Unitron®

MAINTENANCE MANUAL

GROUND POWER UNIT

MODEL: UDC-420M

PART NO: 198-15000-60T

This manual provides installation, operation, troubleshooting, and maintenance information.

IMPORTANT SAFETY INFORMATION
READ AND SAVE THESE INSTRUCTIONS

QUESTIONS: 800-527-1279

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The installation, troubleshooting, and maintenance chapters of this manual are not intended for the equipment operator and should only be used by qualified service personnel.

CHAPTER 3. MAINTENANCE

CHAPTER 4. ILLUSTRATED PARTS BREAKDOWN

CHAPTER 5. SCHEMATIC DIAGRAMS

SAFETY

Important Safety Instructions

SAVE THESE INSTRUCTIONS

Safety information is provided throughout this manual. Read the complete material before installing, operating, or servicing this unit. Follow all instructions and safety information.

To reduce the risk of fire or electric shock, carefully follow these instructions before use.

DANGER - ELECTRIC SHOCK HAZARD: LETHAL LEVELS OF VOLTAGE ARE PRESENT WITHIN THE UNIT. ONLY QUALIFIED EQUIPMENT MAINTENANCE PERSONNEL THAT HAVE READ, UNDERSTAND, AND FOLLOW THESE INSTRUCTIONS SHOULD PERFORM INSTALLATION, MAINTENANCE, OR SERVICE TO THE UNIT.

DANGER - ELECTRIC SHOCK HAZARD: HAZARDOUS VOLTAGES ARE PRESENT WITHIN THE UNIT. DO NOT ATTEMPT TO ACCESS THE INTERIOR OF THE UNIT WHILE POWER IS APPLIED.

DANGER - ELECTRIC SHOCK HAZARD: NO OPERATOR SERVICEABLE PARTS ARE INTERNAL WITHIN THE UNIT. MAINTENANCE AND SERVICE MUST BE PERFORMED BY QUALIFIED EQUIPMENT MAINTENANCE PERSONNEL ONLY.

WARNING - CONDENSATION HAZARD: CONVERTERS USED OR STORED OUTDOORS, OR IN FACILITIES WITHOUT CLIMATE CONTROL SHOULD BE LEFT IN A STANDBY STATE. THIS WILL HELP PREVENT CONDENSATION FROM FORMING INSIDE THE CONVERTER. IF THE UNIT IS WITHOUT SUPPLIED INPUT POWER IN POSSIBLE ADVERSE CONDITIONS, THE USER MUST PERFORM AN INSPECTION AND DRY OUT ANY CONDENSATION BEFORE OPERATING THE UNIT.

WARNING - SAFETY HAZARD: WHEN THE UNIT IS CONNECTED TO A NETWORK, IT IS POSSIBLE FOR A REMOTE USER TO TURN THE UNIT ON AND OFF. TAKE APPROPRIATE PRECAUTIONS TO ENSURE USER SAFETY IN THIS MODE OF OPERATION.

Symbols Used in This Manual

Used to indicate a danger, warning, or caution.

Completely read this material. Follow all instructions and safety information. Save these instructions.

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INTRODUCTION

This introduction provides information regarding organization, scope, purpose, and general contents of this manual, along with the method for using this manual.

A. ORGANIZATION OF THIS MANUAL

This manual is organized in a logical order, separated by chapters and subsections. Each chapter and subsection is listed within the table of contents for quick reference to the location of the material within this manual.

Illustrations are provided throughout this manual near the text associated with the illustration.

B. SCOPE

This manual provides safety, installation, operation, troubleshooting, and maintenance information for the unit listed on the top of this page. This manual covers only the model and part number listed on the top of this page.

C. PURPOSE OF THIS MANUAL

The purpose of this manual is to provide safety, installation, operation, troubleshooting, and maintenance information to qualified installation and equipment maintenance personnel, and to provide safety and operating information to the operator of the unit.

D. CONTENTS OF THIS MANUAL

This manual is divided into the following chapters:

- Chapter 1 ..... General Information, Specifications, and Installation Instructions
- Chapter 2 ..... Operations
- Chapter 3 ..... Maintenance
- Chapter 4 ..... Illustrated Parts Breakdown
- Chapter 5 ..... Schematic Diagrams

E. HOW TO USE THIS MANUAL

Individuals installing, operating, troubleshooting, and providing maintenance to the unit should read and follow the steps outlined within this manual. Read the installation and operation chapters of this manual before installation. Before operating the unit, read the entire operation chapter of this manual.

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CHAPTER 1 - GENERAL INFORMATION, SPECIFICATIONS, AND INSTALLATION INSTRUCTIONS

This chapter provides general information, specifications, and installation procedures for the unit, along with a list of standard and optional features.

DANGER - ELECTRIC SHOCK HAZARD: SAFETY INFORMATION IS PROVIDED THROUGHOUT THIS MANUAL. READ THE COMPLETE MANUAL BEFORE INSTALLING, OPERATING, OR SERVICING THIS UNIT.

DANGER - ELECTRIC SHOCK HAZARD: LETHAL LEVELS OF VOLTAGE ARE PRESENT WITHIN THE UNIT. ONLY QUALIFIED EQUIPMENT MAINTENANCE PERSONNEL THAT HAVE READ, UNDERSTAND, AND FOLLOW THESE INSTRUCTIONS SHOULD PERFORM INSTALLATION, MAINTENANCE, OR SERVICE TO THE UNIT.

A. DESCRIPTION

The unit covered by this manual is designed to provide ground power for aircraft or equipment which operates within equipment specifications. (Refer to the specification information within this chapter.)

The unit described in this manual is manufactured by:

Unitron, LP
10925 Miller Road
Dallas, TX 75238, U.S.A.
Phone: +1 800-527-1279
(CAGE Code Number 3BC99).

B. SPECIFICATIONS AND CAPABILITIES

1) Standard Features

- Indoor/Outdoor (Hangar/Ramp) Use
- Automatic Input Line Monitoring
- Touch Screen Panel, indoor/outdoor color LCD (TSP-4)
- 8000 Event Log/Diagnostic Messages
- Internal Communication Ports - RS485 (MODBUS) & RS232
- External USB Communication Port
- **E**mergency **P**ower **O**FF Switch (EPO)
- Input Voltage and Output Current and Voltage Monitoring
- Internal Digital Elapsed Time Monitoring
- Front Panel Summary Fault Indicators
- Input High Voltage Transient Protection (IEEE, Category B and C)
- Power Regulation (10%)
- Output Current Limit Adjust From 150 A to Full Rated Current
- Certification Markings: ETL Certified for UL 1012
- 18-Inch Hazard Area Clearance

2) Optional Features

- Dual Range Input Voltage (Field Adjustable) (Option T3-MT)
  This unit is configured to accept one of two voltage range conditions. The two voltage ranges are either 208 to 240 VAC or 380 to 480 VAC. The unit is factory configured, as specified by the customer sales order. A temporary information tag is affixed to the input cable indicating set voltage range. The GPU input voltage can be reconfigured if required by the customer to either voltage range.

3) Specifications/Standards Compliance

- ISO 1540 Characteristics of Aircraft Electrical System
- ISO 6858 Aircraft Ground Support Electrical Supplies
- MIL-STD-704F Aircraft Electric Power Characteristics
- MIL-STD-1472 Human Engineering Design Criteria

4) Input Power Specifications

- Voltage Range (Field Adjustable)..... 208 to 240 V (±10%), 3Φ, 3 wire plus ground
  or
  380 to 480 V (±10%), 3Φ, 3 wire plus ground

** **IMPORTANT:** Manual strapping changes are required to change source Input Voltage range. Reference *"Reconfiguring Input Voltage Range" on page 22*.

- Maximum Input Current at Rated Load .... **Low Voltage Configurations:**
  39 amperes at 208 V
  34 amperes at 240 V
  High Voltage Configurations:
  21 amperes at 380 V
  20 amperes at 400 V
  16 amperes at 480 V
  (does not consider overload condition)
- Frequency ..... 50/60 Hz (±10%)
- Phase Rotation ..... Any
- Protection ..... Over/Undervoltage, Loss of Phase, Overcurrent, Short Circuit
  Voltage transient protection IAW IEEE C62.41, Location Category B/C
- Inrush Current ..... No greater than 100% of full load current

5) Environmental

- Acoustical Noise ..... <65 dBA max. at 5 feet (1.5m) (60 dBA typical)
- Temperature Range ..... -40°C to +55°C
- Relative Humidity ..... 0 to 95% (non-condensing)
- Ingress of Water ..... Type 3SX, IP55

6) Energy Factors

- Efficiency ..... 95% typical at full load, 93% typical at half load; varies depending on configuration
- Energy Efficiency Ratio ..... 20.0 typical

7) DC Output Power Specifications and Capabilities

- Full Load Output Current Rating ..... 425 amperes continuous
- Overload ..... 600 amperes for 1 hour
  (10% Duty Cycle) 1000 amperes for 1 minute
- Engine Start Capacity ..... Adjustable up to 1600 amperes for 30 seconds, or
  (10% Duty Cycle) 2000 amperes for 10 seconds
- Voltage ..... Nominal 28 VDC, 2-wire, grounded negative
- Voltage Regulation:
  - 100% Continuous rated load and ±10 Input Voltage ..... ±0.5%
  - No load to rated load with nominal input voltage ..... ±0.5%
- Voltage Transients ..... IAW MIL-STD-704F and ISO 6858.6
- Voltage Adjust ..... 28 VDC (±10.0%)
- Current Limit ..... Adjustable 150A to full rated current
- Protection ..... Overload, Short Circuit and Over/Undervoltage
- Power Regulation 10%

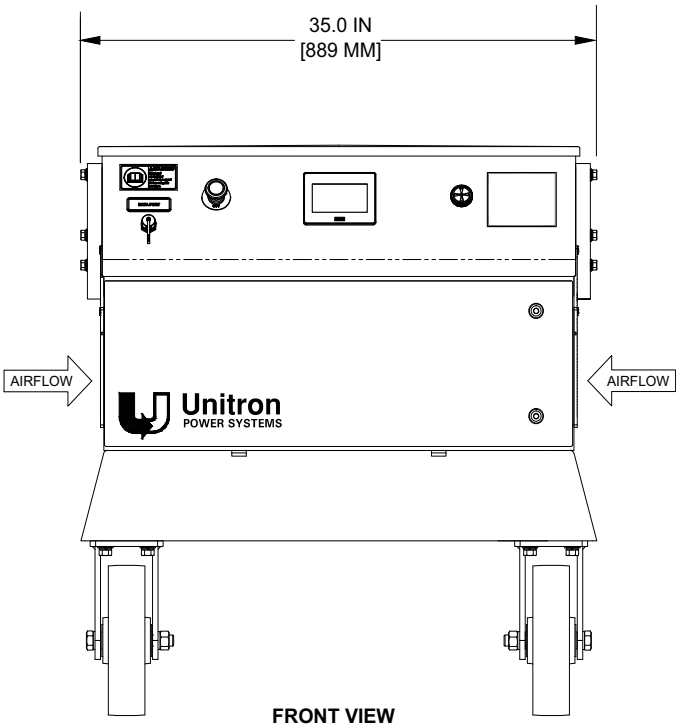
8) Mechanical Specifications

- Weight (without cables) ..... maximum 311 lbs. (141 kg.)

9) Dimensions

Refer to *Figure 1*.

- Height ..... 38.0 in (965 mm)
- Width ..... 35.0 in (889 mm)
- Depth ..... 38.0 in (965 mm)



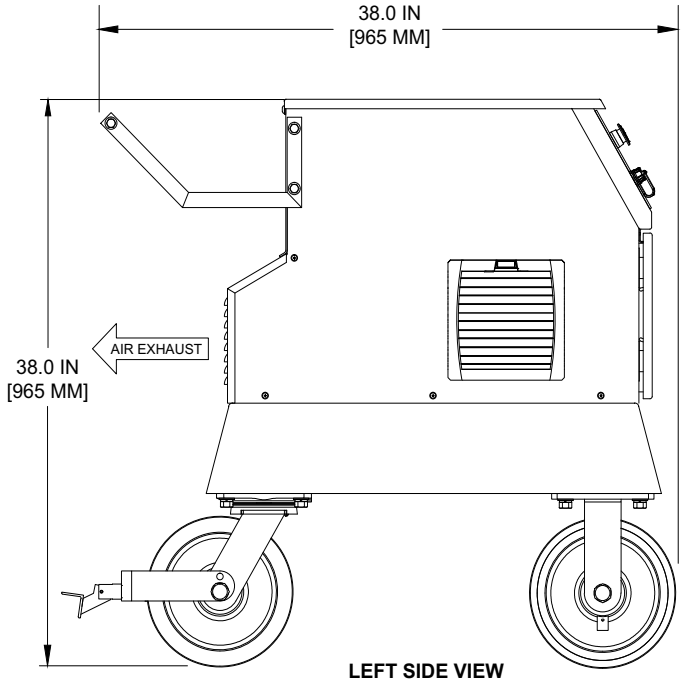


Figure 1. Dimensions UDC-420M

C. INSTALLATION AND HANDLING

WARNING: The UDC-420M weighs a maximum weight of 311 pounds (141 kg), excluding cable. To avoid damage to the unit, keep it on the pallet and move only with a forklift to the final setup location.

1) Storage Requirements Prior to Installation or When Unit is Without Power

When the unit is to be stored prior to installation or when the unit will be left without input power; the unit requires storage in an environment meeting the conditions defined in the unit specifications *"Environmental" on page 13*. Protecting the unit from precipitation and excess humidity will ensure optimal operation of the unit when input power is restored.

The unit is shipped in a custom crate, it is best to keep the unit in this original crate for handling prior to installation or if long term storage is required. Once the unit is installed it is recommended input power is always supplied to the unit. Condensation and extreme temperatures can present adverse effects to the unit electronics when re-energizing the unit.

