

## Introduction

The PS linear power supply accepts a 24 Vac input and outputs a regulated adjustable 24 Vdc to power devices such as RH or temperature transmitters, gas detectors or loop-powered transducers. The device is field-selectable for full-wave or half-wave operation to suit various applications and features a power LED to indicate status.

## Before Installation

Read these instructions carefully before installing and commissioning the power supply. Failure to follow these instructions may result in product damage. Do not use in an explosive or hazardous environment, with combustible or flammable gases, as a safety or emergency stop device or in any other application where failure of the product could result in personal injury. Take electrostatic discharge precautions during installation and do not exceed the device ratings.

Certain precautions must be followed to properly connect devices that require 24 Vac power sources. The system must be analyzed as a whole to determine if any ground type faults will occur. Most devices that require 24 Vac power supplies actually convert the AC power to DC power using either a half-wave rectifier circuit or a full-wave (bridge) rectifier circuit. Depending on the type of rectifier circuit used, each device will require different interconnection and grounding techniques.

## Mounting

The power supply is supplied with snap-track for simple mounting. If necessary, use only fingers to remove the pcb from the snap-track, do not pry on the pcb with tools. Mount the power supply in an approved cabinet using two screws through the base of the snap-track. Ensure the screw heads do not contact the PCB and the device should be mounted to ensure optimum ventilation as power supplies generate heat that may affect other devices.

## Wiring

Disconnect the power before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local codes and the wiring diagrams. Always check the pcb jumper first to verify that the correct full-wave / half-wave configuration is selected and size wires appropriately for the expected current load.

The pcb is supplied with angled screw-block connectors that are clearly marked as to AC input and DC output wiring. Connect the 24 Vac power supply to the two AC IN terminals. The 24 Vac input should come from an isolated 24 Vac transformer. The 24 Vdc output is available on the DC OUT terminals.

### In half-wave mode:

- the AC IN "-" terminal is directly connected to the DC OUT "-" terminal.

### In full-wave mode:

- the input and output do not share a common ground point.
- grounding both the DC OUT "-" terminal and the 24 Vac transformer secondary will blow the fuse.

## Operation

The power supply is factory calibrated to accept a 24 Vac input and output 24 Vdc in the full-wave mode. The output value may be adjusted by rotating the potentiometer control on the circuit board while monitoring the output with a voltmeter. The power supply is fuse protected and the replacement fuse rating is clearly marked on the pcb.

Ensure the device is operated within its ratings as shown in the *Specification* section. The PS is designed to drive a 2.0 Amp load (1.0 Amp for half-wave mode) continuously at 24 Vdc with a 24 Vac input over the full specified operating temperature of 0-50 °C. The PS is factory calibrated for 24 Vdc output, the output should be measured and adjusted with the actual load for if high accuracy is required.

Pay particular attention to these operating conditions:

- increasing the AC input voltage will increase the PS temperature, the output current may need to be reduced.
- decreasing the output voltage will increase the PS temperature, reduce the output current or input voltage.
- operating in half-wave mode will decrease the output current drive.
- output ripple will increase if the input voltage is too low to produce the required output voltage.
- typically, the maximum available output current can be expressed as

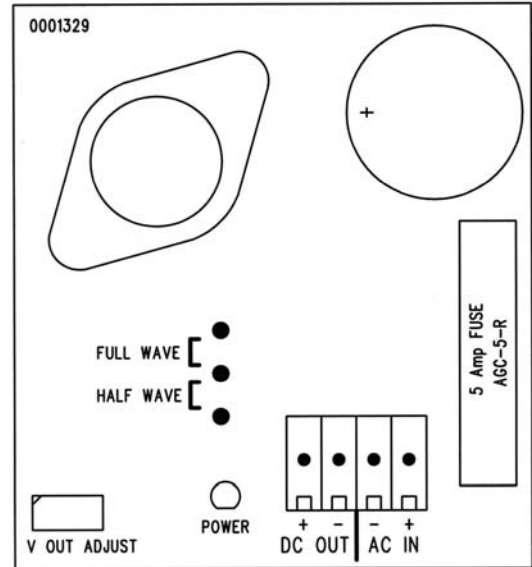
$$I_{out\ max} = (V_{out} / V_{in}) \times 2\ Amps \quad (1\ Amp\ for\ half-wave)$$

Specifications

Voltage Input	24 Vac, 50/60 Hz
Voltage Output	24 Vdc (field adjustable 3-26 Vdc)
Current Input	3.5 Amps (full wave) max 2.3 Amps (half wave) max
Current Output	2.0 Amps (full wave) max 1.0 Amps (half wave) max

Load Regulation	< 1% at full rated current
Line Regulation	< 0.5% at full rated current
Output Ripple	< 20 mV at full rated current
Input Fuse Size	5 Amp (AGC-5)

Device Status	Green power LED
Operating Temperature	32-122 °F (0-50 °C)
Operating Humidity	5-95 %RH non-condensing
Mounting	Snap track included
Dimensions	4.0" L x 3.45" W x 1.7" H 102 x 88 x 43 mm
Weight	118 gm (4.16 oz)
Compliance	RoHS



Notes:

Specs at 24 Vac 60 Hz input, 24 Vdc output, minimum load = 0.25 Amps.

