring to Table 2-1, “Current Limits,” decide which power supply is appropriate for the modules’ current draw on the power supply.

### 2.2 POWER LINE PROTECTION

Line voltage disturbances that exceed the specifications of the power supply (see Appendix A, “Dimensions and Specifications”) may cause problems in the programmable controller system. Such disturbances include:

#### **High-frequency transients**

These are power line disturbances that can be caused by lightning strikes or the switching of large loads.

#### **Surges**

Surges constitute line voltage spikes that are greater than the maximum input voltage of the power supply.

#### **Brownouts**

Brownouts are line voltages that are less than the given power loss ride-through voltage/time.

#### **Blackouts**

A blackout is a complete loss of line voltage.

To protect against line noise and disturbance problems, we recommend using power conditioners and uninterruptible power supplies (such as the TOPAZ<sup>®</sup> Power Peripherals). Contact a Square D distributor for more information.

### 2.3 CALCULATING ENCLOSURE SPACE

Appendix A, “Dimensions and Specifications,” contains dimension drawings for the PS25 and PS35 power supplies and the ADP100 Adapter Plate.

When planning to mount either the PS25 or PS35 at the side of a rack or onto a panel, be sure to include the following in your calculations:

- A three-inch (7.6 cm) clearance between the power supply and other surrounding objects or the side of the enclosure (Figure 2-1)
- A minimum of six inches (15.2 cm) of clearance between the power supply and any electromechanical device such as a motor starter
- Space between the Adapter Plate and the I/O rack.
- Any required clearance between I/O racks (refer to the *SY/MAX Programmable Controller Planning and Installation Guide*, Instruction Bulletin #30598-175) for minimum clearances.
- Cable space: When the CC15 or CC25 cables are plugged into the front of the module, they will protrude approximately 2 inches (50.8 mm).

If electromechanical devices are mounted above the power supply, plan to install a barrier between the power supply and the device to prevent debris from falling onto (or into) the power supply. Take care not to obstruct air vents in the module.

The power supply must be mounted within available cable distance from the rack assembly.

The PS25 and PS35 modules **cannot** be installed horizontally.

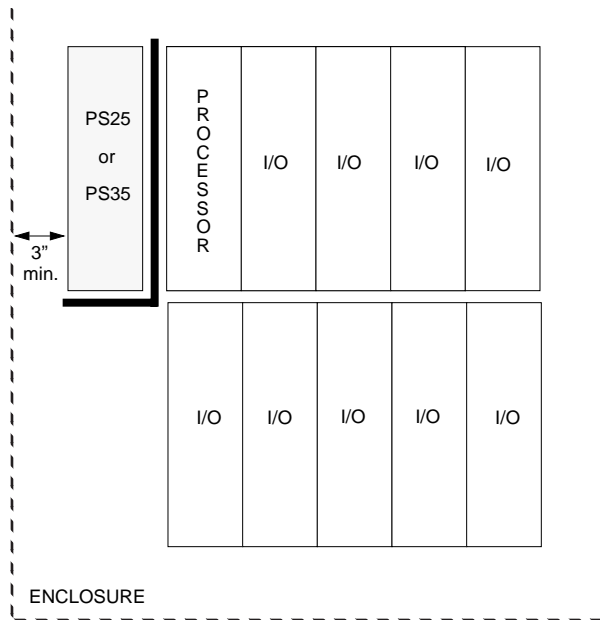


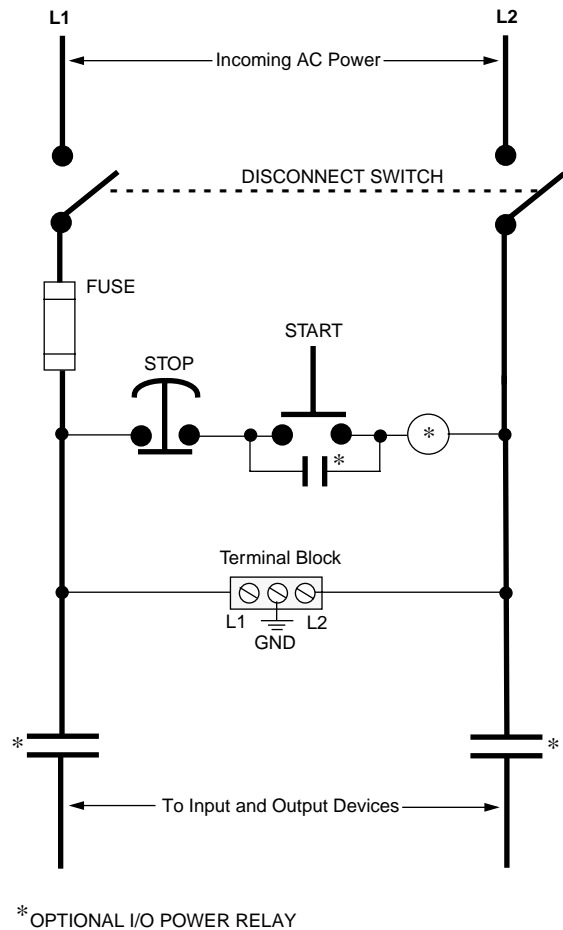
Figure 2-1 Clearance Recommendations

### 2.4 WIRING INFORMATION

When wiring the PS25 or PS35 power supply, be sure to isolate all AC power wires from SY/MAX power supply cables, DC signal wiring, and rack-to-rack communication cables.

### 2.5 USING AN OPTIONAL I/O POWER RELAY

An optional I/O power relay can be used if a manual restart of the programmable controller I/O system is desired in case of power loss. In the three-wire control circuit shown in Figure 2-2, after power is restored, the power supply and the SY/MAX processor would power up, but the I/O would remain disabled until someone pressed a START button. See Figure 2-2 for wiring connections.



\* OPTIONAL I/O POWER RELAY

Figure 2-2 Incoming AC Power Connection for PS25F and PS35F (Optional I/O Power Relay)

## **2.6 PLANNING AN INSTALLATION FOR PS25F AND PS35F POWER SUPPLIES**

The PS25F and PS35F power supply models do not have an ON/OFF switch on the front of the modules.

When planning for installation of the PS25F and PS35F models, plan to install a properly-sized main disconnect switch or main circuit breaker in the power circuit feeding the power supply as a means of removing power from the system.

See Section 3.6, “Installing the PS25F or PS35F,” for installation information.


## 3 INSTALLING THE POWER SUPPLY

### 3.1 GENERAL INSTALLATION INFORMATION

This section describes the procedures necessary to install the PS25 or PS35 in the following configurations:

- In a SY/MAX rack (PS25 only)
- On the side of a SY/MAX rack (PS25 and PS35)
- Onto an enclosure panel (PS25 and PS35).

The PS25 and PS35 power supplies can only be mounted in a vertical position. Do not install the power supplies horizontally.

 **CAUTION**

**EQUIPMENT DAMAGE HAZARD**

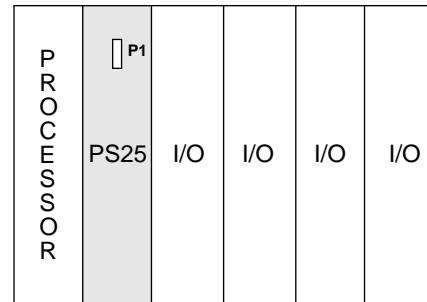
**Before inserting or removing the PS25 or PS35 power supply, be sure the power switch is off or that AC power is disconnected.**

Failure to observe this precaution can result in equipment damage.

#### ***Pre-installation checklist***

1. Confirm that the maximum current capacity of the power supply cables will not be exceeded. Currents exceeding these maximum values may prevent modules in the rack assembly from operating. See Section 2, "Planning for Installation," for more information about current limits.
2. If the PS25 or PS35 is adapter-plate-mounted, confirm that the P1 connector is used to power the rack containing the processor. The P1 connector, together with the CC15 cable, provides the processor with a BATTERY LOW signal from the power supply. The BATTERY LOW LED is ON when the battery is weak. The PS25 power supply can also be rack-mounted; if it is, it sends the BATTERY LOW signal through the backplane.
3. Be sure that clearance is adequate (see Section 2, "Planning for Installation," for information).
4. If the module will be installed on an enclosure panel, be sure that the panel is grounded in accordance with the National Electrical Code (NEC) standards. For more information about system installation, refer to the *SY/MAX Programmable Controller Planning and Installation Guide* (Instruction Bulletin #30598-175).

