8410–48 Power Supply

UL R Complies with UL Standard 1310 Third Edition*

CONTENTS PAGE

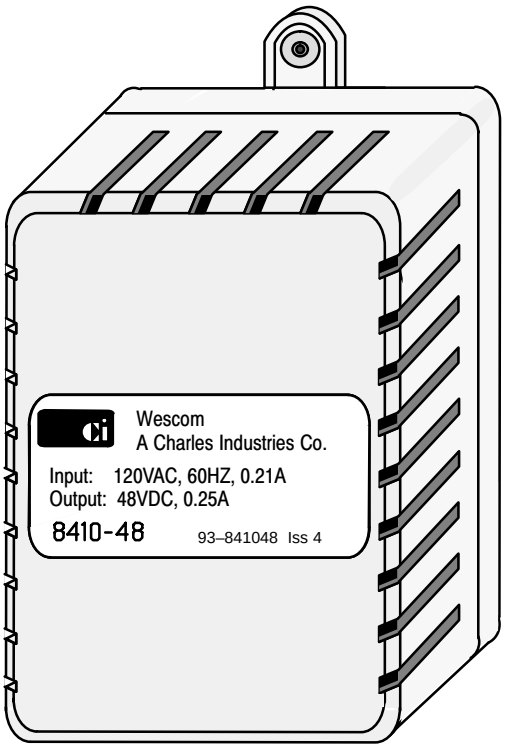

Figure 1. 8410–48 VDC (100mA) Power Supply

1. GENERAL

1.1 Document Purpose

This document includes a circuit description, installation and basic testing information for the Charles Industries 8410–48 Power Supply, shown in Figure 1.

1.2 Document Status

This document is reprinted to provide a general editorial update.

1.3 Equipment Function

The 8410–48 Power Supply unit will supply power to any equipment requiring the voltage and current available from the 8410–48. The 8410–48 controls the DC output by means of a series regulator and provides overload protection through a foldback circuit should an overload condition occur. The 8410-48 provides a floating 48VDC output at 250mA (maximum), such that either output polarity may be grounded.

This unit can be located on the subscriber premises.

1.4 Equipment Location/Mounting

The unit plugs directly into a grounding-type (3-prong) AC duplex receptacle in a location convenient to the equipment to be powered.

1.5 Equipment Features

Features of the 8410–48 include:

- Plugs into any convenient 120VAC grounding-type receptacle
- Supplies regulated 48VDC output at 250mA
- Floating output permits grounding either polarity
- Series Regulator maintains constant 48VDC output from no-load to 250mA
- Foldback current regulation circuit prohibits output current from exceeding 330mA
- Crowbar circuit prohibits output voltage from exceeding 56VDC
- UL listed and complies with UL Standard 1310 Third Edition

2. INSPECTION

2.1 Inspect for Damages

Inspect the equipment thoroughly upon delivery. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company.

2.2 Equipment Identification

Charles Industries' equipment is identified by a model and issue number imprinted on the front panel or located elsewhere on the equipment. Each time a major engineering design change is made on the equipment, the issue number is advanced by 1 and imprinted on subsequent units manufactured. Therefore, be sure to include both the model number and its issue number when making inquiries about the equipment.

CAUTION

Field repairs/modifications may void compliance with UL 1310 – Third Edition.

Compliance with UL 1310 – Third Edition is restricted to inside plant wiring.

3. APPLICATION GUIDELINES

The 8410–48 requires a 120VAC, 60Hz power source through a duplex receptacle having a ground plug provision. When the 8410–48 is properly plugged into the receptacle, the unit can be held in place by using the eyelet at the top of the case. See danger note in Part 6.

The 8410–48 provides a regulated 48VDC output. The unit has a floating output polarity, such that either output polarity may be grounded, depending upon the application.

4. CIRCUIT DESCRIPTION

Refer to Figure 2, the 8410–48 Power Supply Block Diagram, while reading the following circuit description.

