



UFS Corporation
Getting Started
Power Transistor Assembly

22 December 2000 Note – This manual is provided for reference only. The product supplied will differ from what is shown and described.

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www.ufsc.com

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Welcome to UFS Corporation

This guide is intended to be an overview of a typical Power Transistor Assembly and how it works. It is presented to the owners, system designers, installers, and members of the paint-finishing department where the equipment is to be used. Also included are pages specific to your system. It is important that you keep this documentation in an easily accessible place for future reference.

Product Support and Customer Service

For customers in the **United States** and **Canada**:

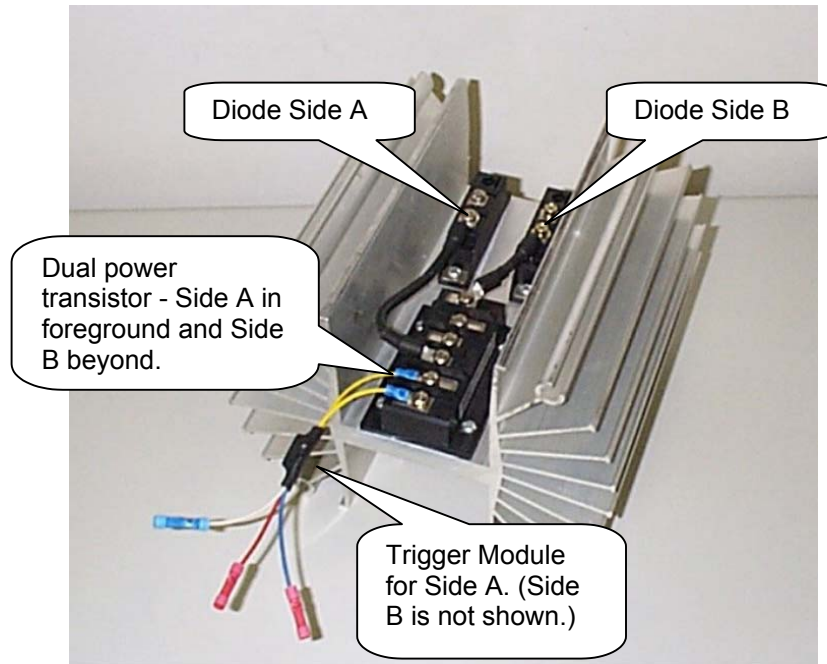
You may call (219-464-2027) or fax (219-464-8646) our office during normal business hours (7:30 a.m. - 4:30 p.m., CST). Technical Service can be reached at extension 13 and Customer Service can be reached at extension 16 or 28.

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Many of the Getting Started manuals are available in German and Spanish. Please contact UFSc for assistance. Persons with disabilities should contact UFSc and request assistance.

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Introduction



This guide provides general instructions for installing, operating, and maintaining a Power Transistor Panel. It is able to deliver +/- 15 VDC @ 3 amps, and the Power Transistor Assembly module is UL recognized.

At the end of this guide are drawings for your Power Transistor Assembly panel.

Safety

A safe work environment for our customers (their employees and outside contractors) is of utmost importance to UFS Corporation. All applicable OSHA and owner's safety requirements must be followed when performing any maintenance, inspection, repair or testing on Electrodes, Membrane Electrode Cells and/or Membrane Electrode Cell Systems. This includes, but is not limited to, the following safety regulations: Lockout/Tagout (Energy Control); Hazard Communication; Confined Spaces; Personal Protective Equipment; Electrical Safe Work Practices; Ergonomics and Material Handling; Accident Prevention signs (Danger – Energized Equipment).

Before installing or working on the DC rectifier, Lockout/Tagout procedures are to be followed. Use a Splash Guard (UFSc PN 175101 or equal) on top of the Electrode Holder with ED tanks that do not have an enclosure wall surrounding the Electrodes.

On going training of employees on ED equipment and system installation, operation, and maintenance of UFSc components is strongly recommended. MSDS (Material Safety Data Sheets) are provided for UFSc materials. Replacement or missing copies are available upon request from the UFSc Safety Coordinator.

Unpacking the Power Transistor Assembly

Carefully remove the packing from around the outside of the assembly. Dispose of the packing material accordingly.