### 3.2 INSTALLING THE POWER SUPPLY IN A SY/MAX RACK (PS25 only)



*Figure 3-1 Rack Mounted Power Supply*

#### 3.2.1 Required Tools and Parts

The only tool needed to mount the PS25 power supply module in a rack assembly is a flat-head screwdriver. No cables or other special equipment are required.

#### 3.2.2 Installation Procedures

To install the power supply in any slot of a rack assembly, follow these steps:

1. Insert the module into the slot.
2. Make sure the module is seated securely.
3. Tighten the captive screw at the bottom of the module.
4. Follow the recommendations given in Section 3.9 on page 3-7 for wiring the terminal block on the module.

## NOTES

- When rack-mounting the PS25 power supply, never use the P1 connector on the power supply to power another rack. The P1 connector should not be used for any purpose when the PS25 module is rack-mounted.
- Do not connect another power supply to the rack using the P1 cable if there is a PS25 in the rack.

### 3.3 INSTALLING THE POWER SUPPLY ON THE SIDE OF A SY/MAX RACK (PS25 or PS35)

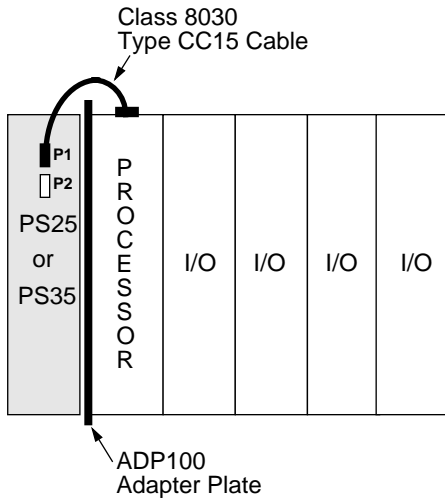


Figure 3-2 Side Mounted Power Supply

#### 3.3.1 Required Tools and Parts

The following tools and parts are needed when the PS25 or PS35 power supply is side-mounted:

- ADP100 Adapter Plate (included with the PS35)
- Class 8030 Type CC15 Cable (included with the PS35)
- Six #8-32 flat head mounting screws and star washers (provided with the hardware kit included with the adapter plate)
- Screwdriver

#### 3.3.2 Installation Procedures

To mount the power supply on the side of a SY/MAX rack, follow these steps (refer to Figure 3-3):

1. Attach the ADP100 Adapter Plate to the side of the rack using the 6 mounting screws and star washers provided. The star washers must be used for proper grounding.
2. Hook the top tab on the adapter plate through the horizontal notch on the top of the power supply and firmly position the supply against the back of the plate.
3. Secure the power supply by tightening the lower bracket captive screw.
4. Follow the recommendations given in Section 3.8.1 on page 3-6 for connecting the Type CC15 cable.
5. Follow the recommendations given in Section 3.9 on page 3-7 for wiring the terminal block on the module.

**CAUTION**

**POTENTIAL CABLE CONNECTOR DAMAGE**

Always follow the recommended methods for routing CC15 and CC25 cables. If the cables are bent or routed incorrectly, damage to the cable connectors on the power supplies may result.

Failure to observe this precaution can result in equipment damage.

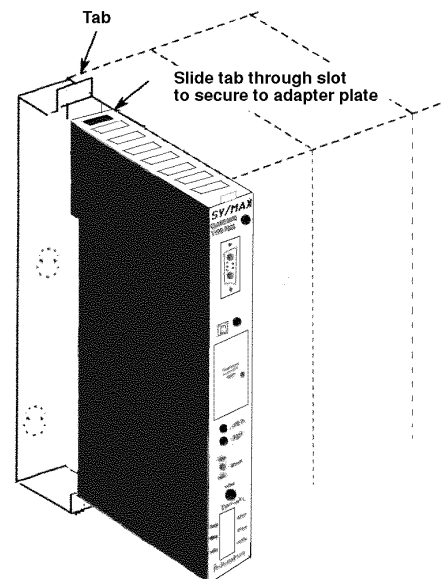
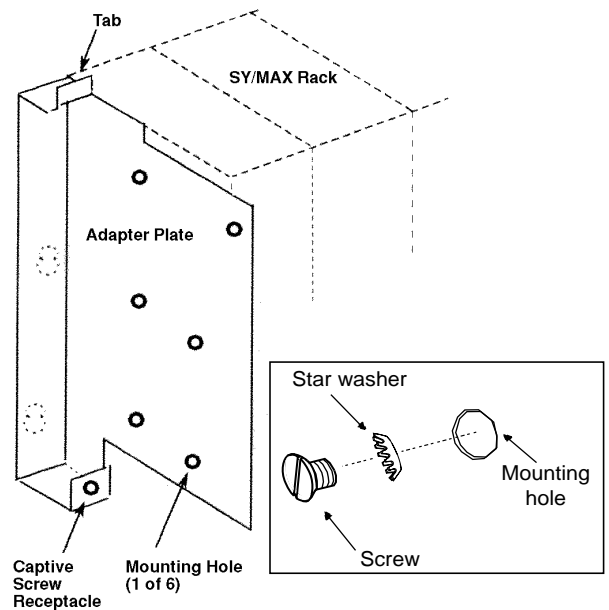


Figure 3-3 Mounting the ADP100 Adapter Plate to the Side of the Rack

### 3.4 INSTALLING THE POWER SUPPLY ON A PANEL (PS25 or PS35)

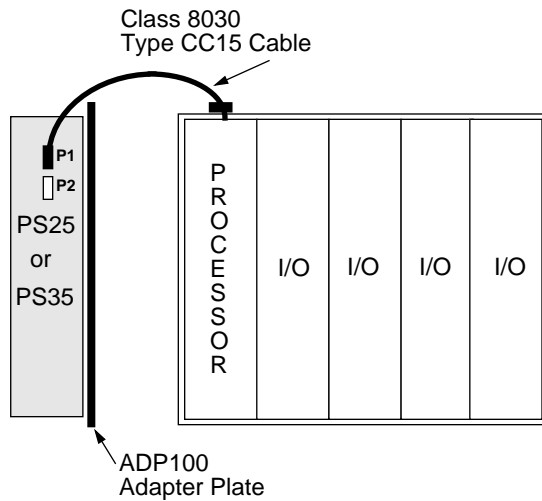


Figure 3-4 Panel Mounted Power Supply

#### 3.4.1 Required Tools and Parts

The following tools and parts will be needed when the PS25 or PS35 power supply is panel-mounted:

- ADP100 Adapter Plate (included with the PS35)
- Class 8030 Type CC15 Cable (included with the PS35)
- Two mounting screws with captive star washers
- Screwdriver
- Drill

#### 3.4.2 Installation Procedures

To mount the power supply on a panel, follow these steps (refer to Figure 3-5):

1. Mark and drill holes on the panel for the ADP100 Adapter Plate (for dimensions, see Figure A-2 in Appendix A).
2. Attach the ADP100 Adapter Plate to the panel by fastening screws with captive star washers through the two mounting holes at the back of the adapter plate.
3. Hook the top tab on the adapter plate through the horizontal notch on the top of the power supply and firmly position the supply against the back of the plate.
4. Secure the power supply by tightening the lower bracket captive screw.
5. Follow the recommendations given in Section 3.8.1 on page 3-6 for connecting the Type CC15 cable.
6. Follow the recommendations given in Section 3.9 on page 3-7 for wiring the terminal block on the module.