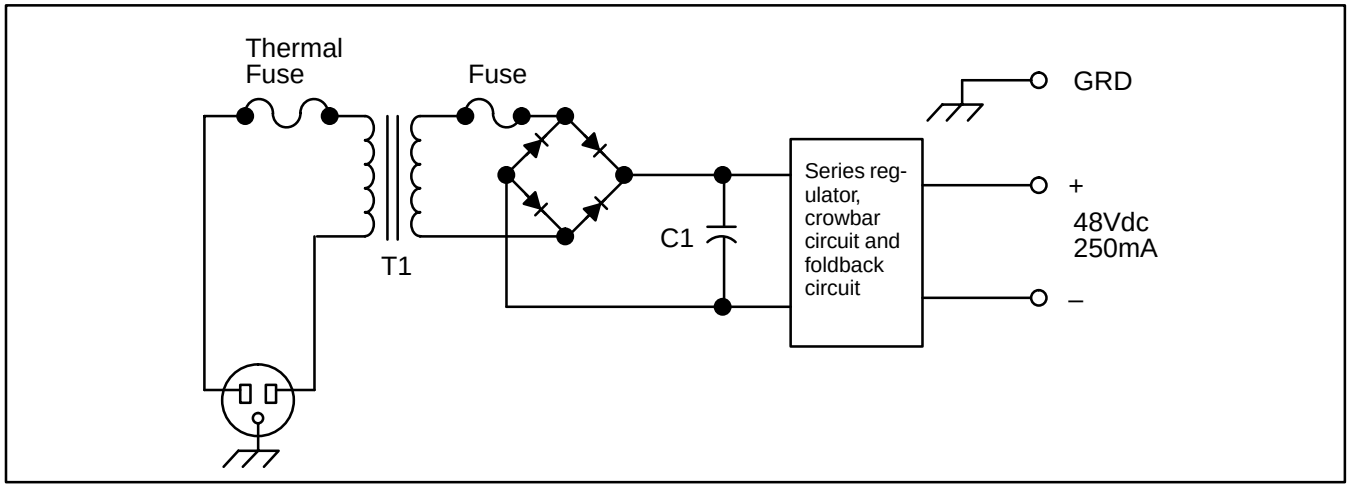

Figure 2. 8410–48 Power Supply Block Diagram

The AC line is connected across the primary winding of the step-down power transformer (T1) through a thermal fuse.

A silicon diode bridge rectifier and filter capacitor, connected across the secondary winding of T1 through a fuse, rectifies the stepped-down AC voltage to a DC voltage with less than 15mV peak-to-peak ripple. This DC voltage is applied to the SERIES REGULATOR AND CROWBAR CIRCUIT.

The SERIES REGULATOR supplies a constant 48VDC from no-load to 250mA. It monitors the output voltage and automatically increases or decreases the output to maintain 48VDC. The output current is also monitored and current in excess of 330mA (nominal) is automatically prohibited (see Figure 3). Thus, the power supply circuitry is protected.

If the output voltage attempts to exceed 56VDC as a result of an internal malfunction or an external induced transient, the crowbar circuit will automatically trip and reduce the output voltage to zero, thus protecting both the equipment being powered and the power supply. The crowbar circuit will remain clamped in this tripped condition until the power supply is momentarily disconnected from the AC power source. This action resets the crowbar circuit for normal operation, unless the overvoltage is caused by a series regulator malfunction.