The device will operate at various AC or DC input voltages (30 Vac / 40 Vdc max). Contact factory for specific application ratings.

For maximum output, use a 85 VA transformer.

System Configurations

The wiring configuration of two half-wave devices sharing a 24 Vac transformer is shown in Figure 1. This is the most common and the safest configuration when properly connected. Many half-wave devices can be connected in this same manner as long as the transformer rating is not exceeded. The important aspect of this configuration is that all device Commons are connected together and may also be connected to the Equipment Ground and/or the transformer ground. Note that a half-wave device has a common input and output line.

Ground problems will occur if the wrong secondary terminal of the transformer is grounded or if a device input is reversed with respect to the common. When either fault occurs a short circuit is created in the circuit which typically results in blown fuses or damaged devices.

A second configuration is when all devices have full-wave rectified power supplies. The safe connection of these types of devices is shown in Figure 2. It can be seen that full-wave or bridge rectified devices do not have a common input and output line, therefore only one point in the system can be grounded. It should be noted that, since bridge type devices have symmetrical inputs, the 24 Vac input connections can be reversed on one device with respect to another. One common error in this type of system is the connection of a ground to one side of the transformer. If the controller or another device is also grounded, a short circuit will result across a diode in the bridge causing damage to devices or a fuse to blow. If the transformer must be grounded in this case, the only solution is to disconnect the equipment ground from the controller.

A third configuration included devices with both types of power supplies, full-wave and half-wave rectified, as shown in Figure 3. A common mistake is to connect the circuit as shown with both devices connected to the same transformer. In this configuration, the secondary of the transformer will be shorted during one half of the AC cycle. This connection is never safe and will result in blown fuses or device damage. In no case can devices with different type rectifier circuits be connected to the same transformer when their signal commons are connected together. Either both devices must have separate transformers or an isolation device must be used to isolate the signal commons.

Figure 1

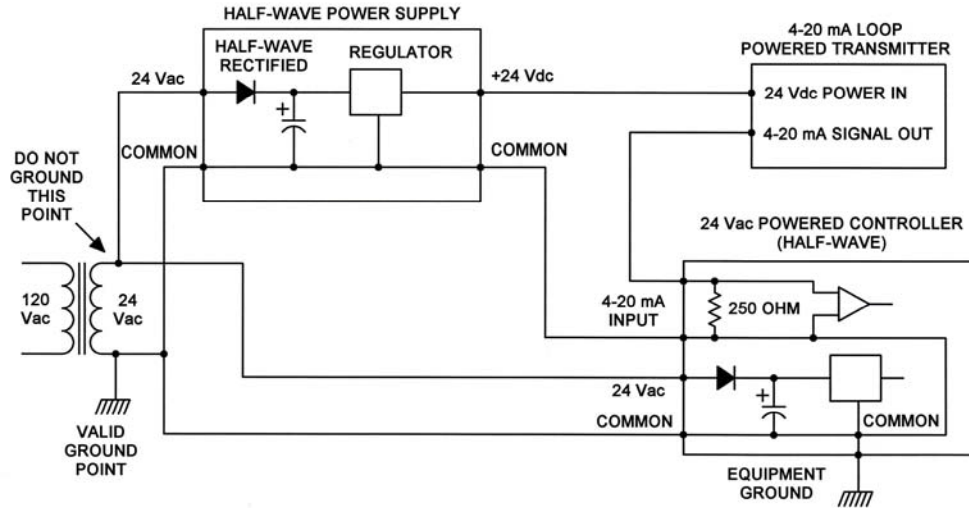


Figure 2

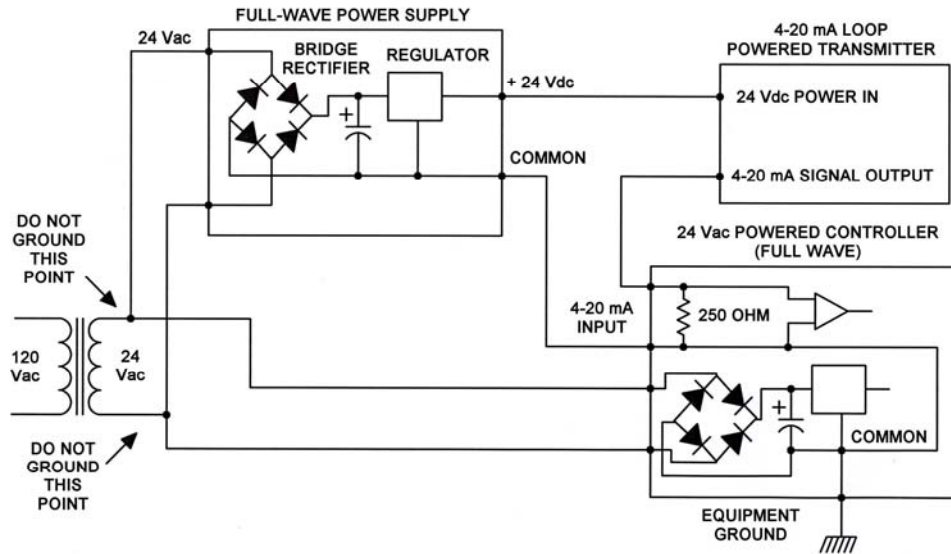


Figure 3