2) Handling

A forklift is recommended for transporting the unit to the final location. The push bar attached to the back of the unit is designed for pushing the unit by hand. Refer to *Figure 2*.
The rear wheels of the unit are equipped manual brakes. Set the manual brake on each rear wheel when the unit is stationary. For brake location Refer to *Figure 3*.

WARNING: USE EXTREME CAUTION WHEN MOVING THE UNIT. DO NOT MOVE THE UNIT BY ANY MEANS OTHER THAN PUSHING THE UNIT BY HAND USING THE PUSHBAR ATTACHED TO THE BACK OF THE UNIT. DO NOT PUSH THE UNIT FROM THE FRONT OR SIDES. DO NOT TOW THE UNIT BY ANY MEANS. FAILURE TO MOVE THE UNIT PROPERLY MAY CAUSE PERSONAL INJURY AND DAMAGE TO THE UNIT.

Figure 2. Proper Handling of Ground Power Unit

3) Input Power Circuit Breaker/Disconnect Switch

DANGER - ELECTRIC SHOCK HAZARD: HAZARDOUS VOLTAGES ARE PRESENT WITHIN THE UNIT. DO NOT ATTEMPT TO ACCESS THE INTERIOR OF THE UNIT WHILE POWER IS APPLIED. USE OF AN EXTERNAL INPUT POWER CIRCUIT BREAKER OR DISCONNECT SWITCH IS REQUIRED.

WARNING - AN EXTERNAL INPUT POWER CIRCUIT BREAKER OR DISCONNECT SWITCH MUST BE PRESENT ON THE INPUT POWER SIDE OF THE UNIT.

IMPORTANT:

- Unitron, LP does not specify user-furnished wiring, connectors, circuit breakers, or disconnect switch sizes due to different conditions and codes throughout the world.
- All wiring must comply with **N**ational **E**lectrical **C**ode (NEC), or EU equivalent, and local codes.

4) Locating Cable Access and Connection Points

The unit is routinely shipped with the input and output power cables already installed. However, if it is necessary for the user to install or replace the cables, the unit provides access panels for gaining access to the input and output connection points.

Use this procedure to identify the locations of the Input and Output cable entry and connection points.

IMPORTANT:

- Entry for the input and output wiring/cabling connections can be made through the rear access panel. Refer to *Figure 3*.
- Access to connection points for the power cables can be gained through the top cover. Refer to *Figure 4*.
- The unit is designed to use 3-phase wires plus safety ground for input power installation.

PROCEDURE

1. When connected to external input power, turn OFF (open) the external input power circuit breaker or disconnect switch. Verify that no power is applied. Use the proper lockout/tagout device to ensure the input circuit breaker or disconnect switch remains off during maintenance or inspection.
2. Verify unit power cables are not connected to a power source.
3. Remove the unit cover.
4. Remove the unit rear access panel.
5. Locate the 28 VDC positive busbar and the 28 VDC negative busbar. Refer to *Figure 4*.
6. Locate the input power contactor (K1). Refer to *Figure 4*.
7. Locate ground lug (GB1). Refer to *Figure 4*.
8. Verify required conduit port sizes and locations for the rear access panel.

CAUTION: PROTECT THE INSIDE OF THE UNIT FROM DAMAGE. DO NOT ALLOW METAL FILINGS OR SHAVINGS TO FALL INTO THE UNIT WHILE PUNCHING THE CONDUIT ACCESS PORT(S).

9. Punch or drill the conduit access ports in the rear access panel as necessary.

   IMPORTANT:

   - Remove any metal filings or shavings that may fall into the unit.
   - Remove any sharp or burred edges from the ports.

10. Install conduit as identified in *Step 8*.
11. Replace the rear access panel.
12. Replace the top cover.

PROCEDURE COMPLETED

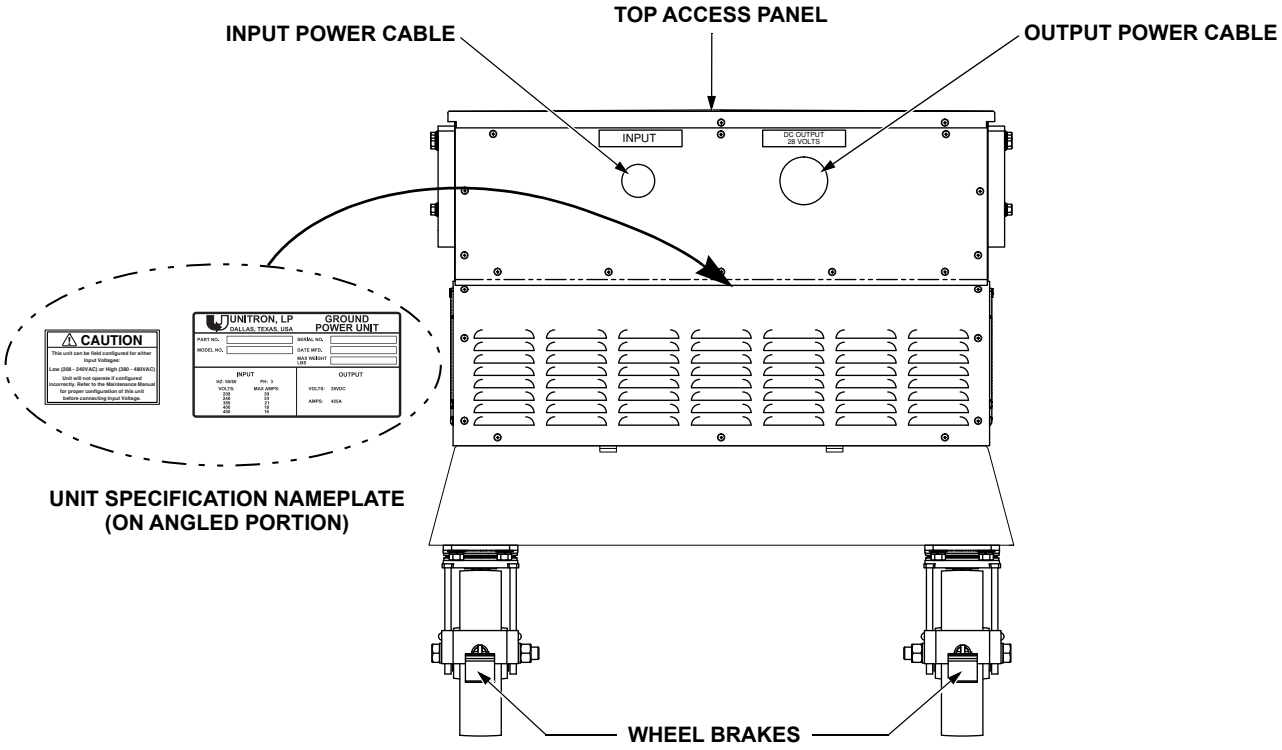


Figure 3. Cable Access Location

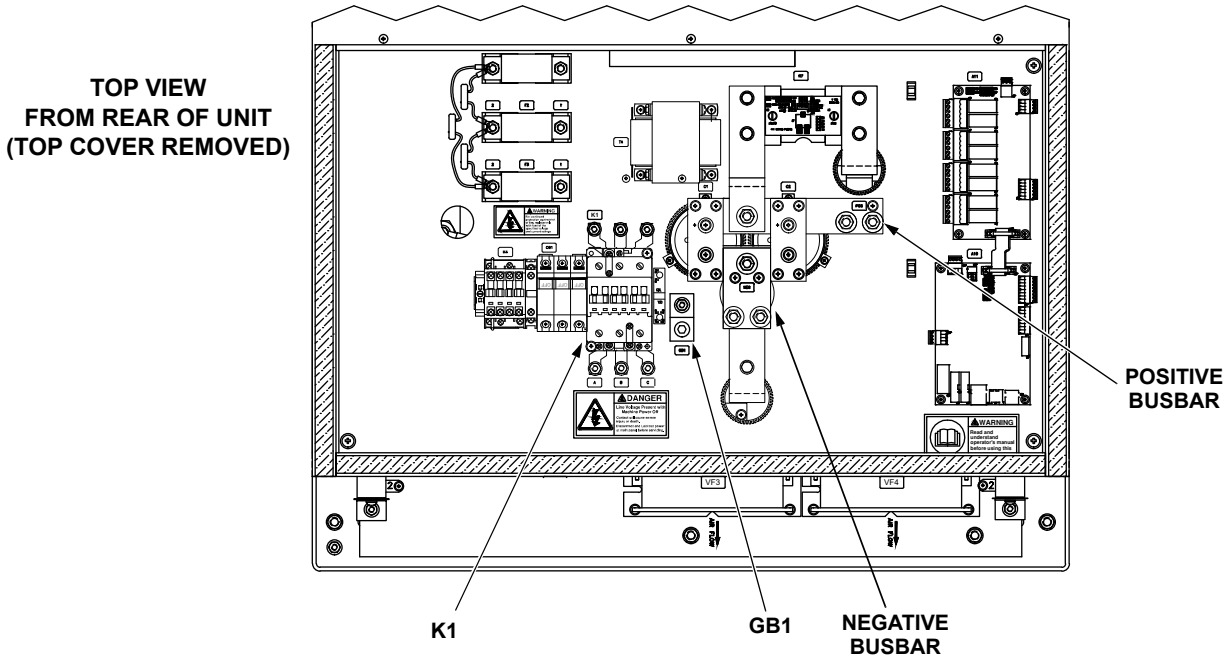


Figure 4. Input and Output Connection Points

5) Connecting DC Output Power Cable

The unit is routinely shipped with the output power cables installed. However, if it is necessary for the user to install or replace the output power cable, the following guidance is provided. Refer to *Figure 5*.

DANGER - ELECTRIC SHOCK HAZARD: ENSURE EXTERNAL INPUT CIRCUIT BREAKER OR DISCONNECT SWITCH IS OFF (OPEN).

CAUTION: DO NOT ALLOW ANY HARDWARE, TOOLS, PARTS, OR OTHER OBJECTS TO FALL INTO THE UNIT. INSPECT FOR ANY ITEMS THAT MAY HAVE FALLEN INTO THE UNIT DURING INSTALLATION AND REMOVE THEM. STRAY OBJECTS CAN CAUSE SHORT CIRCUITS, RESULTING IN DAMAGE TO THE UNIT AND POSSIBLE INJURY TO THE OPERATOR.

IMPORTANT:

- During new installation, always connect the output wiring before connecting the input power. This should be done as an added measure of safety for the installer.
- All wiring must comply with the **N**ational **E**lectrical **C**ode (NEC), or EU equivalent, and local codes.
- Installation of a cord grip on the cable is recommended.

PROCEDURE

1. When connected to external input power, turn OFF (open) external input power circuit breaker or disconnect switch. Verify that no power is applied. Use the proper lockout/tagout device to ensure the input circuit breaker or disconnect switch remains off during maintenance or inspection.

2. Verify unit power cables are not connected to a power source.
3. Remove the top cover.
4. Remove the cable access panel from the rear of the unit.
5. Route the output cable through the output port to the positive busbar, and to the negative busbar. Refer to *Figure 5*.
6. Attach the Output wires to the terminals as follows:

Cable Wire	Connection Point
• 28 VDC Positive wire	Positive Busbar
• 28 VDC Negative wire	Negative Busbar

IMPORTANT:

- The unit is shipped with the DC negative connected to chassis ground.
- The Positive and Negative Busbars accept 5/16 inch ring lugs.

7. Confirm all connections are properly tightened and cord clamps are secure.
8. Confirm output power cable terminal lugs are not shorted to the adjacent terminal.
9. Reinstall the rear access panel.
10. Reinstall the top cover.

PROCEDURE COMPLETED

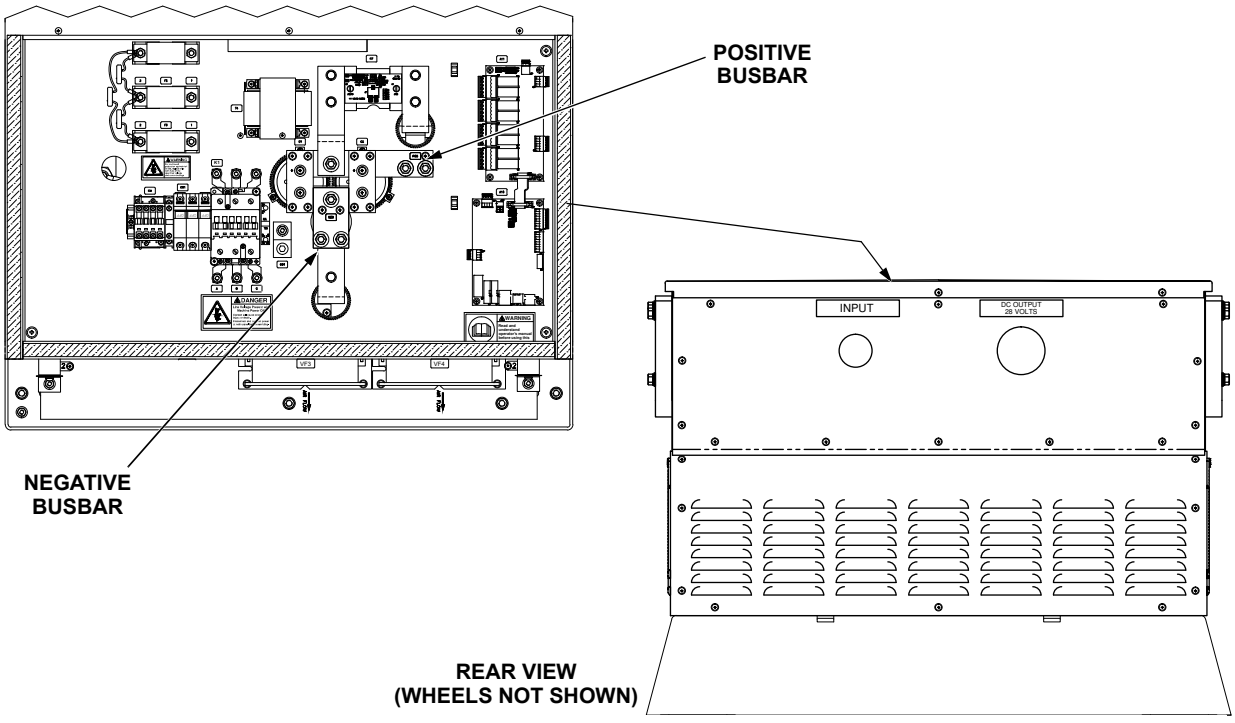


Figure 5. Output Power Cable Connections

6) Connecting Input Power Cable

DANGER - ELECTRIC SHOCK HAZARD: ENSURE EXTERNAL INPUT CIRCUIT BREAKER OR DISCONNECT SWITCH IS OFF (OPEN) BEFORE MAKING ANY CONNECTIONS.