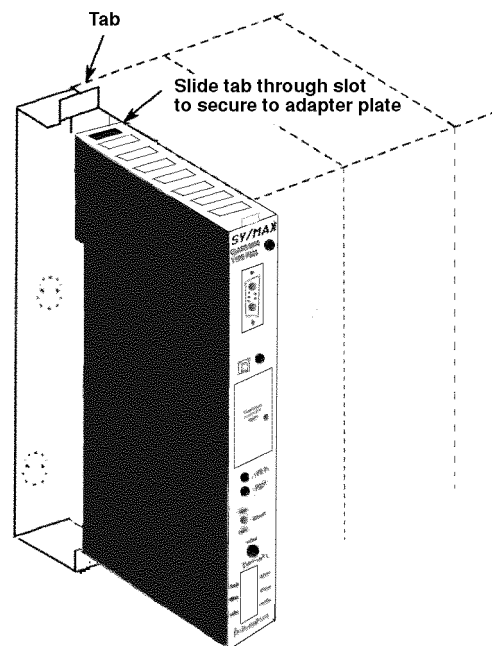
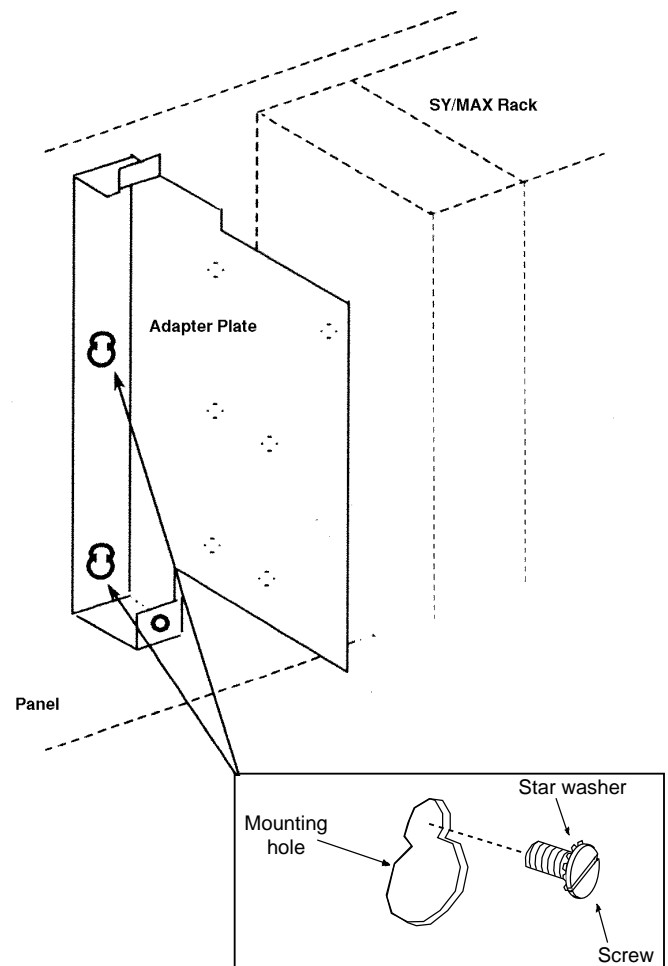


Figure 3-5 Mounting the ADP100 Adapter Plate to the Panel

### 3.5 INSTALLING THE POWER SUPPLY IN A TWO-RACK CONFIGURATION (PS35 only)

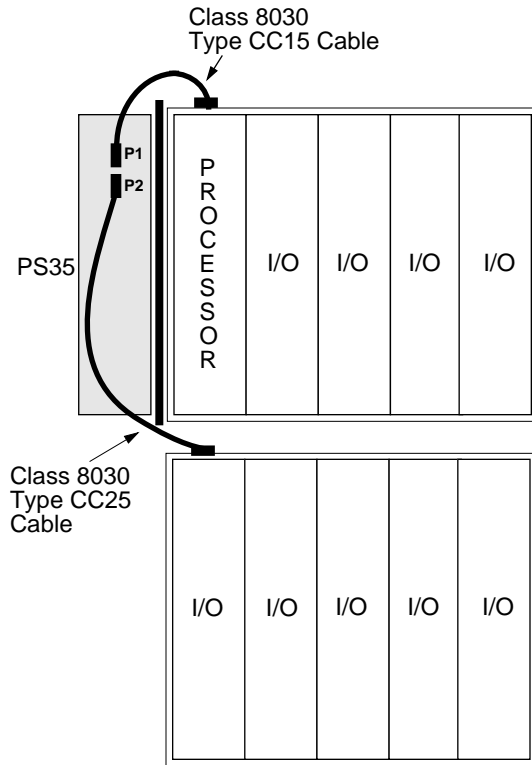


Figure 3-6 Using the PS35 to Power Two Racks

In a two-rack configuration, the PS35 power supply must be installed on the side of the SY/MAX rack assembly. To install the power supply so that it provides power to two racks, follow the installation steps in Section 3.3 on page 3-2.


**NOTE**

**When connecting the CC25 cable to the second rack, be sure that the second rack does not contain a processor. If there is a processor in the second rack, it will not be able to detect a BATTERY LOW signal sent by the power supply. The CC25 cable does not transmit the BATTERY LOW signal.**

After the power supply is installed, connect the CC25 cable to the P2 connector and to the lower rack power plug. The P1 connector and CC15 cable **must** be used to power the SY/MAX rack containing the processor. This rack must be located to the side of the power supply so that cables can be routed according to recommended methods (see Section 3.8 on page 3-5 for proper cabling procedures).

The P2 connector and CC25 cable must be used to power a SY/MAX rack that contains **only** auxiliary I/O. This second rack must be located below the power supply so that cables can be routed correctly.

### 3.6 INSTALLING THE PS25F OR PS35F POWER SUPPLIES

 **WARNING**

**UNINTENTIONAL EQUIPMENT OPERATION**

**Because the PS25F and PS35F models do not have an ON/OFF switch on the modules, a properly-sized main disconnect switch or main circuit breaker must be installed in the power circuit feeding the power supply as a means of removing power from the programmable controller system.**

Failure to observe this precaution can result in death, severe personal injury, or equipment damage.

The Type PS25F and PS35F power supplies do not have an ON/OFF switch on the front of the module. It is necessary to install a main disconnect switch or circuit breaker in the power circuit feeding the power supply so that there is a means of removing power from the programmable controller system.

The procedures for installing the PS25F and PS35F power supplies are the same as for the PS25 and PS35 models, except for the addition of the separate main disconnect switch or circuit breaker.

### 3.7 USING THE RRK300 REGISTER RACK ASSEMBLY

Two PS25 power supplies can be used in a single Class 8030 Type RRK300 Register Rack Assembly. One PS25 should be used in the upper rack assembly, and the other should be used in the lower rack assembly. The power supplies can be placed in non-addressable slots. When PS25 power supplies are used in the rack in this manner, no connections can be made to other power supplies using the rack power plugs.

Both power supplies can be energized simultaneously from the 120/240 VAC line. When energized separately, the power supply in the upper RRK300 rack must be energized before the power supply in the lower rack in order to properly initialize the processor in the upper rack.

### 3.8 POWER SUPPLY CABLES AND CONNECTORS

Table 3-1 contains a summary of the cabling requirements for the PS25 and PS35 power supplies. See Appendix C for pin-out information for the P1, P2, and edge connectors.

Table 3-1: Summary of Cable Requirements

Model	PS Amps	Mounting Configuration	Recommended Cabling
PS25/25F	12	Rack mount	No cables; edge connector only
		Side or panel mount	P1 with CC15 cable only; total 23 Amps
PS35/35F	23	Side or panel mount	P1 with CC15 cable (rated at 23 Amps) <sup>a</sup>
			P2 with CC25 cable (rated at 8 Amps) <sup>a</sup>

<sup>a</sup>. If using both P1 and P2 connections, do not exceed 23 Amps total draw on the power supply.



## CAUTION

### POTENTIAL CABLE CONNECTOR DAMAGE.

**Always follow the recommended methods for routing CC15 and CC25 cables. If the cables are bent or routed incorrectly, damage to the cable connectors on the power supplies may result.**

Failure to observe this precaution can result in equipment damage.



### 3.8.1 Using the CC15 Cable

- Always use the CC15 cable with the P1 connector.
- Make sure that the CC15 cable is always routed in the **upward** direction from the P1 connector toward the rack. Mount the power supply on the side of or below the rack to which it will supply power (see Figure 3-7).
- Never bend the CC15 cable in a downward direction from the P1 connector.
- Do not exceed the rated current capacity for the power supply. (See Table 3-1 on page 3-5.)