Description and Function

The Power Transistor Assembly panel is used to provide a means to turn Off and On DC loads, such as a Membrane Electrode Cell.

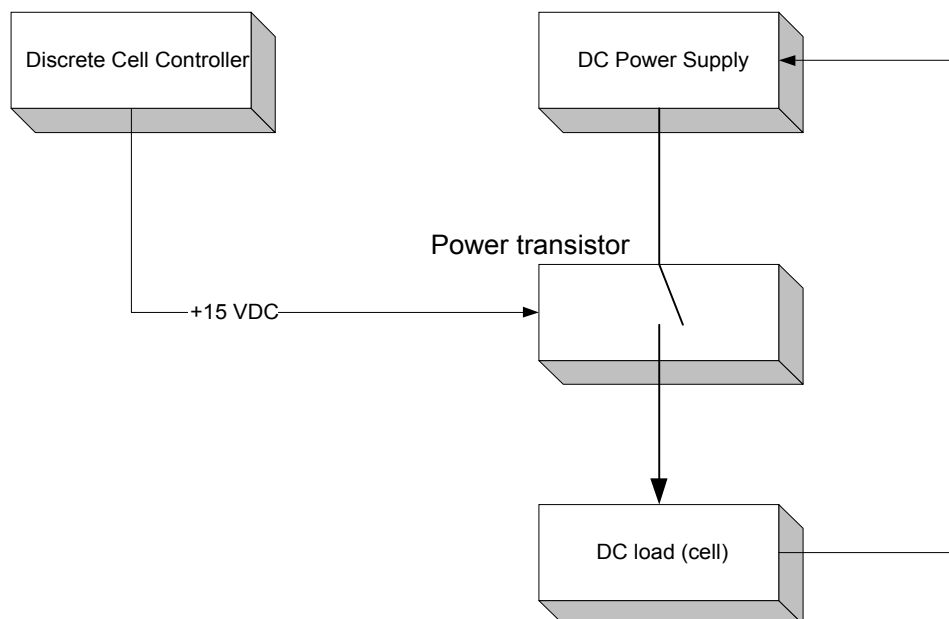
For more information see the FAQ's section at the end of this guide.

System Requirements

The Power Transistor Assembly panel requires a +15 VDC input signal. The customer must supply line and load cabling, conduit, etc. Assembly must be mounted outside the ED enclosure in a suitable metal cage in an area where there is plenty of ambient air motion.

Basic Schematic and Diagram

A basic schematic of the Power Transistor Assembly panel is shown below.



Pre-Installation Planning

A. Rating

The maximum current rating is 100 amps per point. As a practical matter, it is wise to only use $\frac{1}{2}$ of the maximum rating for long life of the solid state transistor. Ensure the continuous load is no more than 50 amps.

B. Cell Numbering

Establish a numbering scheme for each Cell. This numbering scheme will then be used to match location of cells with the numbers shown above and below the switches on the front of the Current Monitor Panel.

Monorail Systems – Begin the numbering sequence at the entrance of the ED tank. Select one of the entrance cells (either side is fine) to be #1. The opposite cell will then become #2. The second cell behind #1 will become #3. The second cell behind #2 will become #4 and so on.

Hoist Systems – Begin the numbering sequence on one end of the ED tank. Select a cell from either side (either side is fine) to be #1. The opposite cell will then become #2. The second cell on the same side as #1 will become #3. The second cell on the same side as #2 will become #4 and so on.

Create a Plan View Diagram of the Cell Locations – Create a plan view of the ED tank with the Cells shown in their approximate location. Show the direction of flow for the ware and the direction North. Each cell should have a number next to its approximate location. This number should be the same as the number on the front of the Variable Current Overload or Discrete Cell Controller program. Cover this plot with a layer of clear plastic and hang near the ED enclosure.

Installation

The Power Transistor Assembly installation is comprised of mechanical support, electrical installation, and cabling. Refer to the Drawings at the end of this guide.

A. Mechanical Support

The Power Transistor Assembly panel should be mounted in a metal cage so that no fingers can reach in and touch any part of the transistor or the hot connections. Ensure there is plenty of airflow to cool the heat sink.

B. Electrical Installation

Size line and load cables appropriately. Use only high-grade quality connectors.