IMPORTANT:

- During new installation, always connect the output wiring before connecting the input power. This should be done as an added measure of safety for the installer.
- All wiring must comply with the **N**ational **E**lectrical **C**ode (NEC), or EU equivalent, and local codes.
- Installation of a cord grip on the cable is recommended.
- Unitron, LP does not specify user-furnished wiring, connectors, circuit breakers, or disconnect switch sizes due to different conditions and codes throughout the world.
- The input power must be connected through an external circuit breaker or disconnect switch (*Figure 6*).

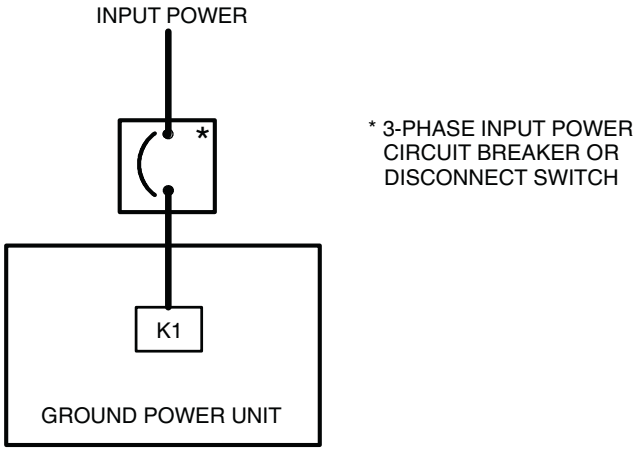


Figure 6. Input Power Circuit Breaker or Disconnect Switch

PROCEDURE

1. When connected to external input power, turn OFF (open) the external input power circuit breaker or disconnect switch. Verify that no power is applied. Use the proper lockout/tagout device to ensure the input circuit breaker or disconnect switch remains off during maintenance or inspection.
2. Verify unit power cables are not connected to a power source.
3. Remove the top cover.
4. Remove the cable access panel from the rear of the unit.
5. Route the wiring through the input cable port. Refer to *Figure 6*.

6. Locate the input contactor (K1) and ground terminal (GB1) in *Figure 6*.
7. Connect the input power wires as follows, contacts accept 1/4 inch ring lugs:

Cable Wire	Connection Point
• Phase A (black wire)	Terminal A on input contactor K1
• Phase B (red wire)	Terminal B on input contactor K1
• Phase C (white or tan wire)	Terminal C on input contactor K1
• Ground (green wire)	Ground lug GB1

IMPORTANT: Input contactor K1 accepts 1/4 inch ring lugs.

NOTE: The above order is recommended, however, the unit will operate properly regardless of the input power phase rotation (Phase A-B-C or C-A-B).

8. Confirm all connections are properly tightened and cord clamps are secure.
9. Confirm input power cable terminal lugs are not shorted to the adjacent terminal.
10. Reinstall the rear access panel.
11. Reinstall the top cover.

PROCEDURE COMPLETED

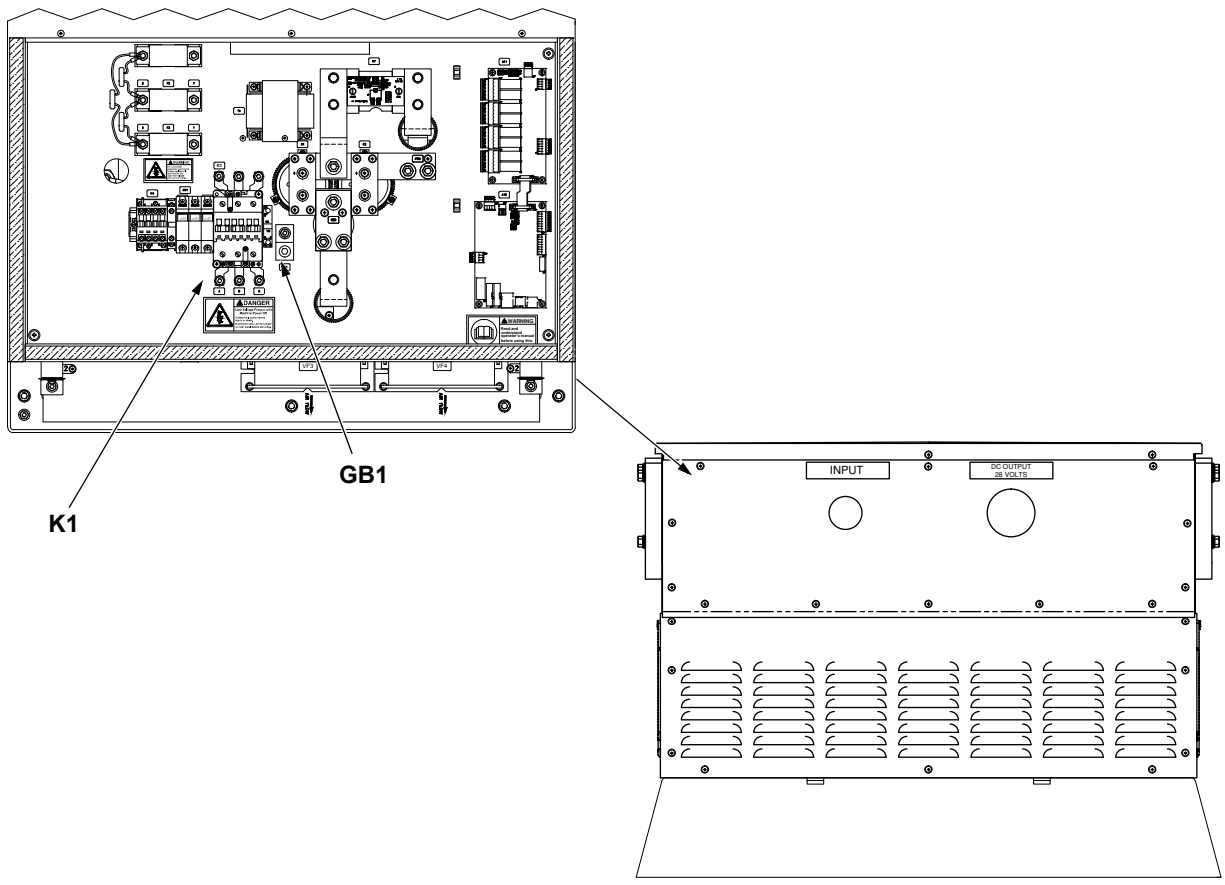


Figure 7. Input Power Cable Connections

7) Reconfiguring Input Voltage Range

This UDC-420M has been designed to operate in a Low Voltage or a High Voltage range of input voltages:

- Low Voltage Range (LV208 to 240 VAC
- High Voltage Range (HV)380 to 480 VAC

The input voltage configuration of the unit must conform to the supplied voltage of the facility. When the unit configuration does not conform to the supplied facility voltage, the input voltage may be reconfigured either from Low Voltage to High Voltage, or from High Voltage to Low Voltage.

IMPORTANT: This procedure is provided for authorized maintenance personnel, only.

PROCEDURE

1. Turn the Unit power OFF.
2. Turn OFF (open) the external input power circuit breaker or disconnect switch. Verify no power is applied to unit.

   NOTE: When the source power is off, the unit ON/OFF icon is not lit.
3. Use the proper lockout/tagout device to ensure the external input circuit breaker or disconnect switch remains off during maintenance or inspection.
4. Remove the lower rear cover panel on the unit to gain access to the strapping panel. Refer to *Figure 8* for access and location of strapping connections.

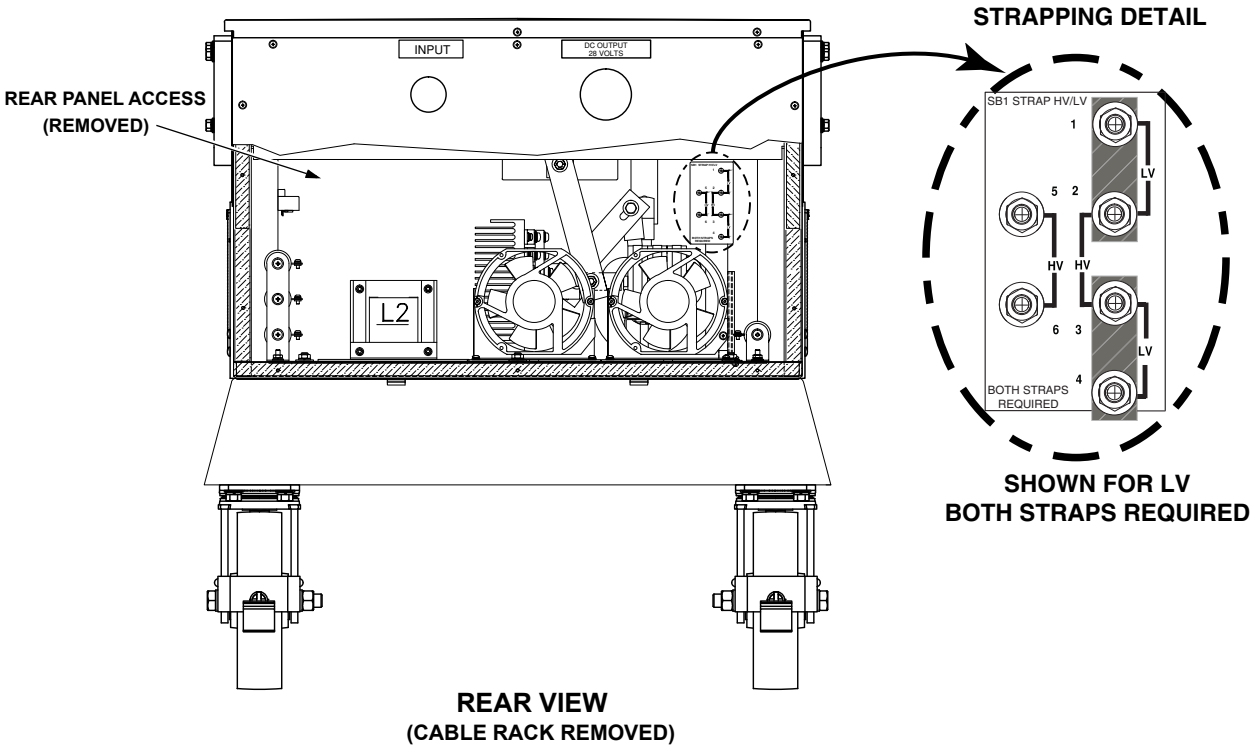


Figure 8. Strapping Access and Connections Input Voltage

5. Review the strapping configuration on the plate decal:
   - Low Voltage Range (LV).....Connect busbars across posts 1-2 and 3-4
   - High Voltage Range (HV).....Connect busbars across posts 2-3 and 5-6

IMPORTANT: Both busbars must be in place for proper operation of unit.

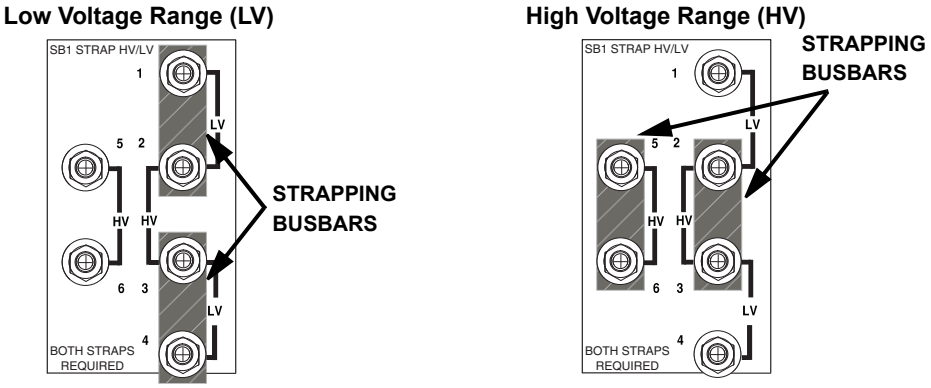


Figure 9. Low and High Voltage Strapping Configurations for Input

6. Remove hardware (nut, flat washer, and lock washer) from the posts.
7. Follow the strapping configuration detail shown in *Figure 9* and *Step 5*.
8. Replace the hardware and secure the nuts on the strapping lugs.
9. Replace the back access panel when complete.
10. Mark the unit plate decal for the newly configured source input voltage range.

CAUTION - User is responsible for identifying current configuration of the Input Voltage, if changed from factory configuration.

11. Remove lockout/tagout device from external input circuit breaker or disconnect switch.
12. Make sure the external input power circuit breaker or disconnect switch is ON (closed), and power is applied to the unit.

    NOTE: When the source power is on, the unit ON/OFF icon displays red.

    IMPORTANT: If the unit detects a problem with the input voltage and the strapping configuration, one of the following errors will display across the Home screen.