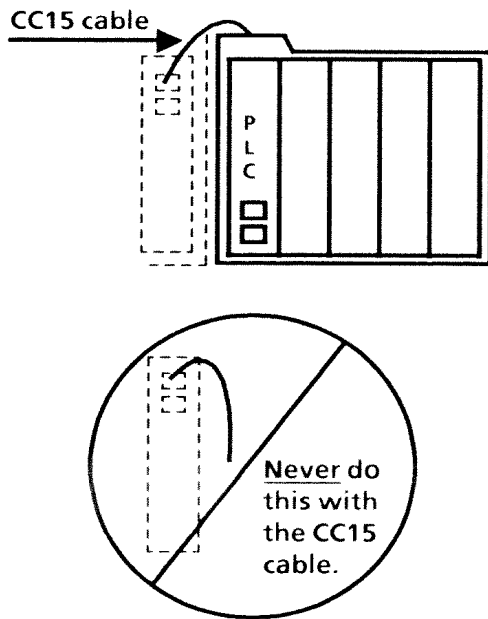


Figure 3-7 Proper CC15 Cable Orientation

### 3.8.2 Using the CC25 Cable

- Always use the CC25 cable with the P2 connector.
- Make sure that the CC25 cable is always routed in the **downward** direction from the P2 connector toward the rack. Mount the power supply above the rack to which it will supply power (see Figure 3-8).
- Never bend the CC25 in an upward direction from the P2 connector.
- Do not exceed the rated current capacity of the power supply. (See Table 3-1 on page 3-5.)

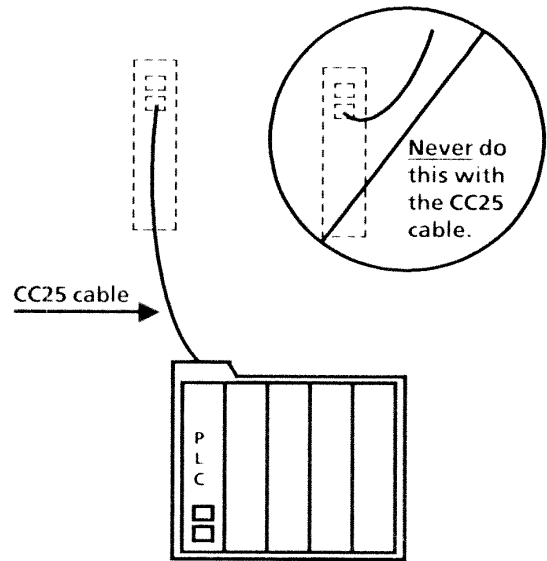



Figure 3-8 Proper CC25 Cable Orientation

### 3.9 WIRING THE POWER SUPPLY

In all wiring installations be sure to wire the power supply in accordance with all the electrical codes that apply to that system application. For more information, also refer to the *SY/MAX Planning and Installation Guide* (Instruction Bulletin #30598-175).

 <b>WARNING</b>
<p><b>HAZARDOUS VOLTAGE</b></p> <p><b>Do not touch the terminal block or the circuit board while power input wiring is connected.</b></p> <p>Failure to observe this precaution can result in death, severe personal injury, or equipment damage.</p>

The terminal block is located at the bottom front of the power supply. Five terminal connectors are positioned on the terminal. The top three terminals are marked for incoming voltage (L1 and L2) and ground connections, respectively. The bottom two terminals are connected by a jumper wire that must be in place for 120 VAC operation (see Figure 3-9). Always remove the jumper wire for 240 VAC incoming voltage.

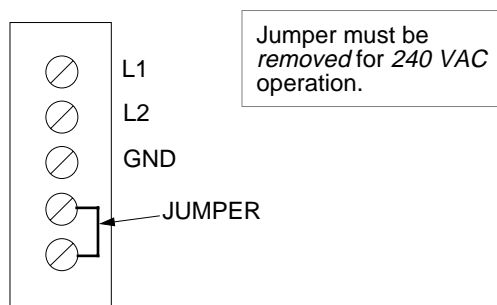


Figure 3-9 Terminal Block Shown with Jumper Attached for 120 VAC Operation

The terminals will accept two #14 stranded or solid wires. Ring lugged wires can be used.

#### 3.9.1 Power Considerations

Incoming power is wired directly to the terminals labeled **L1**, **L2**, and **GND** on the terminal block on the front of the power supply (see Figure 3-9). Keep the following considerations in mind when wiring the power supply.

- Do not combine AC and DC signal wires in the same wire trough or bundle them together for parallel runs. Right-angle crossovers should be used where wires cross over each other. This minimizes the chance of coupling electrical noise into the system.
- Incoming power must be sinusoidal AC with a frequency of 47 to 63 Hz. Square wave or sine wave inputs with other frequencies should not be used.
- The BATTERY LOW LED indicator on the power supply will not operate if incoming power is lost.

#### 3.9.2 Ground Connection

- Be sure the ground terminal “GND” is wired directly to ground.
- Maintain a single ground point in programmable controller systems with multiple power supplies. Use a building support column or grounding electrode that is a known “true earth” ground. Never allow electronic control equipment to share a “series” ground with electrically noisy hardware (for example, inductive motors or arc welders).

### 3.10 VERIFYING OPERATION

After the power supply is installed, verify operation by following these steps:

1. Verify that the power supply is wired correctly.
2. Turn on the power supply. (For the PS25F or PS35F, be sure that the main disconnect switch or circuit breaker is energized.)
3. Check the LEDs. The BATTERY LOW LED should be off, and the +5VDC LED should be on.

# 4 OPERATING AND TROUBLESHOOTING

## 4.1 LED INDICATORS

Both the PS25 and PS35 power supplies have two indicator lights for diagnostic purposes. These lights are the BATTERY LOW and the +5VDC LEDs (Figure 4-1).

### 4.1.1 BATTERY LOW Indicator

When the BATTERY LOW LED is on, this is an indication that the battery should be replaced as soon as possible. The data and program will be retained for about two weeks after the LED goes on. See Section 4.3 for instructions on replacing the battery.

When the BATTERY LOW LED is off, the battery voltage is sufficient to retain the memory of a processor or other modules that require battery backup during power outages.

The BATTERY LOW LED will not operate if incoming power is lost.

### 4.1.2 +5VDC Indicator

When the +5VDC LED is on, proper output signals are being supplied by the power supply.

If the +5VDC LED is off, see Table 4-1 on the next page for possible causes of the problem.

## 4.2 TROUBLESHOOTING CHART

Table 4-1 on the next page summarizes problems that may be encountered, their possible causes, and solutions. The remaining sections provide procedures for replacing the battery, fuse, and the power supply module.