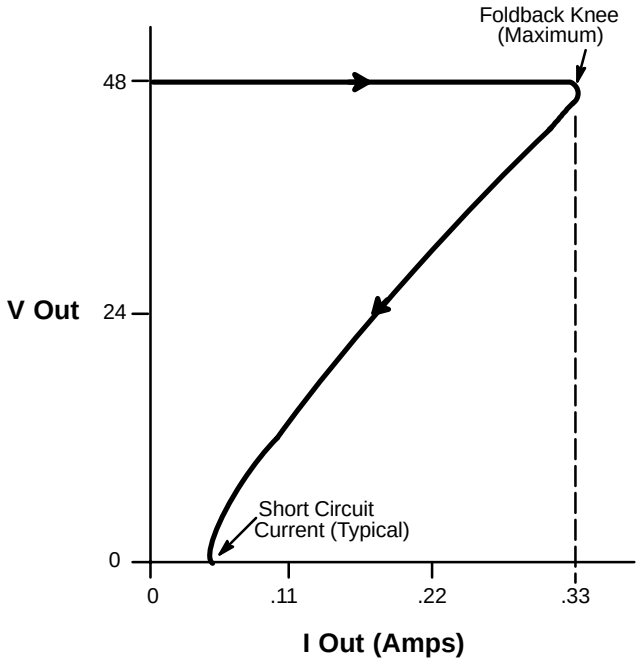

Figure 3. Typical Foldback Circuit Current Regulation

5. INSTALLER CONNECTIONS

Make all installer connections to the screw-type terminals provided on the plug side of the 8410–48 prior to mounting. Refer to Figure 4 for proper polarity and termination of the 48VDC output.

Observe the proper polarity for the desired application when connecting the positive and negative 48VDC terminals. When powering positive ground equipment, strap the GRD lead to the +48VDC terminal. Conversely, when powering negative ground equipment, strap the GRD lead to the –48VDC terminal.

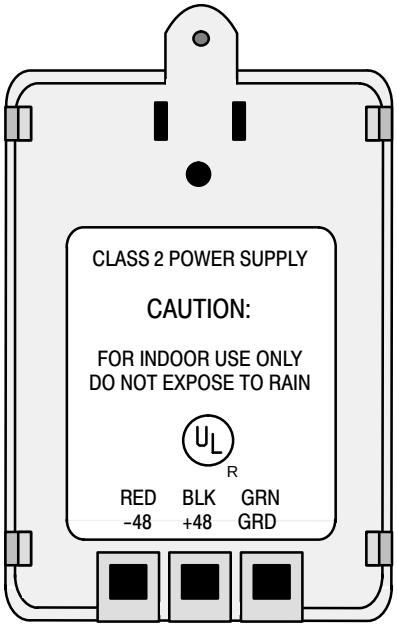

Figure 4. 8410–48 Installer Connection Locations

6. MOUNTING

Make all installer connections before attempting to mount power supply. The power supply is intended for installation in a protected environment and for semipermanent installation in a 3-prong grounding receptacle.

DANGER

To reduce the risk of electrical shock, disconnect power to the receptacle before installing or removing the 8410–48. When removing receptacle cover screw, cover may fall across plug pins or receptacle may become displaced. Use only with duplex receptacle having center screw. Fasten the 8410–48 and the coverplate to the receptacle through the eyelet on the power supply using a mounting screw of appropriate length.

After making all installer connections, remove the mounting screw from the coverplate of the AC duplex receptacle that will receive the 8410–48 unit. Hold the coverplate firmly in position while plugging the 8410–48 into the receptacle.

DANGER

If a metal coverplate is used, either shut off the AC power to the receptacle or exercise extreme caution to prevent the coverplate from shorting across the blades of the power supply plug. Fasten the 8410–48 and the coverplate to the receptacle through the eyelet on the power supply using a mounting screw of appropriate length.

7. TESTING

Verify proper mounting into the AC receptacle and verify that all installer connections are properly made. Then check for the required receptacle voltage (105 to 129VAC). Check for the proper output voltage on the appropriate terminals. If the output voltage is zero, the crowbar circuit may have been tripped. Momentarily disconnect the power supply from the AC power source. This action resets the crowbar circuit for normal operation.