    Error Message **Fault**
    - DC LINK VOLT FAULT MEASURED:.....Input to GPU is HV, strapped for LV
    - INPUT FUSE FAULT:.....Input to GPU is LV, strapped for HV

    When either of these error messages occur, remove source power from the unit. Do not operate the unit; call maintenance personnel for service.

    PROCEDURE COMPLETED

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CHAPTER 2 - OPERATIONS

This chapter provides a description of the operator controls and indicators, along with operating instructions for the unit.

DANGER - ELECTRIC SHOCK HAZARD: SAFETY INFORMATION IS PROVIDED THROUGHOUT THIS MANUAL. READ THIS MANUAL BEFORE OPERATING THIS UNIT.

DANGER - ELECTRIC SHOCK HAZARD: LETHAL LEVELS OF VOLTAGE ARE PRESENT WITHIN THE UNIT. ONLY QUALIFIED EQUIPMENT MAINTENANCE PERSONNEL THAT HAVE READ, UNDERSTAND, AND FOLLOW THESE INSTRUCTIONS SHOULD PERFORM INSTALLATION, MAINTENANCE, OR SERVICE TO THE UNIT. THERE ARE NO OPERATOR SERVICEABLE PARTS OR CONTROLS INSIDE THE UNIT.

WARNING - CONDENSATION HAZARD: UNITS USED OR STORED OUTDOORS, OR IN FACILITIES WITHOUT CLIMATE CONTROL SHOULD BE LEFT IN A STANDBY STATE. THIS WILL HELP PREVENT CONDENSATION FROM FORMING INSIDE THE UNIT. IF THE UNIT IS WITHOUT SUPPLIED INPUT POWER IN POSSIBLE ADVERSE CONDITIONS, THE USER MUST PERFORM AN INSPECTION AND DRY OUT ANY CONDENSATION BEFORE OPERATING THE UNIT.

A. CONTROLS AND INDICATORS

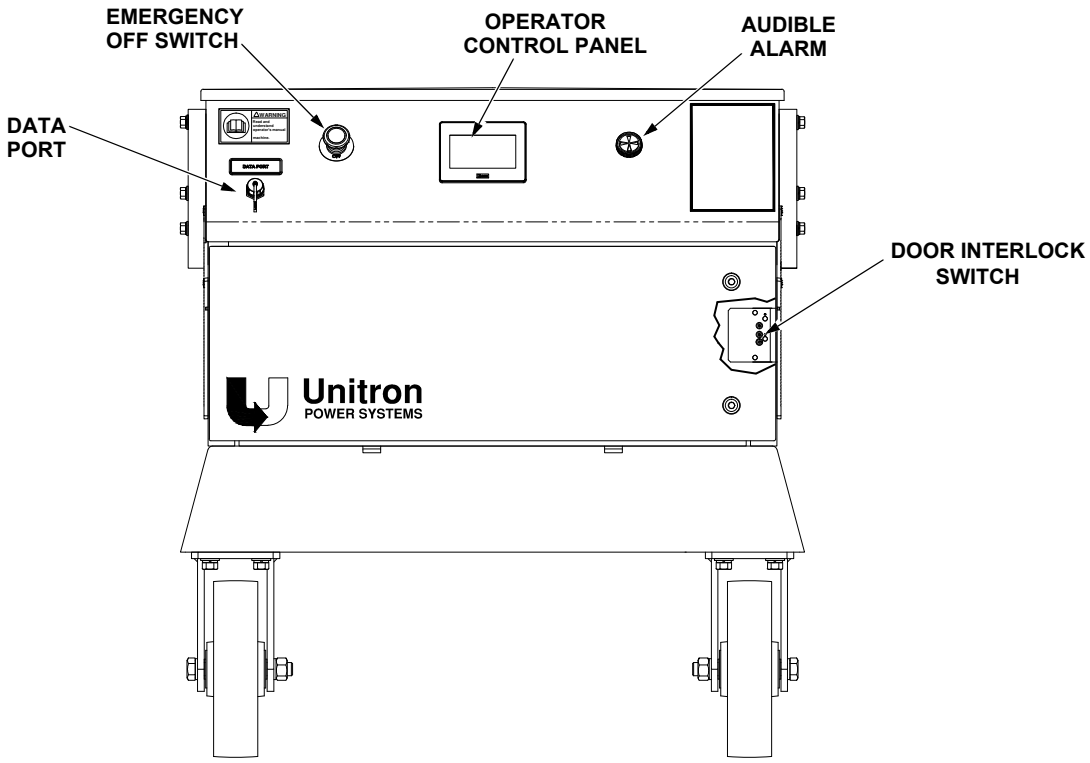


Figure 10. Controls and Indicators

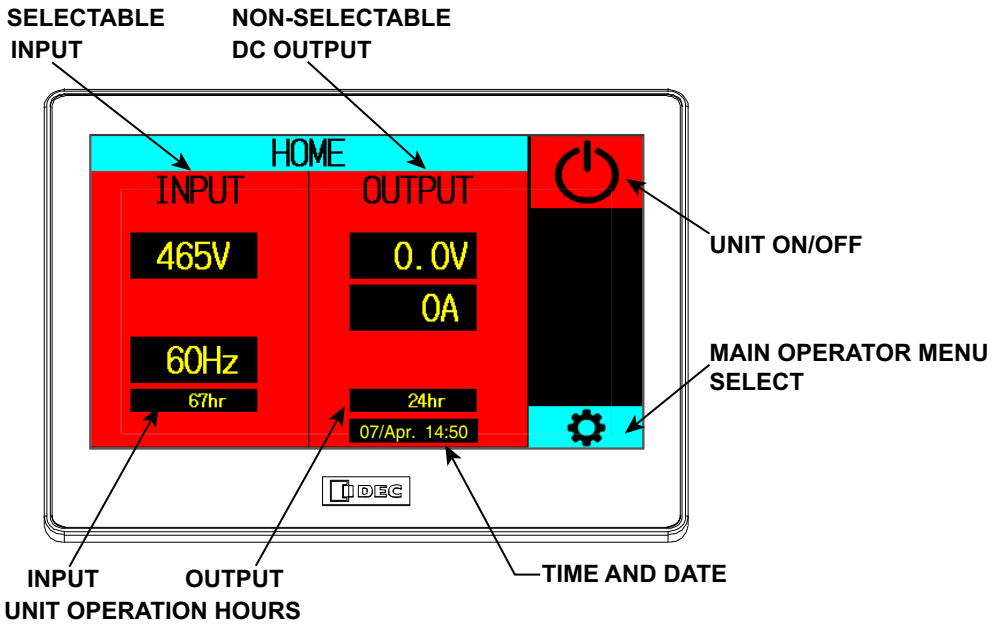


Figure 11. Operator Control Panel Home Screen - Unit OFF with Output OFF

1) Operator Control Interface

The unit is primarily operated using features of the Operator Control Panel. The Operator Control Panel comprises several controls and indicators. Refer to *Figure 10* and *Figure 11*.

IMPORTANT: *Menu pictorials used for this manual may vary depending on the specific configuration of each unit.*

a. Touch Screen Display

For the touch screen display, menu items are selected by touch.

Unit ON/OFF Icon

This icon turns the unit ON and OFF. When connected to input power within acceptable operating limits, the button illuminates red. Pressing the red ON/OFF icon turns the unit on, and the icon illuminates green.

Additionally, turning on the unit provides 28 VDC power to the output cable. When the Output cable is connected to a load, the Output readings column changes from red to green, and the output power characteristics are displayed.

Hours displayed at the bottom of the screen denote accumulated unit operating hours of the Input and Output, respectively.

Date and Time

The Home screen displays the current date and time as set in the *"Adjust Menu Functions" on page 34*.

Main Menu Icon (Gear Icon)

Pressing and holding this icon for three seconds displays the Main menu. The Main menu displays four additional Operator menus: CONTROL, ADJUST, REPAIR, and EVALUATE. The main screen also displays a BRIGHTNESS control for touch screen illumination, and a Menu Language icon for selecting a display language. Refer to *"Navigating the Operation Menus" on page 31* for detailed descriptions of these functions.

Input/Output Readings

The Home screen displays the Input and Output values. Source power voltage, amperage, and frequency display. Output voltage and amperage also display.

Pressing the selectable Input column heading opens the Evaluate screen for viewing detailed current values for the Input source.

NOTE: The DC Output column heading is not selectable.

b. Emergency Power Off Switch

This mushroom pushbutton switch opens the input contactor and turns the unit OFF. The **E**mergency **P**ower **O**ff (EPO) switch removes power from the inverter and, therefore, from the output contactor.

NOTE:

- EPO switch may be pushed in at any time without damage to the unit.
- EPO switch must be pulled out (extended) for the unit to operate.

c. Audible Alarm

The audible alarm sounds whenever specific fault conditions are detected. Refer to *Figure 10*.

IMPORTANT: An Alarm should never be Silenced without also being Cleared.

d. Data Port

This unit has an external USB data port, for maintenance purposes only.

e. Door Interlock Switch

The access door is equipped with a safety interlock switch to ensure the door is closed and secured during operation.

IMPORTANT: Do **NOT** attempt to override this switch unless you are a qualified maintenance technician, and it is necessary for you to override the switch for servicing the unit.

B. UNIT STARTUP AND SHUTDOWN PROCEDURES

1) Setup

⚠ DANGER - ELECTRIC SHOCK HAZARD: ENSURE EXTERNAL INPUT POWER CIRCUIT BREAKER OR DISCONNECT SWITCH IS OFF (OPEN).

IMPORTANT: Before attempting to apply power to or startup the unit, read completely through this chapter.

PROCEDURE

1. Turn OFF (open) the external input power circuit breaker or disconnect switch. Verify no power is applied to the unit. Use the proper lockout/tagout device to ensure input circuit breaker or disconnect switch remains off during maintenance or inspection.
2. Ensure the **E**mergency **P**ower **O**ff (EPO) switch is in the extended (pulled out) position.
3. Unit front access door is equipped with a safety interlock switch; ensure access door is closed and secured.
4. Proceed to *"Startup" on page 29*.

PROCEDURE COMPLETED

2) Startup

DANGER - ELECTRIC SHOCK HAZARD: ENSURE EXTERNAL INPUT POWER CIRCUIT BREAKER OR DISCONNECT SWITCH IS OFF (OPEN).

IMPORTANT:

- Before attempting to apply power to, or to startup the unit, read completely through this chapter.

PROCEDURE

1. Compare the location and description of each operator control and indicator to the actual operator control and indicator on the unit.
2. Confirm input power cable is properly connected, and external circuit breaker or disconnect switch is open so that no power is available to the unit.
3. Confirm access door is closed.

   NOTE: The input contactor is interlocked with the door interlock switch. The door must be securely latched before the input contactor will close.
4. Close the external input circuit breaker.
5. Connect the output power cable of the unit to the load.
6. To turn on the machine, press the Unit ON/OFF icon. When the unit powers on, the following happens:
   - The Unit ON/OFF icon turns green.
   - The Input readings column turns green and displays the source power readings. Refer to *Figure 12*.
   - The Output readings column turns green and displays the Output power readings. Refer to *Figure 12*.
   - The ventilation fans turn on.

   NOTE: Hours displayed at the bottom of the screen denote accumulated unit operating hours.

   IMPORTANT: In the event the unit sounds and displays an alarm due to detecting a FAULT condition, the user may perform the following to reset the alarm notification status of the unit:
   - Select SILENCE to silence the horn. The touch screen displays CLEAR.
   - Select CLEAR to clear the alarm from the unit. This allows the alarm to be re-issued when the FAULT recurs.

   IMPORTANT: Always Clear an alarm after Silencing it.

   IMPORTANT: If the unit detects a problem with the input voltage and the strapping configuration, one of the following errors will display across the Home screen.

Error Message	Fault
DC LINK VOLT FAULT MEASURED:	Input to GPU is HV, strapped for LV
INPUT FUSE FAULT:	Input to GPU is LV, strapped for HV

   When either of these error messages occur, remove source power from the unit. Do not operate the unit; call maintenance personnel for service.

   PROCEDURE COMPLETED

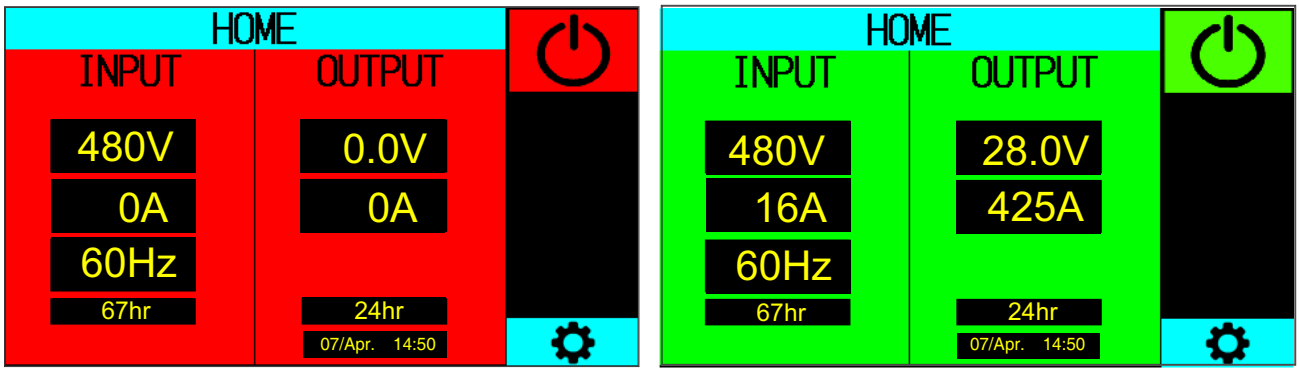


Figure 12. Home Screen - OFF and ON

3) Normal Shutdown

Use this procedure to remove power from the load and to turn OFF the unit.