C. Wiring Detail

Refer to the wiring plot for UFSc PN 997407 for a detailed view of the internal and external electrical connections. There are terminal strips for up to five independent load connections.

Checkout

After all the installation steps are completed, it is time to test and debug the field wiring to look for shorts and poor connections. If there are problems, refer to the Troubleshooting section.

Turn on the +15 VDC input to turn "On" the power transistor for Cell #1. Make sure the switch has closed. Remove the +15 volts, and the switch should open. Repeat this test for each and every power transistor.

Quality Assurance

In the back of this Guide is a copy of an Inspection and Certification report(s). All product(s) are tested and certified before they leave the factory. The matters of the testing and the results are shown on this report.

Operation

NOTE: Please read all the "Maintenance" and "Troubleshooting" sections before beginning operation. The "Troubleshooting" section explains the most common kinds of problems and what to do about them.

Maintenance

The routine maintenance required for the Power Transistor Assembly is minimal. The largest task is to make sure all the bolted electrical joints stay tight. Each electrical joint will experience great thermal stress. As current flows, the joint will warm up and when the current stops, the joint will cool off. This cycle is repeated many times each hour.

A. Marking

The Power Transistor is a dual and therefore it has Side 1 and Side 2. When troubleshooting, keep this in mind as circuits are traced and fixed.

B. Heat Sink

It is important to the cool operation and long life of the power transistor that the heat sink be kept clean and free of dirt, paint, dust, etc.

C. Wiring Problems

Refer to the wiring schematic (UFSc Drawing #997407) at the end of this guide.

D. Diode Continuity Check

Perform this test annually using a digital VOM. Follow the instructions for your VOM to perform this test.

E. Spare Parts

Refer to the Spare Parts plot at the end of this manual for complete information on end-user, serviceable parts.

Power Transistor Assembly Troubleshooting

Problem	Possible Cause	Remedies
A. Power Transistor Malfunction	Downstream diode failed in the closed position and transistor overheated. Heat sink cooling ineffective.	Replace units as required. Clean heat sink, Order 1 x 210013.
B. Load is not working	Trigger Module failed. +15 VDC signal is missing. Diode has failed "open".	Replace with UFSc PN 210018. Investigate and fix. Order UFSc 285012.

Spare Parts and Accessories

UFSc offers several add-on products to complete the instrumentation of your project. UFSc has a Current Monitor™ Panel, which is used to display current levels to each Cell. UFSc also offers signal-conditioning products so a PLC can measure and record information.

Limited Warranty and Liability

WARRANTY

We warrant all equipment manufactured by us to be free from defects in material and manufacture at the time of shipment for a period of one (1) year from the date of shipment. We will furnish without charge F.O.B. our factory, but will not install, replacements for such parts as we find to have been defective.

This warranty shall not apply to any equipment which has been subjected to misuse, neglect or accident, or has been altered or tampered with, or if corrective work has been done thereon without our specific written consent. No allowances will be made for such corrective work done without such consent. Improper maintenance, deterioration by chemical action, and wear, do not constitute defects. Equipment manufactured by others, and included in our offering, is not warranted in any way by us but carries only the manufacturer's warranty, if any. All electrodes (and or cathodes), of any material, are not warranted by us in any way since they by nature are sacrificial and will erode or corrode away with time.

All warranty claims must be submitted within ten (10) days of discovery of defects or shall be deemed waived. All parts returned for inspection must be sent prepaid. No representative of our company has any authority to waive, alter, vary or add to the terms hereof without prior approval in writing. The foregoing is in lieu of all other warranties (including that of merchantability), whether express or implied.

LIABILITY

It is expressly understood that our liability, including that for breach of Contract, negligence, strict liability in tort, or otherwise, for our products is limited to the furnishing of such replacement parts, and that we will not be liable for any other expense, injury, loss or damage, whether direct or consequential, including but not limited to loss of profits, production, increased cost of operation, or spoilage of material, arising in connection with the sale or use of, or inability to use, our equipment or products for any purpose, except as herein provided.

Frequently Asked Questions (FAQ's)

1. Why does the heat sink need to be kept clean?

The heat sink radiates heat into the surrounding air. If the heat sink becomes coated with dirt, paint, dust, etc., then these contaminants act like a blanket. This results in poor thermal dissipation of heat and the junction temperature of the transistor is likely to be exceeded.