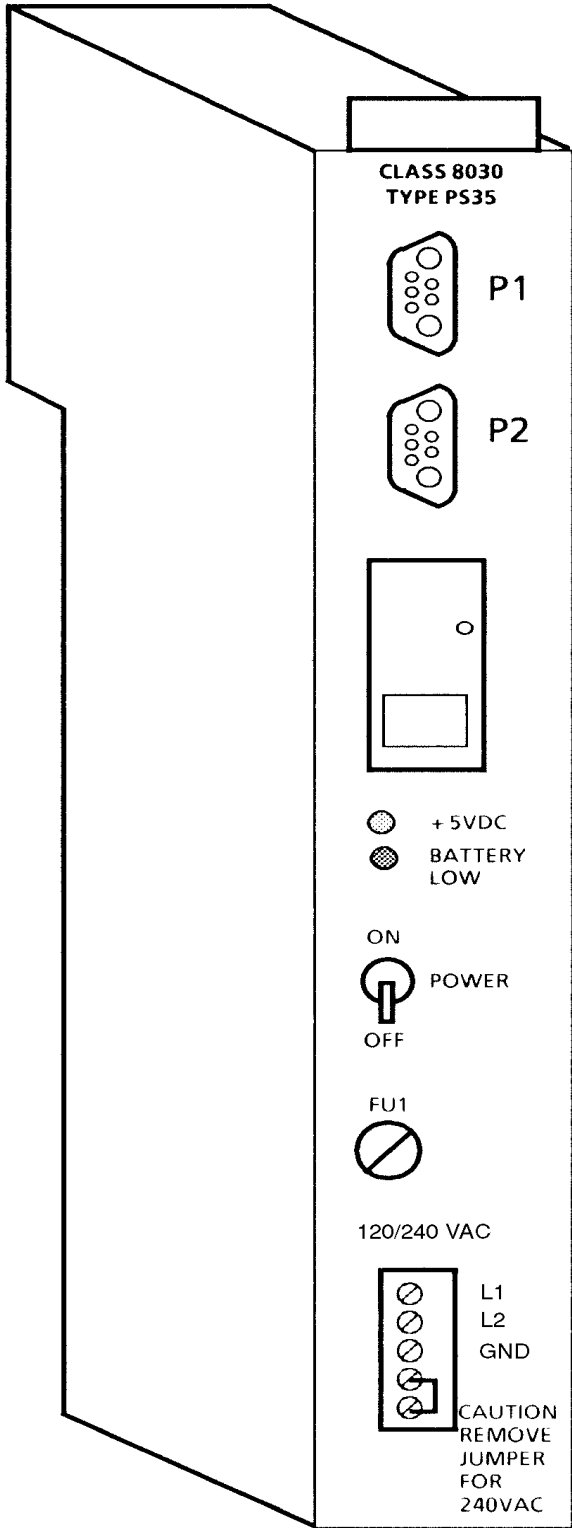


Figure 4-1 Front Panel of PS35

Table 4-1: Troubleshooting Chart

Symptom	Possible Cause	Required Action
+5VDC LED is off.	The power supply fuse may be blown.	Check to see that the fuse is operational. If it is not, replace the fuse. See Section 4.4, "Replacing the Fuse," for information on fuse replacement.
	An incorrect line voltage may be applied to the supply.	Make sure that the jumper is in position on the terminal block for 120 VAC incoming voltage or that it is removed from the terminal block for 240 VAC operations.
	The power supply load may exceed the specified output current rating.	Make sure that the current draw on the power supply does not exceed its output current rating. Check the specifications for the power supply (Appendix A) and refer to Table 2-1 and Appendix B to calculate the total load on the power supply.
	The power supply may be inoperative.	Replace the power supply. See Section 4.5, "Replacing the Power Supply," for instructions on power supply replacement. Contact your Square D distributor for additional assistance.
BATTERY LOW LED is on.	The backup battery in the supply is weak.	Replace the battery as soon as possible. See Section 4.3, "Replacing the Battery," for instructions on battery replacement.
	There may be no battery in the battery compartment.	Check to be sure that a battery is present.
CC15 or CC25 cable cannot be plugged into the P1 or P2 connector.	Slide locks on cable may be in locked position.	Check the cable end that has the 9-pin D-connector on it. The slide locks over the two screws on either side of the connector should both be in the OPEN position.

### 4.3 REPLACING THE BATTERY

The PS25 and PS35 power supplies contain a single Tadiran 3.6 VDC Lithium battery that maintains the memory of a processor (or other module that requires battery backup) during a power outage.

The battery should be replaced when the red BATTERY LOW LED on the power supply illuminates, or after the battery's rated life expires.

Note that the BATTERY LOW indicator will not operate if incoming power is lost.

<b>NOTE</b>
If a power supply is used in an ambient temperature that continuously exceeds 45°C (113° F), the battery within the supply should be examined at least every six months for any change in the battery casing (swelling or distortion). Replace the battery if necessary.

### Battery Replacement Procedure

The Lithium battery can be replaced through the battery door on the front of the module using a screwdriver. To remove and reinstall the battery, use the following procedure.

#### NOTE

While replacing the battery, leave the power on to the power supply.

1. Before replacing the battery, be sure to back up programs or data.
2. Always have a fresh Tadiran TL-5104, 3.6VDC Lithium battery available (Square D part number 29904-08961). (Contact a Square D distributor for information on how to purchase spare batteries.)
3. Using a small blade screwdriver, loosen the captive screw securing the battery door and open the door to gain access to the battery. (Refer to Figure 4-1 on page 4-1.)
4. Snap the battery out of its battery holder. (Note that when the battery is removed from the power supply, the BATTERY LOW LED will illuminate.)
5. Making sure to observe proper polarities, replace the battery by snapping it into the battery holder.
6. Close the battery door and refasten the captive screw to secure the door in place.
7. Write the date the battery was replaced on the front panel of the power supply module.
8. Verify memory.

#### CAUTION

##### EXPLOSIVE CHEMICALS

**Always follow the manufacturer's warning when using or disposing of lithium batteries. Do not incinerate, charge, crush, penetrate, or heat above 80°C (176°F) or the battery may leak or explode.**

Failure to observe this precaution can result in personal injury or equipment damage.

### 4.4 REPLACING THE FUSE

The fuse holder is located on the front of the module (see Figure 4-1 on page 4-1). To see if there is a blown fuse, use the following procedure:

1. Remove incoming power to the power supply.
2. Check the fuse. If the line fuse is blown, the cause of the blown fuse must be determined and corrected.
3. Replace the blown fuse with the proper size for the power supply (see Table 4-2).

Table 4-2: Fuse Types and Ratings

PS25/PS25F	PS35/PS35F
Bussmann MDL-3 or Littelfuse 313003 3A, 250 VAC (1/4" x 1-1/4") ----- or -----	Bussmann MDL-5 or Littelfuse 313005 5A, 250 VAC (1/4" x 1-1/4") ----- or -----
Bussmann GDC-3.15 or Littelfuse 2183.15 3.15A, 250 VAC (5 mm x 20 mm)	Bussmann GDC-5 Littelfuse 218005 5A, 250 VAC (5 mm x 20 mm)

### 4.5 REPLACING THE POWER SUPPLY


When replacing the power supply (for example, when upgrading the system, or in troubleshooting an inoperative system), the contents of any RAM memory may be lost. Be sure to back up programs or data.

For troubleshooting purposes, the cable from the power supply should remain connected to the rack assembly.

Always refer to the appropriate SY/MAX processor instruction bulletin for backup procedures before removing the power supply.

To remove the power supply, follow these steps:

1. Make sure that the power switch is set to OFF.

 <b>WARNING</b>
<b>UNINTENTIONAL EQUIPMENT OPERATION</b>
<b>Because the PS25F and PS35F models do not have an ON/OFF switch on the modules, a properly-sized main disconnect switch or main circuit breaker must be installed in the power circuit feeding the power supply as a means of removing power from the programmable controller system.</b>
Failure to observe this precaution can result in death, severe personal injury, or equipment damage.

2. Loosen the captive screw at the bottom of the module.
3. ***If the power supply is side or panel mounted,*** swing the module out from the bottom and unhook it from the Adapter Plate.  
***If the power supply is rack mounted,*** pull the module out of the slot, using the finger tab located at the top of the module. Use *even pressure* when removing or inserting the module.
4. Install a new module, using the appropriate installation instructions given in Section 3 of this instruction bulletin.