PROCEDURE

1. When the unit is to be shutdown, press the power icon on the front panel to turn the unit OFF.
2. Open the external input circuit breaker or disconnect switch to remove power to the unit.
3. Disconnect and stow the output and input cables.
4. Shutdown is complete.

PROCEDURE COMPLETED

4) Emergency Shutdown

PROCEDURE

1. Press in the **E**mergency **P**ower **O**ff (EPO) switch. The input contactor will open and all circuit cards will de-energize. The unit cannot be re-started until the EPO switch is returned to the extended (pulled out) position.
2. Open the external input circuit breaker or disconnect switch to remove power to the unit.

DANGER - ELECTRIC SHOCK HAZARD: ENGAGING THE ACCESS PANEL SAFETY INTERLOCK OR PRESSING THE EPO SWITCH DOES NOT REMOVE POWER FROM ALL OF THE UNIT'S INTERNAL COMPONENTS. INPUT VOLTAGE, 24 VDC AND STORED ENERGY IN THE CAPACITORS ARE ALL STILL PRESENT AFTER INTERLOCK / EPO ACTIVATION. THE INLET CIRCUIT BREAKER(S) (PROVIDED BY OTHERS) MUST BE OPENED TO BEGIN REMOVAL OF ALL POWER FROM THE EQUIPMENT.

PROCEDURE COMPLETED

C. MONITORING OPERATION

1) Home Screen

During normal operation, the control panel will display the Home Screen, *Figure 12*. Select selectable entities by touch.

When the touch screen displays the unit screen saver, touching anywhere on the screen brings up the Home screen. When the unit Password Padlock is active, the unit password is required to access the Home screen.

When the unit is off, but is connected to a suitable power source, the unit ON/OFF icon displays red. The Input displays the electrical parameters of the source.

When the unit ON/OFF icon is selected, the ON/OFF icon displays green. Selecting the heading of the Input column on the display enables viewing of its detailed parameters.

2) Navigating the Operation Menus

The HOME screen will have the same basic features, only changing to accommodate the variances of the options of the unit configuration. Pressing the gear icon in the lower right corner of the HOME screen for three seconds displays the MAIN MENU screen. Refer to *Figure 13*. The menu tree for the operation selections is shown in *Figure 14*.

a. Screen Brightness

Use the directional arrows to select the desired illumination level of the touch screen display panel.

b. Menu Language

Selecting the Menu Language icon opens the Language Selection screen. selecting one of the flag icons changes the display language to the prevailing language of that country.

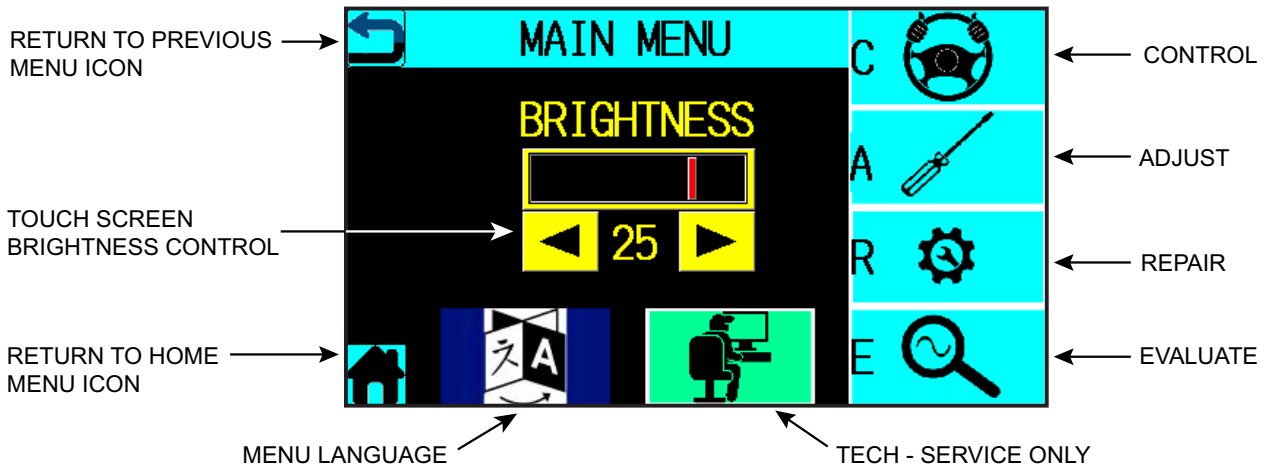
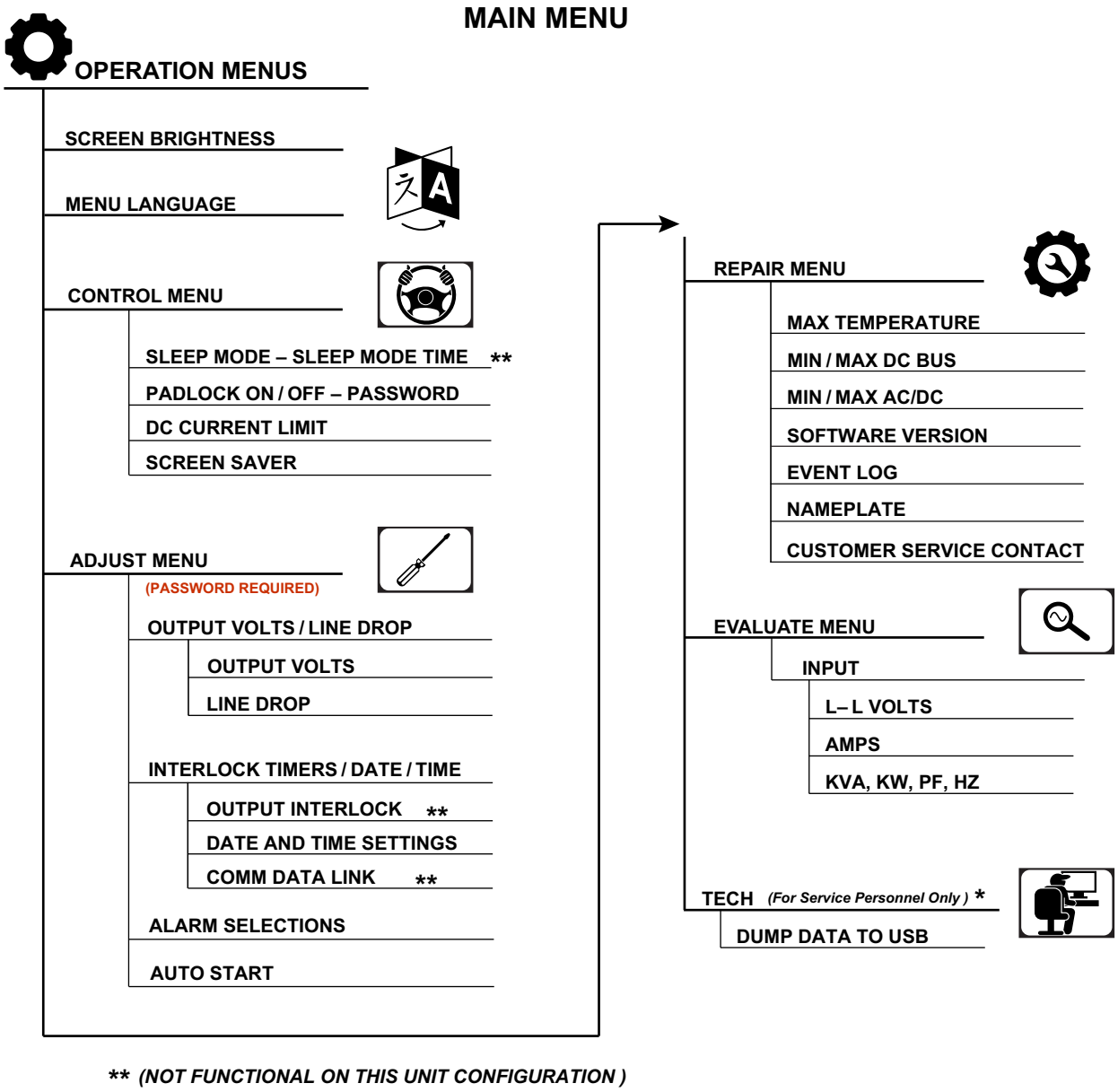


Figure 13. Operation Menu Screen



** *(NOT FUNCTIONAL ON THIS UNIT CONFIGURATION)*

Figure 14. Unit Operation Menu Tree

3) Control Menu Functions

a. Password Padlock

The Padlock Password can be used to require a password before the unit can be used.

- The default password is **42**.
  The password can be changed to any number, from one to four digits. For TECH password refer to *"Adjust Menu Functions" on page 34*.
  NOTE: If you have forgotten the password, contact the factory at 1-800-427-1279 or 1-214-340-8600 with your machine's serial number for assistance.

b. Sleep Mode

IMPORTANT: *This menu function is not available in this unit configuration.*

The function of the Sleep Mode Timer, once it is selected ON, is to automatically detect the opening of the output contactor(s) and start the timer. If the timer reaches zero and the output contactor has not changed state, the unit will remove power to all but a few necessary circuits to keep external communications active.

Selecting the Sleep Mode icon will toggle the SLEEP MODE OFF and ON. When OFF the selection is red, when ON it is green.

The Sleep Mode time is set by selecting the icon adjacent to Sleep Mode. A numeric keypad will display to enter the timer length in minutes; the range is 5 to 60 minutes.

IMPORTANT: When Sleep Mode has been activated the unit must first be turned back ON before it is able to provide output power again.

c. Output DC Current Limit

From the Control menu the DC Current Limit selection the user can to set the value of the DC current limit from 150 A to the full rated current for this unit.
Refer to *"DC Output Power Specifications and Capabilities" on page 13* for the upper limit.
By selecting the Current Limit box a keypad will be displayed to enter the desired DC Current Limit value. Select the ENT icon to accept the entry.

d. Screen Saver

The SCREEN SAVER selection allows the user to set the inactivity timer. When the inactivity timer reaches the timer limit, the unit screen saver is activated. When the Password Padlock is active, the unit password is required for reopening the user interface. The display reopens to the Home screen.
The range of values for the screen saver timer ranges from 30 to 9999 seconds.

4) Adjust Menu Functions

The Adjust menu has the following functions for this unit. This menu is password protected with a default password of **42**. Once the password is entered the Adjust menu will be accessible for 5 minutes or until power is cycled.

a. Output Volts and Line Drop

Output Voltage Adjust
This function allows the operator to adjust the Output voltage of the unit by ±10% of nominal output voltage.

Line Drop Adjust
This function allows the operator to adjust the Output voltage, as measured at the end of the unit output cable, by 10% of the nominal output voltage.

b. Interlock Timers, Date, and Time

Output Interlock Adjust **IMPORTANT:** *This menu function is not available in this unit configuration.*

This function allows the operator to adjust the time, in seconds, unit will wait for the interlock signal to be returned. The acceptable range is 5 to 60 seconds.

Date and Time Settings

This function allows the operator to enter the current local time and date values. The unit uses a 24-hour clock format, UTC/GMT time zone (Coordinated Universal Time/Greenwich Mean Time), with the date presented in Day, Month, Year (DD, MM, YYYY) format.

Comm Data Link **IMPORTANT:** *This menu function is not available in this unit configuration.*

When the unit is equipped with the Gateway option, the MODBUS link is enabled. Users may execute TCP/IP commands to the unit through the MODBUS link.

c. Alarm Settings

Select the Bell icon in the Adjust Menu title bar to access the Alarm Settings.

This function allows the operator to select the desired audible alarm configuration. The selected alarm will be highlighted green, all others will be highlighted red.

No Alarm–The unit does not annunciate an occurring alarm event, however, the event is recorded in the unit Event Log. Selecting this setting causes a No Alarm icon to appear in the upper left corner of the Home screen, to provide a persistent visual cue to the unit operator.

Warning–The unit annunciates Warning alarm events, only.

Fault–The unit annunciates Fault alarm events, only.

Alarm Both–The unit annunciates both Warning and Fault alarm events.

ALARM OPERATION: SILENCE and CLEAR

When a FAULT condition is detected by the unit an error will display on the touch screen. The operator will be able to Silence, and/or Clear the display.

Pressing SILENCE causes the horn to no longer sound and CLEAR to be displayed.
Pressing CLEAR .....allows the alarm to be re-issued, and the horn to sound again if the same issue re-occurs.

IMPORTANT: An Alarm should never be Silenced without also being Cleared.

d. Auto Start

The Auto Start option allows the unit to automatically restart when input power has been interrupted. When the input power is restored to within normal operating limits, the unit will automatically restart and the output contactor will return to the state it was in (ON/ OFF) when power was interrupted.

When Auto Start is selected, the icon is highlighted green and reads AUTO START ON.

IMPORTANT: Setting this option requires a password.

5) Repair Menu Settings

The Repair menu gives the user various parameter alarm thresholds and current readings to assist in understanding specific unit operational values. Access service contact information for Unitron, LP by selecting the telephone icon in the menu title bar.

a. Max Temperature

Access Max Temperature to view the alarm threshold for unit heat sink temperature, as read from unit sensor(s).

b. Min/Max AC

Access Min/Max AC/DC to view the alarm threshold for voltage, as read from the input and output signals. Maximum current only applies to the unit input.

c. Min/Max DC Bus

Access Min/Max DC Bus to view the alarm thresholds for the voltage, as read from unit DC Link. Threshold limits typically range from 600 to 800 VDC.

d. Software Versions

Access Software Versions to retrieve currently loaded software values for both the unit and the touch screen user interface. The IP Address of the unit is shown at the bottom of this screen.

e. Event Log

Access the Event Log to retrieve recorded unit alarms and events, used for diagnostic purposes.

f. Nameplate Date

Access the Nameplate Data to retrieve unit configuration data.

g. Service Contact Information – Unitron, LP

Press the phone icon in the Repair menu title bar to display the Unitron Service contact information.