8. TECHNICAL ASSISTANCE

8.1 Technical Assistance — U.S.

If technical assistance is required, contact Charles Industries' Technical Services Center at:

847–806–8500
847–806–8556 (FAX)
800–607–8500
techserv@charlesindustries.com (e-mail)

9. WARRANTY & CUSTOMER SERVICE

9.1 Warranty

Charles Industries, Ltd. offers an industry-leading, 5-year warranty on products manufactured by Charles Industries. Contact your local Sales Representative at the address or telephone numbers below for warranty details. The warranty provisions are subject to change without notice. The terms and conditions applicable to any specific sale of product shall be defined in the resulting sales contract.

Charles Industries, Ltd.
5600 Apollo Drive
Rolling Meadows, Illinois 60008–4049
847–806–6300 (Main Office)
847–806–6231 (FAX)

9.2 Field Repairs (In-Warranty Units)

Field repairs involving the replacement of components within a unit are not recommended and may void the warranty and compatibility with any applicable regulatory or agency requirements. If a unit needs repair, contact Charles Industries, Ltd. for replacement or repair instructions, or follow the *Repair Service Procedure* below.

9.3 Advanced Replacement Service (In-Warranty Units)

Charles Industries, Ltd. offers an “advanced replacement” service if a replacement unit is required as soon as possible. With this service, the unit will be shipped in the fastest manner consistent with the urgency of the situation. In most cases, there are no charges for in-warranty repairs, except for the transportation charges of the unit and for a testing and handling charge for units returned with no trouble found. Upon receipt of the advanced replacement unit, return the out-of-service unit in the carton in which the replacement was shipped, using the preaddressed shipping label provided. Call your customer service representative at the telephone number above for more details.

9.4 Standard Repair and Replacement Service (Both In-Warranty and Out-Of-Warranty Units)

Charles Industries, Ltd. offers a standard repair or exchange service for units either in- or out-of-warranty. With this service, units may be shipped to Charles Industries for either repair and quality testing or exchanged for a replacement unit, as determined by Charles Industries. Follow the *Repair Service Procedure* below to return units and to secure a repair or replacement. A handling charge applies for equipment returned with no trouble found. To obtain more details of this service and a schedule of prices, contact the CI Service Center at 217–932–5288 (FAX 217–932–2943).

Repair Service Procedure

1. Prepare, complete, and enclose a purchase order in the box with the equipment to be returned.

2. Include the following information:

   – Company name and address
   – Contact name and phone number
   – Inventory of equipment being shipped
   – Particulars as to the nature of the failure
   – Return shipping address

3. Ship the equipment, purchase order, and above-listed information, transportation prepaid, to the service center address shown below.

   CI Service Center
   Route 40 East
   Casey, IL 62420–2054

4. Most repaired or replaced units will be returned within 30 or 45 days, depending on the product type and availability of repair parts. Repaired units are warranted for either 90 days from the date of repair or for the remaining unexpired portion of the original warranty, whichever is longer.

10. SPECIFICATIONS

10.1 Electrical

The electrical characteristics of the 8410–48 are as follows:

(a) INPUT VOLTAGE: 105 to 129VAC, 60Hz $\pm$2Hz, single phase.

(b) DC OUTPUT: Regulated, 48VDC, $\pm$3%; 250mA.

(c) DC OUTPUT PROTECTION: Series regulator, foldback, and crowbar circuit. Output limited to less than 330mA.

(d) OUTPUT POLARITY: Floating, 48VDC.

(e) DC OUTPUT RIPPLE: Less than 15mV peak-to-peak.

10.2 Physical

The physical characteristics of the 8410–48 are shown in Table 1.

Table 1. Physical Specifications

Feature	U.S.	Metric
Height	4.9 inches	12.45 centimeters
Width	2.81 inches	7.14 centimeters
Depth	2.55 inches	6.48 centimeters
Weight	1.62 pounds	735 grams
Temperature	32° to 120°F	0 to 49° C
Material	High-impact-resistant thermoplastic.	