# A DIMENSIONS AND SPECIFICATIONS

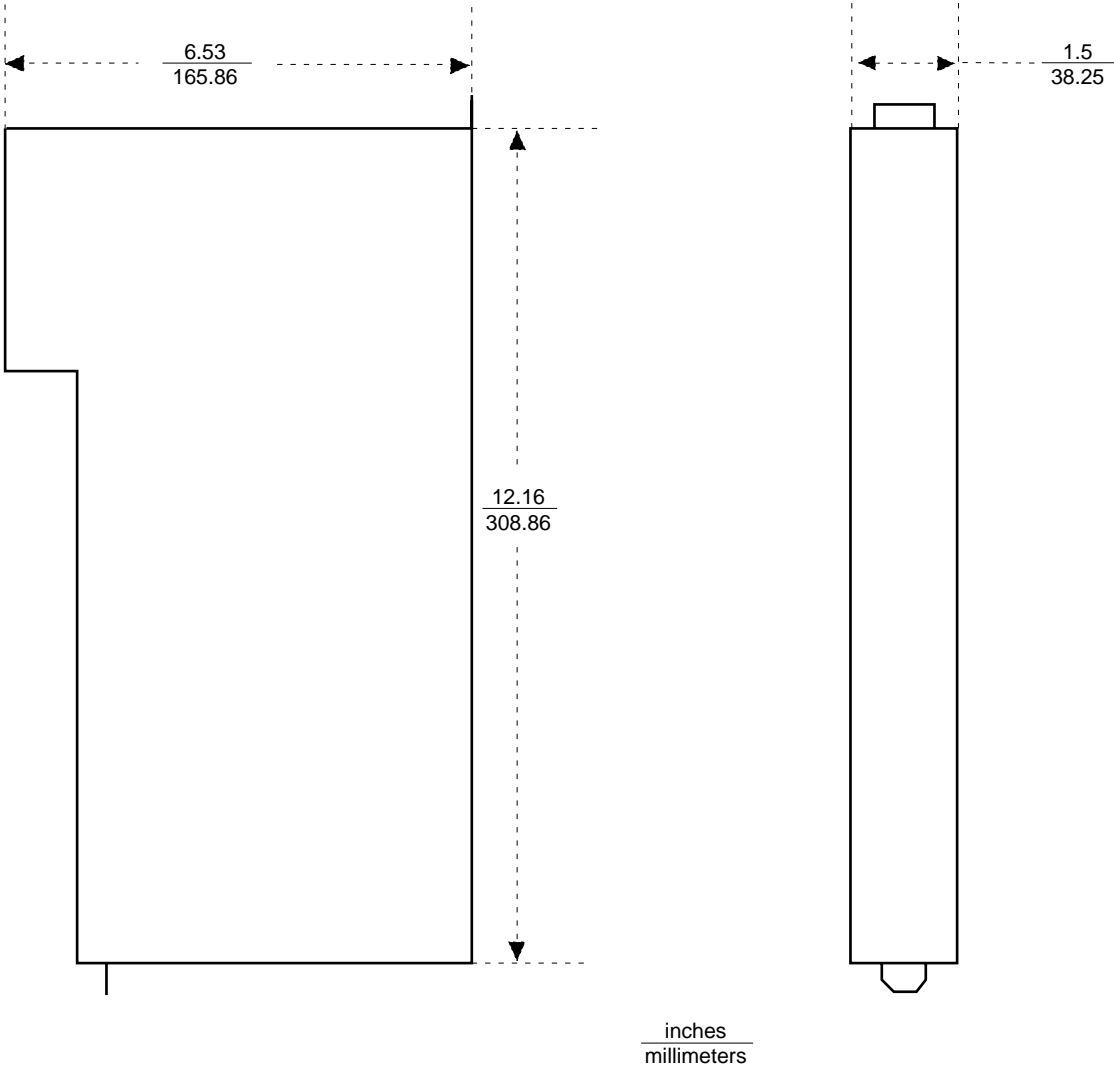


Figure A-1 Dimensions for PS25 and PS35 Power Supplies

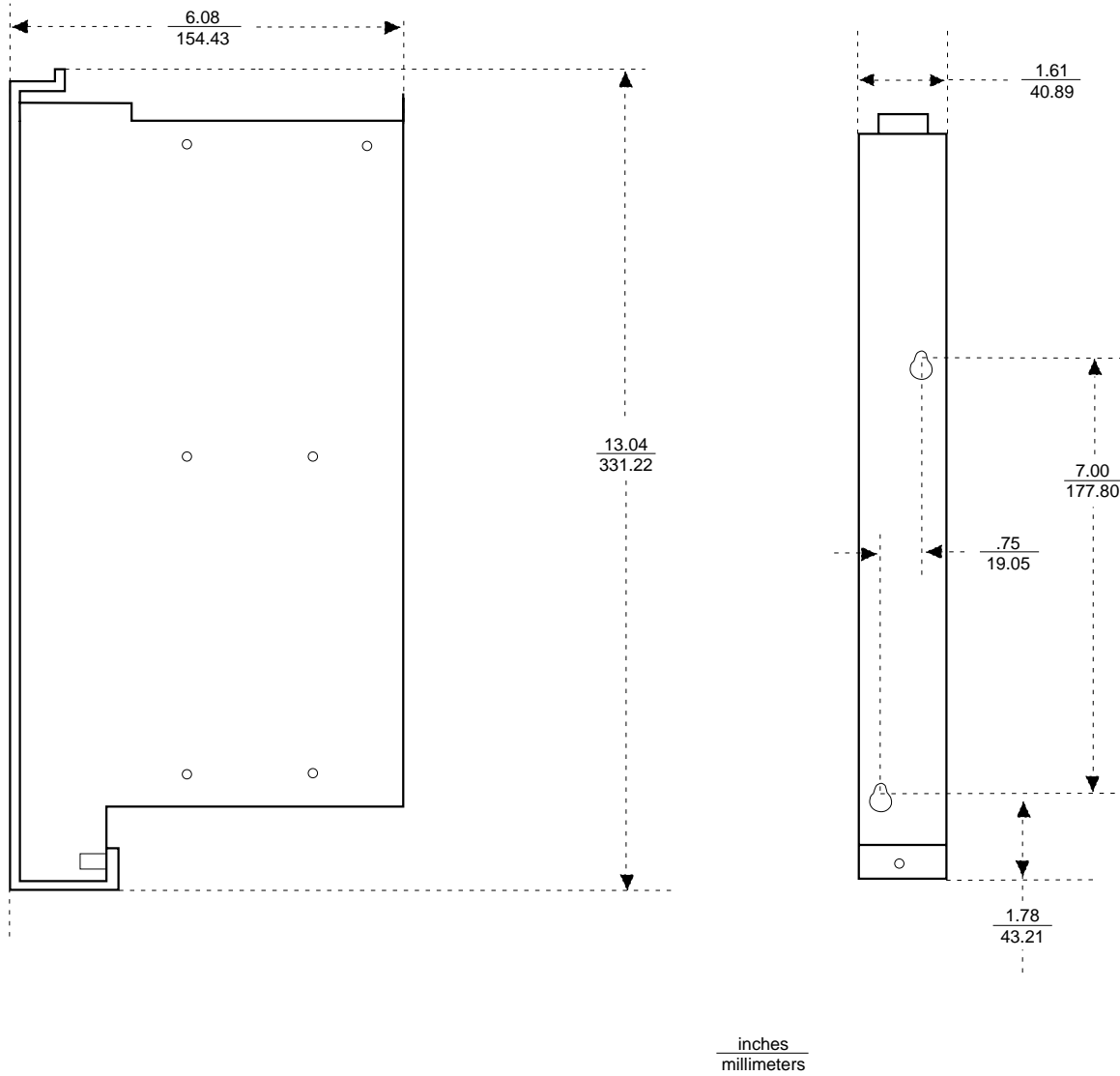


Figure A-2 ADP100 Adapter Plate Dimensions



Table A-1 PS25 and PS35 Specifications

	PS25 and PS25F	PS35 and PS35F
Input Voltage Range @ 47-63 Hz	102-132 VAC / 204-264 VAC	102-132 VAC / 204-264 VAC
Input Power Consumption	175 VA nominal	350 VA nominal
Power Loss Ridethrough at Full Rated Load	16 ms minimum at 102/204 VAC	16 ms minimum at 102/204 VAC
Input Fuse Type and Rating	Bussmann MDL-3 or Littelfuse 313003 3A, 250 VAC (1/4" x 1-1/4") (Shipped installed in module) ----- or ----- Bussmann GDC-3.15 or Littelfuse 2183.15 3.15A, 250 VAC (5 mm x 20 mm) (Also included with module; with fuse holder)	Bussmann MDL-5 or Littelfuse 313005 5A, 250 VAC (1/4" x 1-1/4") (Shipped installed in module) ----- or ----- Bussmann GDC-5 or Littelfuse 218005 5A, 250 VAC (5 mm x 20 mm) (Also included with module; with fuse holder)
Approx. I/O Capacity <sup>a</sup>	128	512
Specific Output Voltage Range	5.12 - 5.20 VDC	5.12 - 5.20 VDC
Output Voltage (Nominal)	+5 VDC	+5 VDC
Output Current Capacity @ 40°C	12 Amps DC (0.6 Amps DC for battery bus)	23 Amps DC (0.6 Amps DC for battery bus)
Output Current Capacity @ 50°C	10 Amps DC (0.6 Amps DC for battery bus)	20.2 Amps DC (0.6 Amps DC for battery bus)
Output Current Capacity @ 60°C	8 Amps DC (0.6 Amps DC for battery bus)	15 Amps DC (0.6 Amps DC for battery bus)
Weight (lb / kg) <sup>b</sup>	3.9 / 1.8 (ADP100 optional)	4.4 / 2.0 (ADP100 required)
Size in inches w/o adapter plate (H x W x D)	12.16 x 1.51 x 6.53	N/A
Size in inches with adapter plate (H x W x D)	13.04 x 1.61 x 6.53 (Note: The CC15 cable connector protrudes approximately 2 inches (50.8 mm) when plugged into the front of the module.)	13.04 x 1.61 x 6.53 (Note: The CC15 and CC25 cable connectors protrude approximately 2 inches (50.8 mm) when plugged into the front of the module.)
Output Connections	1 - 100 pin edge connector; 1 - P1	1 - P1; 1 - P2
Cables Included	None	CC15 Cable; Adapter Plate
Indicator Lights (LEDs)	+5 VDC; Battery Low	+5 VDC; Battery Low
Undervoltage Lockout	When output voltage is below normal operating range, undervoltage lockout circuit shuts down regulator.	When output voltage is below normal operating range, undervoltage lockout circuit shuts down regulator.
Overvoltage Protection	5.75 V min.; 6.25 V nominal; 6.75 V max. Cycle power to reset.	5.75 V min.; 6.25 V nominal; 6.75 V max. Cycle power to reset.
Ambient Temperature Rating	0° to 60°C (32° to 140°F)	0° to 60°C (32° to 140°F)
Storage Temperature Rating	-40° to 80°C (-40° to 176°F)	-40° to 80°C (-40° to 176°F)
Humidity Rating	5-95%, non-condensing	5-95%, non-condensing
Battery Type	Tadiran Electronic Industries series TL-5104, Type AEL/S, catalog no. 15-51-04-210-000 Lithium Battery, 3.6 VDC, 1.9 Ah (Square D part number 29904-08961). Contact a Square D distributor to obtain this part.	
Terminal Block/Power Plug	Square D Part No. 25410-02791 (Contact a Square D distributor to obtain this part.)	
SY/MAX Rack Assemblies in which the PS25 Can Be Used in the "Rack Installation." Module Configuration: ADP100, which weighs 4.9 lbs (2.2 kg).	CRK210, CRK300, DRK210, DRK300, GRK110, GRK210, HRK100, HRK150, HRK200, HRK300, RRK200, RRK300.	N/A