6) Evaluate Menu

The Evaluate menu gives the current input and output operating values, used to assist in understanding unit operational status.

a. Input

These Input Power parameter readings are given:

- Line-to-Line electrical potential in volts (V)
- Current in amperes (A)
- Apparent power in kilovolt-ampere (kVA)
- Power in kilowatts (kW)
- Power factor
- Frequency in hertz (Hz)

7) Tech Menu – *For Service Support Only*

Use the Tech Menu to download important unit configuration and performance information. The Tech Menu screen is password protected.

a. Dump Data to USB

Authorized service personnel can select whether to receive either a partial, or full, download of unit data.

NOTE: Unit must be OFF to download unit data.

D. DATA PORT USAGE

The unit has an external USB port. Use the USB interface to receive unit data.

IMPORTANT: This USB connection is used for maintenance purposes only.

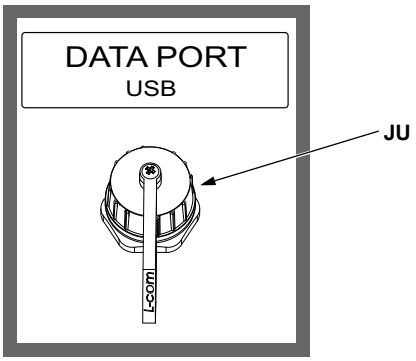


Figure 15. Data Port –External USB Connection

CHAPTER 3 - MAINTENANCE

A. COMPLEMENTING SERVICES

Unitron considers proper upkeep and maintenance of the unit to be your best insurance against unscheduled downtime. Therefore, Maintenance Training Courses are offered on an individual basis.

To ensure that our customers derive maximum benefit from their unit, Unitron offers a variety of training classes tailored to specific interests and requirements. Maintenance classes can be presented at either the Unitron factory or the customer's site. Contact Unitron Customer Service Department to discuss what technical capability and field test equipment would be necessary for field repair of the unit.

B. SERVICING

This chapter provides information for providing maintenance to the unit.

This information is provided for qualified equipment maintenance personnel only.

DANGER - ELECTRIC SHOCK HAZARD: LETHAL LEVELS OF VOLTAGE ARE PRESENT WITHIN THE UNIT. ONLY QUALIFIED EQUIPMENT MAINTENANCE PERSONNEL THAT HAVE READ, UNDERSTAND, AND FOLLOW THESE INSTRUCTIONS SHOULD PERFORM INSTALLATION, MAINTENANCE, OR SERVICE UNIT.

DANGER - ELECTRIC SHOCK HAZARD: HAZARDOUS VOLTAGES ARE PRESENT WITHIN THE UNIT. DO NOT ATTEMPT TO ACCESS THE INTERIOR OF THE UNIT WHILE POWER IS APPLIED.

WARNING - EYE INJURY HAZARD: WEAR EYE PROTECTION WHEN BLOWING AIR INTO THE UNIT TO CLEAN AWAY DUST AND DEBRIS.

1) Metal Oxide Varistor Protection

This unit is designed with **M**etal **O**xide **V**aristor (MOV) protection across input fuses to protect it from input voltage spikes, *see "Input/Output Panel Assembly – A1" on page 50*. As these MOV devices experience voltage spikes they will degrade over time and should be replaced periodically to ensure continued input surge protection for unit. This is especially recommended if unit is located outside in a high lightning area.

2) Scheduled Maintenance - Before Each Use

PROCEDURE

1. Turn OFF input power at the circuit breaker or disconnect switch box.
2. Visually inspect unit for damage. Do not use until all damage is repaired.
3. Inspect and secure all loose parts and access doors.
4. Use low pressure air to blow out accumulated dust and debris within the unit.

PROCEDURE COMPLETED

3) Scheduled Maintenance - Semiannual

PROCEDURE

1. Test the output voltage and frequency with certified equipment. Output should be within the range specified in the specification chart for the unit. Output should be within the range specified in the*"DC Output Power Specifications and Capabilities" on page 13*.
2. Inspect all (2) air intake filters and replace as required.
3. It is recommended that power cables be disconnected from the load and stowed when the unit is not in use.

PROCEDURE COMPLETED

4) Scheduled Maintenance - Annual

PROCEDURE

1. Turn OFF input power at the circuit breaker or disconnect switch box.
2. Inspect the unit for damage. Do not use until all damage is repaired.
3. Inspect all internal terminal block wiring connections. Tighten as necessary.

PROCEDURE COMPLETED

5) Air Filter Replacement

PROCEDURE

NOTE: Location of filters are shown in *Figure 16*; there are a total of two (2) filters, one on each side of unit.

IMPORTANT: Filter mat should only be replaced with Hammond filter mat part no. PFF30000.

1. Grasp the upper edge of the louvered filter outside cover (1) and pull outward to expose the filter mat (2).
2. Remove the used filter mat and replace with the new filter mat; ensure filter is installed in the proper position.
3. Push the louvered filter outside cover back into position until it snaps closed.

PROCEDURE COMPLETED

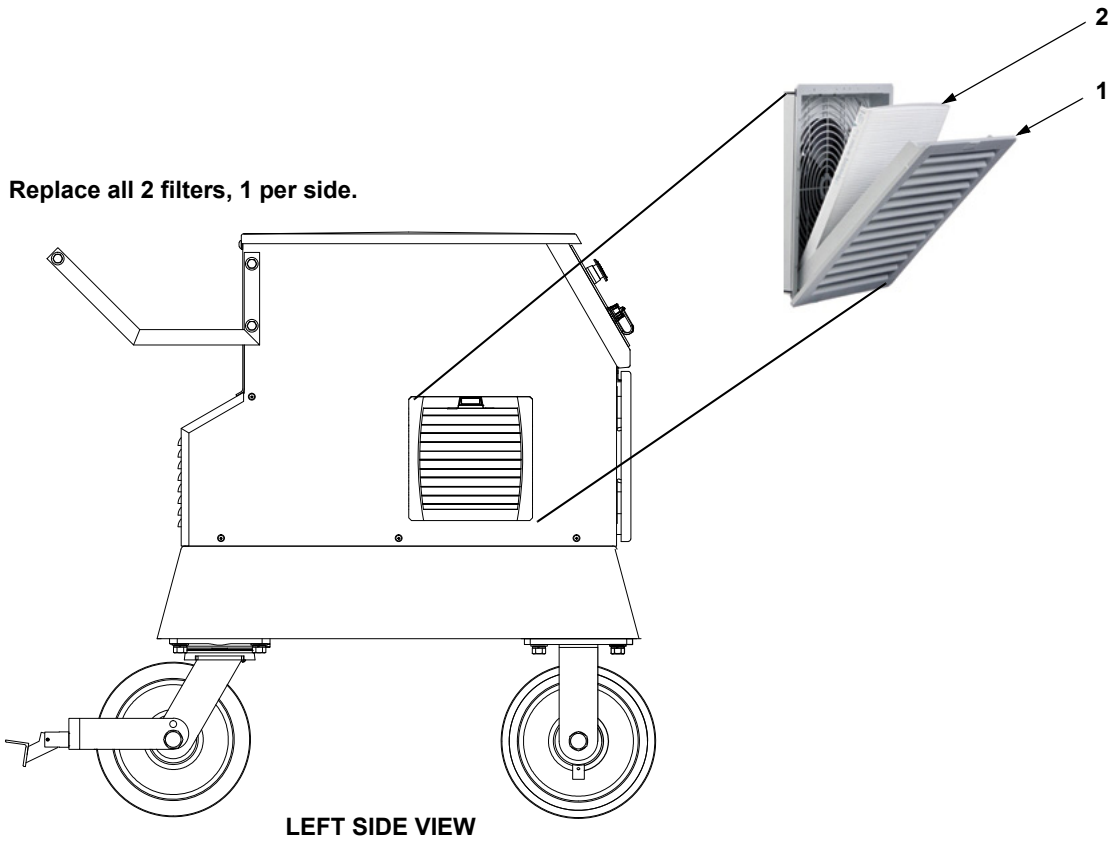


Figure 16. Air Filter Replacement

C. TROUBLESHOOTING

This section provides information for troubleshooting the unit.

This information is provided for qualified equipment maintenance personnel only.

DANGER - ELECTRIC SHOCK HAZARD: LETHAL LEVELS OF VOLTAGE ARE PRESENT WITHIN THE UNIT. ONLY QUALIFIED EQUIPMENT MAINTENANCE PERSONNEL WHO HAVE READ, UNDERSTAND, AND FOLLOW THESE INSTRUCTIONS SHOULD PERFORM INSTALLATION, MAINTENANCE, OR SERVICE TO THE UNIT.

DANGER - ELECTRIC SHOCK HAZARD: HAZARDOUS VOLTAGES ARE PRESENT WITHIN THE UNIT. DO NOT ATTEMPT TO ACCESS THE INTERIOR OF THE UNIT WHILE POWER IS APPLIED.

1) Troubleshooting Steps

IMPORTANT: The first step in troubleshooting the unit is to recognize that hazards are present from lethal levels of high voltage within the unit. Caution should be used during all troubleshooting steps.

Steps to identify a fault condition include a visual inspection of the indicators on the front panel. Fault indicators on the front panel are used to indicate if a fault is associated with an internal failure within the unit or an external condition, such as input voltage, output load, etc.

Due to the variety of faults, front panel indicators cannot identify every possible condition which may trigger a fault condition, however, the front panel is the best starting point for troubleshooting unit.

IMPORTANT: An Alarm should never be Silenced without also being Cleared.

2) Viewing Event Log

The Event Log contains a record of system operations (events, commands, warnings, and faults). The Event Log is accessed from the Repair menu. The latest alarm condition will scroll across the display panel. To review the current alarm and previous alarms or events, access the Alarm screen:

PROCEDURE

1. Press the gear icon to open the operator Main Menu.
2. Select the Repair icon.
3. From the Repair menu, select Event Log. The Alarm screen opens.
4. View the Event Log on the Alarm screen. Refer to *Figure 17* and *Figure 18* for details.

PROCEDURE COMPLETED

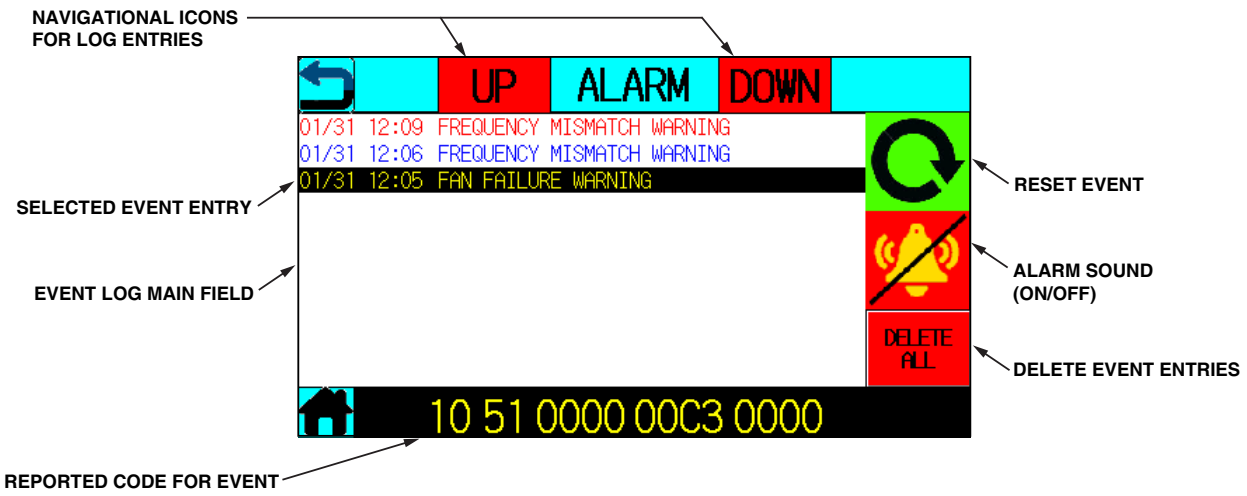


Figure 17. Event Log Screen

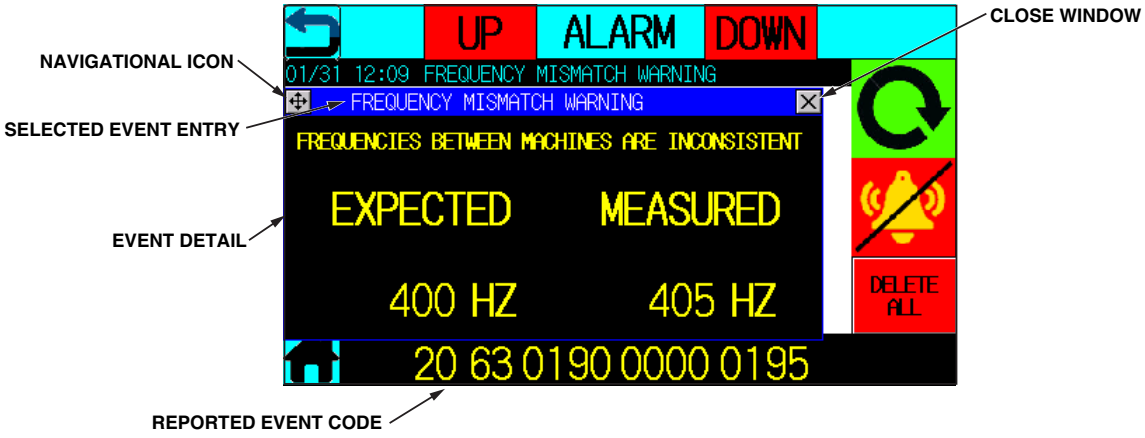


Figure 18. Event Detail

3) Managing and Reading Event Log

When an event or alarm occurs, an entry is made in the Event Log. The Event Log is accessed from the Repair menu, and viewed on the Alarm screen. For the purpose of viewing and managing the Event Log, the Alarm Silence and Alarm Clear icons may be ignored.