## B CURRENT DRAW FOR SY/MAX MODULES

*Table B-1: Current Draw for SY/MAX Modules*

### Class 8010 - Operator Interface & Programmers

Device Type Number	Description	Current Draw	
		75% Duty Cycle	100% Duty Cycle
AXS211	Local Interface Module	3.5 A	3.5 A
SLM100	Loader/Monitor	600 mA	600 mA
SPR100	Hand-Held Programmer	1.0 A	1.0 A

### Class 8020 - SY/MAX Processors

Device Class/Type Number	Description	Current Draw at 5VDC	
		75% Duty Cycle	100% Duty Cycle
SCP311	Model 300 512 Word Standard with RAM	1.5 A	1.5 A
SCP312	Model 300 1K Standard with RAM	1.5 A	1.5 A
SCP313	Model 300 2K Standard with RAM	1.5 A	1.5 A
SCP321	Model 300 512 Word Deluxe with RAM	1.5 A	1.5 A
SCP322	Model 300 1K Deluxe with RAM	1.5 A	1.5 A
SCP323	Model 300 2K Deluxe with RAM	1.5 A	1.5 A
SCP332	Model 300 1K Deluxe with UV PROM	2.0 A	2.0 A
SCP333	Model 300 2K Deluxe with UV PROM	2.0 A	2.0 A
SCP344	Model 300 1K RAM/1K PROM Deluxe	2.0 A	2.0 A
SCP401	Model 400 4K RAM without Floating Point	2.5 A	2.5 A
SCP423	Model 400 8K RAM with Floating Point	3.5 A	3.5 A
SCP424	Model 400 16K RAM with Floating Point	3.5 A	3.5 A
SCP444	Model 400 16K RAM/PROM Mix with Floating Point	3.5 A	3.5 A
SCP631	Model 600 with 16K RAM	5.5 A	5.5 A
SCP632	Model 600 with 26K RAM	5.5 A	5.5 A
SCP644	Model 600 with 26K RAM/UV PROM	5.5 A	5.5 A
SCP721	Model 700 with 8K RAM	5.1 A	5.1 A
SCP722	Model 700 with 16K RAM	5.1 A	5.1 A
SCP723	Model 700 with 32K RAM	5.1 A	5.1 A
SCP724	Model 700 with 64K RAM	5.1 A	5.1 A
SMM721	Model 700 64K RAM Memory Module	2.2 A	2.2 A

### Class 8030 - Digital I/O

Device Type Number	Description	Current Draw	
		75% Duty Cycle	100% Duty Cycle
CIM101	4-Function 120V AC/DC Input Module	30 mA	30 mA
CIM131	4-Function 12-24V AC/DC Input Module	30 mA	30 mA
CIM141	4-Function 48V AC/DC Input Module	30 mA	30 mA
CIM151	4-Function TTL Input Module	20 mA	20 mA
CIM161	4-Function 240V AC/DC Input Module	30 mA	30 mA
CIM191	4-Function Input Simulator Module	35 mA	40 mA
COM221	4-Function 120V AC Output Module	125 mA	145 mA
COM231	4-Function 240V AC Output Module	125 mA	145 mA
COM241	4-Function 9-55V DC Output Module	115 mA	135 mA
COM251	4-Function 60-160V DC Output Module	195 mA	245 mA
COM252	4-Function 10-250V DC Output Module	195 mA	245 mA
COM261	4-Function TTL Output Module	120 mA	145 mA

**Class 8030 - Digital I/O (Continued)**

Device Type Number	Description	Current Draw at 5VDC	
		75% Duty Cycle	100% Duty Cycle
COM271	4-Function Form A Reed Relay Output Module	285 mA	350 mA
COM281	4-Function Form B Reed Relay Output Module	285 mA	350 mA
COM291	4-Function Output Simulator Module	55 mA	65 mA
DIM101	4-Function 120V AC Deluxe Isolated Input Module	50 mA	60 mA
DIM141	4-Function 6-48V AC/DC Deluxe Isolated Input Module	50 mA	60 mA
DIM161	4-Function 240V AC/DC Deluxe Input Module	50 mA	50 mA
DOM221	4-Function 120V AC Deluxe Output Module	125 mA	145 mA
DOM225	2-Function 120V AC 5A Deluxe Output Module	100 mA	100 mA
DOM231	4-Function 240V AC Deluxe Output Module	125 mA	145 mA
DOM235	2-Function 240V AC 5A Output Module	100 mA	100 mA
DOM241	4-Function 9-55V DC Deluxe Output Module	115 mA	135 mA
DOM251	4-Function 60-160V DC Deluxe Output Module	195 mA	245 mA
GOM221	4-Function 120V AC Isolated Output Module	125 mA	145 mA
GOM231	4-Function 240V AC Isolated Output Module	125 mA	125 mA
HIM101	8-Function 120V AC Input Module	60 mA	70 mA
HIM102	6-Function 120V AC/DC Isolated Input Module	60 mA	70 mA
HIM131	8-Function 12-24V AC/DC Input Module	65 mA	70 mA
HIM141	8-Function 48V AC/DC Input Module	65 mA	70 mA
HIM151	8-Function TTL Input Module	32mA	32mA
HIM161	8-Function 240V AC/DC Input Module	65 mA	70 mA
HIM191	8-Function Input Simulator Module	40 mA	40 mA
HIM310	Fiber Optic Interface Module	75 mA	75 mA
HOM211	8-Function 12-50V AC Output Module	220 mA	265 mA
HOM221	8-Function 120V AC Output Module	225 mA	270 mA
HOM222	6-Function 120V AC Isolated Output Module	225 mA	270 mA
HOM231	8-Function 240V AC Output Module	225 mA	265 mA
HOM232	6-Function 240V AC Isolated Output Module	225 mA	265 mA
HOM241	8-Function 9-55V DC Output Module	250 mA	275 mA
HOM251	8-Function 60-160V DC Output Module	385 mA	455 mA
HOM261	8-Function TTL Output Module	225 mA	275 mA
HOM271	8-Function Form A Reed Relay Output Module	525 mA	625 mA
RIM101	16-Function 120V AC/DC Input Module	275 mA	300 mA
RIM331	32-Function 24V DC Input Module	520 mA	600 mA
RIM361	16-Function 240V AC/DC Input Module	275 mA	300 mA
RIM731	64-Function 24V AC/DC Input Module	515 mA	600 mA
ROM221	16-Function 120V AC Output Module	850 mA	950 mA
ROM271	16-Function 120V AC Output Relay Module	750 mA	900 mA
ROM431	16-Function 240V AC Output Module	850 mA	950 mA
ROM441	32-Function 24V DC Output Module	750 mA	850 mA
ROM871	64-Function Relay Output Module	1.0 A	1.25 A

**Class 8030 - Interface Modules**

Device Type Number	Description	Current Draw at 5VDC	
		75% Duty Cycle	100% Duty Cycle
CRM115	Bus Expander Interface Module	320 mA	320 mA
CRM116	Bus Driver Interface Module	100 mA	100 mA
CRM210	Local Interface Module with 512 Registers	1.6 A	1.6 A
CRM211	Local Interface Module with 4096 Registers	1.6 A	1.6 A
CRM220	Remote Interface Module - Digital I/O Rack (4-Function)	1.0 A	1.0 A
CRM222	Remote Interface Module - Digital I/O Rack (8-Function)	1.0 A	1.0 A
CRM230	Local Transfer Interface Module	1.6 A	1.6 A
CRM232	Remote Transfer Interface Module	1.0 A	1.0 A
CRM310	Fiber Optic Interface Module	400 mA	400 mA
CRM510	SY/NET Network Interface Module	950 mA	950 mA

**Class 8030 - Interface Modules**

Device Type Number	Description	Current Draw at 5VDC	
		75% Duty Cycle	100% Duty Cycle
CRM511	Multi-Media Network Interface Module	950 mA	950 mA
CRM540	SY/NET Network Interface Module for Class 8005 Model 50	950 mA	950 mA
CRM560	SY/NET Remote Network Interface Module	950 mA	950 mA
CRM565	SY/NET Network Interface Module for PowerLogic Circuit Monitors	950 mA	950 mA
CRM570	SY/NET Network Interface Module with Modbus Protocol	950 mA	950 mA
CRM580	Transfer Network Interface Module	950 mA	950 mA
CRM601	RS-232/422 Dual Interface Converter Module	430 mA	430 mA
CRM720	Speech Module	1.4 A	1.4 A
DLM110	D-LOG Data Controller Module with 9K Memory	725 mA	725 mA
DLM120	D-LOG Data Controller Module with 29K Memory	800 mA	800 mA
EQ5138G1	Parallel Digital Driver Interface Module	875 mA	875 mA
EQ5138G2	Parallel Digital Receiver Interface Module	200 mA	200 mA
EQ5163G1	Systronics Network Interface Module	950 mA	950 mA

**Class 8030 - Intelligent I/O**

Device Type Number	Description	Current Draw at 5VDC	
		75% Duty Cycle	100% Duty Cycle
RIM121	4-Function Analog Input Module	1.4 A	1.4 A
RIM123	8-Channel High Speed Analog Input Module	875 mA	875 mA
RIM125	16-Function Analog Input Module	800 mA	800 mA
RIM126	8-Function Analog/Thermocouple Input Module	1.25 A	1.25 A
RIM127	12-Channel RTD Input Module	1.0 A	1.0 A
RIM131	High Speed Counter Module	1.2 A	1.2 A
RIM144	Multiplexed BCD Input Module	750 mA	750 mA
ROM121	4-Function Analog Output Module	1.5 A	1.5 A
ROM122	4-Function Isolated Analog Output Module	1.2 A	1.2 A
ROM131	Stepper Motor Controller Module	1.5 A	1.5 A
ROM141	Multiplexed BCD Output Module	900 mA	900 mA

**Class 8052 - MicroCell Controllers**

Device Type Number	Description	Current Draw at 5VDC	
		75% Duty Cycle	100% Duty Cycle
MCM713	MicroCell Controller with 512K RAM Memory	2.5 A	2.5 A

**Class 8055 - Ethernet Processors**

Device Type Number	Description	Current Draw at 5VDC	
		75% Duty Cycle	100% Duty Cycle
SCP654	SY/MAX Model 650 Ethernet Processor with 16K Memory	5.5 A	5.5 A
SCP655	SY/MAX Model 650 Ethernet Processor with 26K Memory	5.5 A	5.5 A

# C CABLES AND CONNECTORS

Figure C-1 and Table C-1 contain pin-out information for the P1, P2, and edge connectors respectively. An explanation of some of the signal names follows Table C-1 on page C- 2.

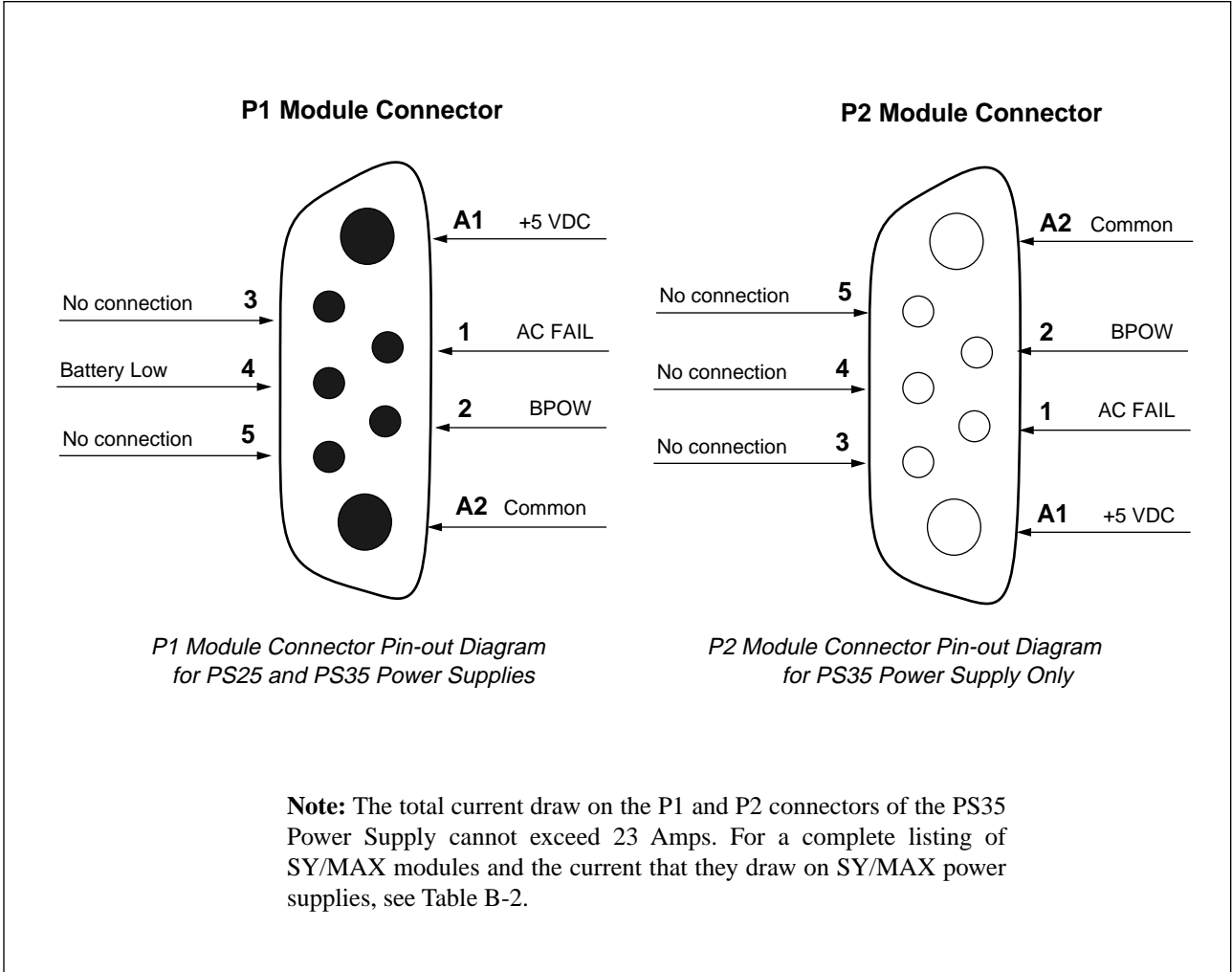


Figure C-1: Pinout Diagrams for P1 and P2 Module Connectors

Table C-1 Edge Connector Pin-outs for PS25 Power Supply Only

Connector Pin Number <sup>a</sup>	Signal Name
1	Common
2	Common
3	Common
4	Common
5	+5 VDC
6	+5 VDC
7	AC FAIL
8	BPOW
9	BLOW
10	No connection
37	Chassis
38	Chassis
95	+5 VDC
96	+5 VDC
97	Common
98	Common
99	Common
100	Common

<sup>a</sup> Only the pins associated with the modular power supply are given.

### **AC FAIL**

A signal that prepares the processor and other register modules being driven by the power supply for a system power up or system shutdown.

### **BLOW**

A signal indicating that the battery voltage is low.

### **BPOW**

Battery power voltage supply.