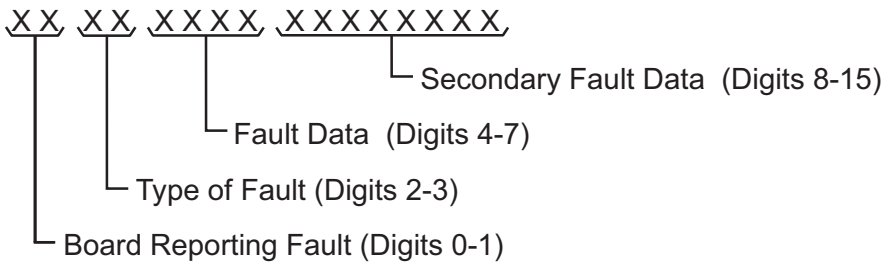
The Event Log entries, recorded as line items in the main field, may be managed using the Navigational icons, located below the main field.

The selected event entry shows the following information:

- Date of Event
- Time of Event
- Event Description

The reported event code for a selected Event Log entry is displayed at the bottom of the Alarm screen as a 16-digit hexadecimal number (0-9, A-F).

The code, shown at the bottom of the Alarm screen, is structured as:



Of particular interest is the location of the reported fault. Designations of the board reporting the fault (Digits 0-1) are:

00 Reserved/Internal
10 System Board
20 Inverter Board
30 Converter / Rectifier #1 Board
40 Converter / Rectifier #2 Board
90 Display Board
A0 Remote Control
B0 Ethernet
C0 Modbus

The following is the interpretation of a reported Event Code.

EXAMPLE: Reviewing the Event Code – 30DC 03DE 00F40000

Digits 0-1 .....30 = Converter / Rectifier #1 Board
Digits 2-3 .....DC = DC Link Fault
Digits 4-7 .....03DE = Reports a voltage in base 10 of 990 V
Digits 8-15 .....00F40000 = Reports the average volts in base 10 as 244 V

CHAPTER 4 - ILLUSTRATED PARTS BREAKDOWN

This chapter contains illustrated parts breakdowns for the unit, along with the manufacturer information.

This information is provided for qualified equipment maintenance personnel only.

A. INTRODUCTION

The illustrated parts list is provided for ordering replacement parts for repair of the unit. This parts list covers the unit and model number defined by the description listed on the top of this page.

B. MANUFACTURER IDENTIFICATION

Manufacturers are identified by the **C**ommercial **a**nd **G**overnment **E**ntity (CAGE) code, formerly known as the **F**ederal **S**upply **C**ode for **M**anufacturers (FSCM) number. The following listings provide the code, name, and address of component manufacturers for this unit.

1. Primary Manufacturer of This unit

Table 1: Primary Manufacturer

CAGE NO.	NAME	ADDRESS
3BC99	Unitron, LP	10925 Miller Rd. Dallas, TX 75238

2. Manufacturers with CAGE Code Number

Table 2: Manufacturers with Cage Code Numbers

CAGE NO.	NAME	ADDRESS
021P3	Ametherm Inc.	3111 N. Deer Run Rd., Suite 4 Carson City, NV 89701
03030	Empro Manufacturing Co., Inc.	10620 E. 59th St. Indianapolis, IN 46226
0WBJ2	Allstar Magnetics	6205 NE 63rd St Vancouver, WA 98661
14655	Cornell-Dubilier Electronics	1605 E. Rodney French Rd. New Bedford, MA 02744
1DAT2	Cosel USA Inc.	3283 Scott Blvd. Santa Clara, CA 95054
1NT30	Semikron Inc.	11 Executive Drive Hudson, NH 03051
1VEL5	Knight Electronics	10557 Metric Dr. Dallas, TX 75243-5514
21574	Ferraz Shawnut Co.	88 Horner Ave., Toronto Ontario, Canada M8Z 5Y3

Table 2: Manufacturers with Cage Code Numbers

CAGE NO.	NAME	ADDRESS
27264	Molex Inc.	1500 Hancel Parkway Mooresville, IN 46158
32353	ABB Control Inc.	1206 Hatton Rd. Wichita Falls, TX 76302
3BC99	Unitron, LP	10925 Miller Rd. Dallas, TX 75238
3CYE8	ABB Control Inc.	1206 Hatton Rd. Wichita Falls, TX 76302
43321	L-COM	45 Beechwood Dr. N. Andover, MA 01845
44655	Ohmite Manufacturing Co.	1600 Golf Rd., Suite 850 Rolling Meadows, IL 60008
56493	Bell Floyd Associates Inc.	720 Dearborn Park Ln. Columbus, OH 43085-5703
57027	International Resistive	4222 South Staples St. Corpus Christi TX 78411
5Y407	Phoenix Contact, Inc.	586 Fulling Mill Rd. Middletown, PA 17057
62292	EBM Inc.	100 Hyde Rd. Farmington, CT 06034
63426	NKK Switches of America Inc.	7850 E. Gelding Dr. Scottsdale, AZ 85260
71400	Cooper Bussmann, Inc.	114 Old State Rd. Ellisville, MO 63021-5942
74829	ILSCO Corp.	4730 Madison Rd. Cincinnati, OH 45227-1426
77342	Tyco Electronics Corp.	8010 Piedmont Greensboro, NC 27409-9407
7M138	United Chemi-Con Manufacturing Co.	185 McNeil Rd. Lansing, NC 28643
90201	Mallory Capacitor Co.	4760 Kentucky Ave. Indianapolis, IN 46206
91929	Honeywell	315 E. Stephenson St. Freeport, IL 61032-4353
SHX73	IDEC	7-31 NISHI-MIYAHARA 1-CHOME YODOGAWA-KU 532-8550 Japan

Table 2: Manufacturers with Cage Code Numbers

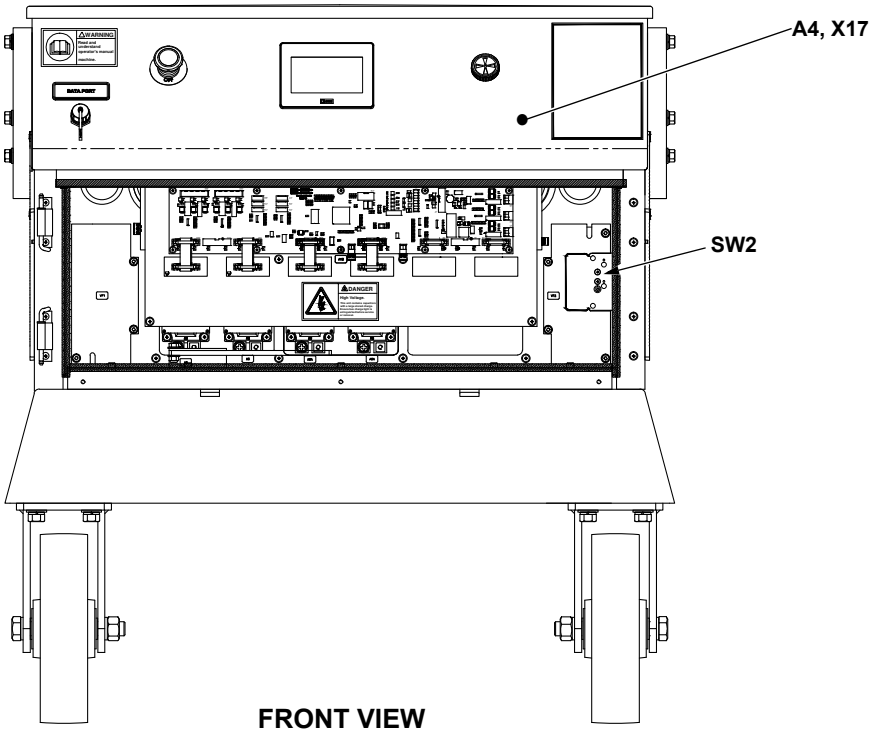
CAGE NO.	NAME	ADDRESS
7R7U8	Durable USA/Superior Casters Inc.	2801 E. Abram St. Arlington, TX 76010
1MPP4	Hammond Manufacturing Co.	475 Cayuga Rd. Cheektowaga, NY 14225
60991	Microchip Technology Inc.	2355 W, Chandler Blvd. Chandler, AZ 85224-6199
532A1	Mean Well USA, Inc.	44030 Fremont Blvd. Fremont, CA 94538-6042

C. ILLUSTRATED PARTS BREAKDOWN

A list of part numbers is located following the illustrations. Use the illustration to locate the part to be serviced or replaced. Once the part is identified, the parts lists can be used to locate the part number, description, quantity, and manufactures CAGE code number. The following pages provide detailed illustrations of the component parts and their location within the unit.

For ordering information, contact:

Unitron, LP · 10925 Miller Road · Dallas, TX 75238 · 800-527-1279 · Attn: Customer Service.



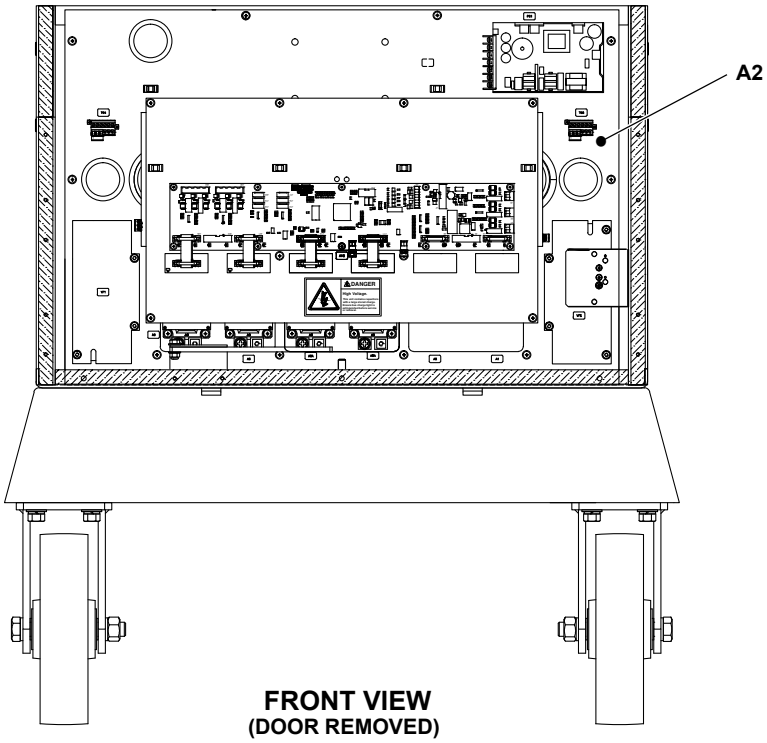
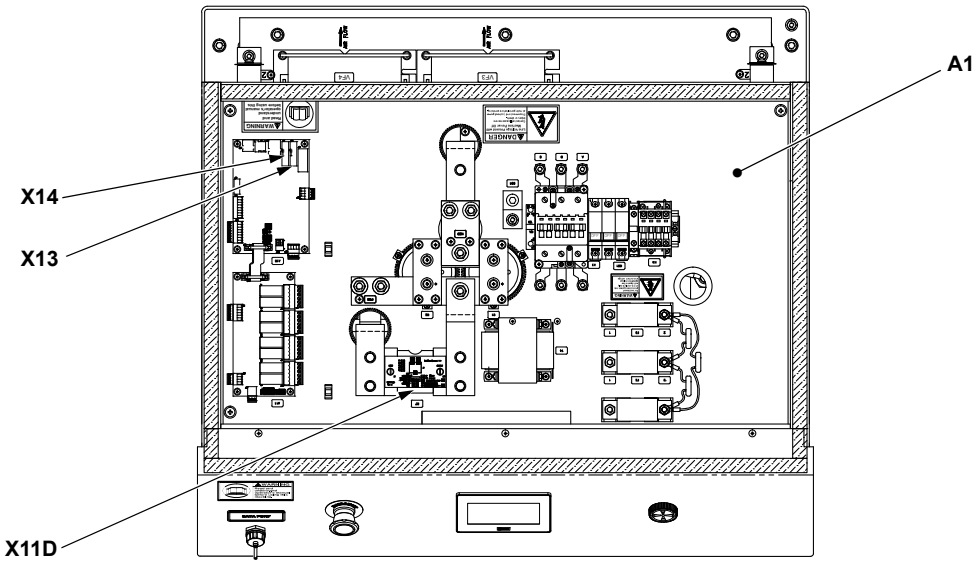
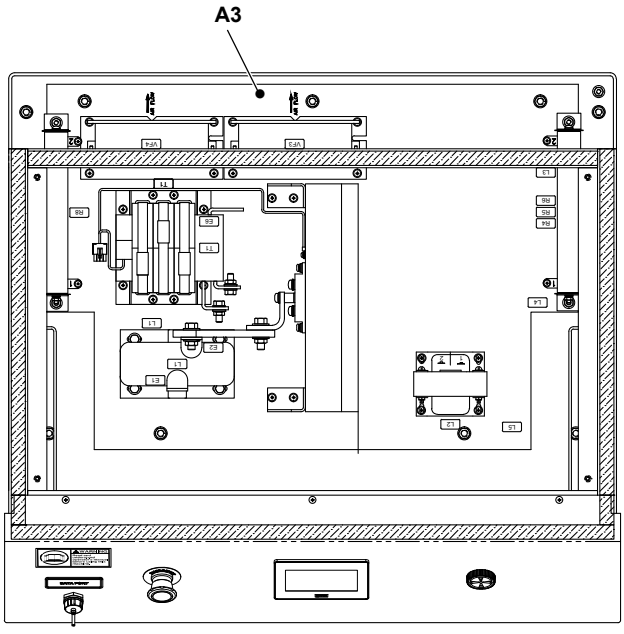


Figure 19. UDC-420M Ground Power Unit, Sheet 1 of 3

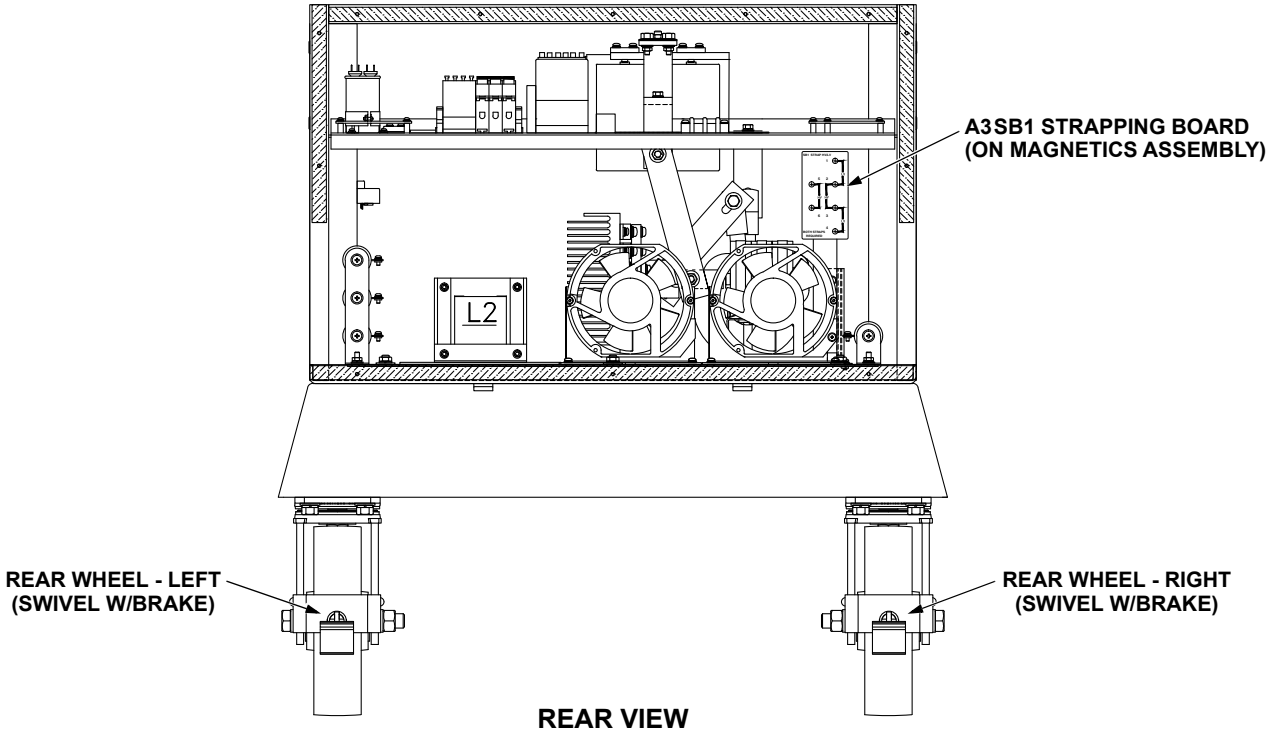


TOP VIEW
(EXTERNAL PANELS REMOVED)

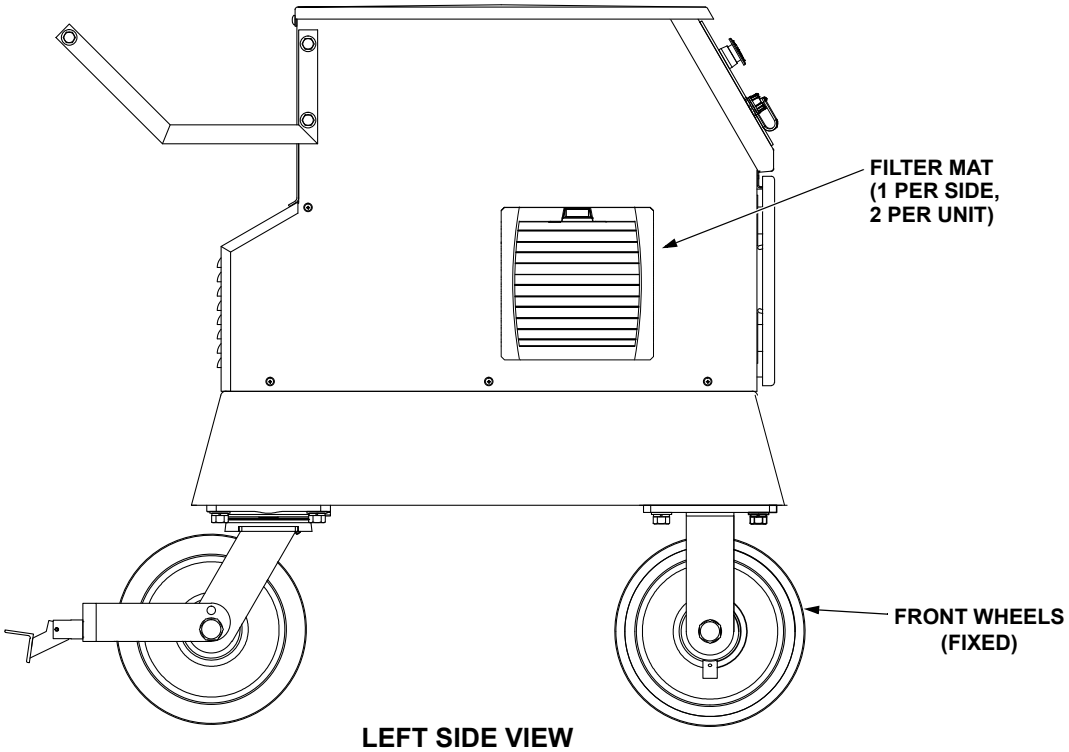


TOP VIEW
(EXTERNAL PANELS, A1, AND A2 REMOVED)

Figure 19. UDC-420M Ground Power Unit, Sheet 2 of 3



REAR VIEW
(PANEL REMOVED)



LEFT SIDE VIEW

Figure 19. UDC-420M Ground Power Unit, Sheet 3 of 3

Figure/ Item	Part Number	Description	Qty.	CAGE Code	Ref. Des.
19 –	**198-15000-60T**	**UDC-420M, TSP-4, T-3(MT)**	**REF**	**3BC99**	
1	198-14015-7	. IN/OUT PNL ASSY, UDC, S2, 6P,	1	3BC99	A1
2	198-15022-4	. PWR MDL ASSY,600A,UDC,6P (P)	1	3BC99	A2
3	198-15042-3	. MAGNETICS ASSY,UDC,AC FANS, 6P	1	3BC99	A3
4	198-19029-9	. METER PANEL ASSY,TS4“,TEX WHT	1	3BC99	A4
5	22AC2	. SWITCH, MS16106-1	1	91929	SW2
6	198-11011-25	. CABLE ASSY, CURRENT TRANSDUCER, 25“L	1	3BC99	X11D
7	198-11014-2	. RIBBON CABLE ASSY, RECTIFIER/INVERTER BUS	1	3BC99	X13
8	TRD695RA6BL-7	. RJ45 PATCH CORD RA (LEFT) 7'	1	43321	X14
9	E54	. CABLE,USB 3.0,RT ANGLE MALE TO FEMALE,12”	1	3BC99	X17
10	03-09-1022	. RECEPTACLE, 2-PIN	1	27264	J6
11	03-09-1042	. RECEPTACLE, 4-PIN	1	27264	J7
12	PFF30000	. FILTER MAT	2	1MPP4	FILTER MAT
13	67ER10BC5319FY	. CASTER, 10", RIGID, CAREFREE, SILVER RIM	2	7R7U8	FRONT WHEELS
14	67ER10BCP319FY	. CASTER, 10" CAREFREE, PLNGE BRAKE, LG PLATE	2	7R7U8	REAR WHEELS

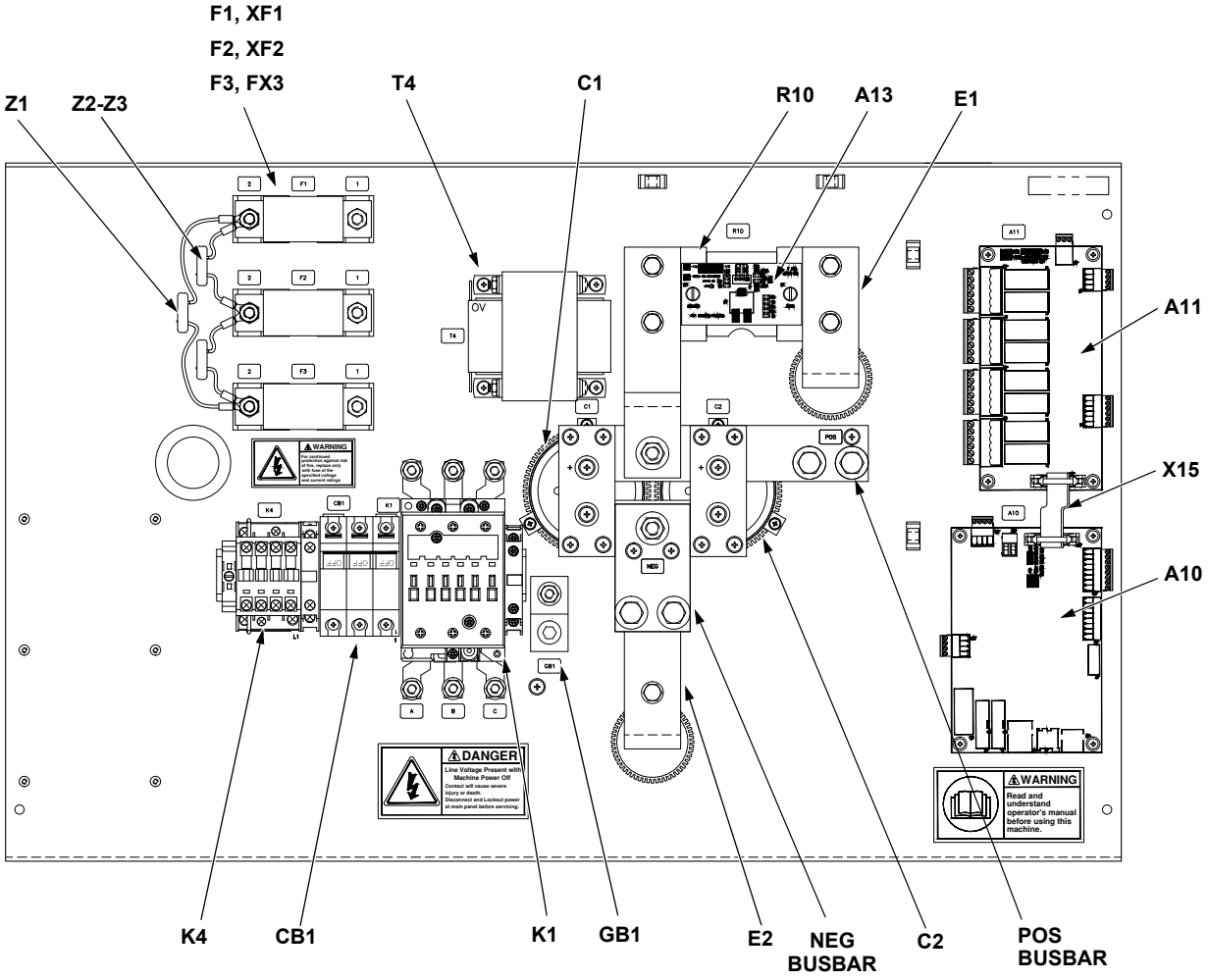


Figure 20. Input/Output Panel Assembly – A1

Figure/ Item	Part Number	Description	Qty.	CAGE Code	Ref. Des.
20 –	198-14015-7	**IN/OUT PNL ASSY, UDC, S2, 6P**	**REF**	**3BC99**	**A1**
1	198-13030-1	. PWA, UFC, SYSTEM CONTROL	1	3BC99	A1A10
2	198-11033-1	. PWA, UFC, I/O EXPANDER	1	3BC99	A1A11
3	198-12039-1	. PWA, DC SHUNT, 1000 A, 28 V, UDC	1	3BC99	A1A13
4	CG333U050X5L	. CAPACITOR, 33k uF, 50 VDC	2	90201	A1C1, A1C2
5	S203-C6	. CIRCUIT BREAKER, 277/480 VAC, 6AAC	1	32353	A1CB1
6	198-12105-1	. BUSBAR, #5, UDC	1	3BC99	A1E1
7	198-12103-1	. BUSBAR, #3, UDC	1	3BC99	A1E2
8	A50QS125-4*	. FUSE, 125 A, 500 VAC, SEMICONDUCTOR	3	21574	A1F1 - A1F3
9	C5268-4	. FUSE BLOCK, ENDS, MODULAR, 1/4-20 X 1”	6	71400	A1XF1 - A1XF3
10	TA250	. LUG, SOLDERLESS	1	74829	A1GB1
11	AF75-30-11-70	. CONTACTOR,105A,100-250V COIL	1	3CYE8	A1K1
12	AF09-30-10-13	. CONTACTOR, 3 P, 25A, 100-250VDC, 1 N.O.	1	14655	A1K4
13	B-1000-50	. SHUNT, DC AMMETER	1	03030	A1R10
14	600-12501-00	. AUTOTRANSFORMER, 500 VA, 480V:240V	1	3BC99	A1T4
15	600-12044-00	. RIBBON CABLE ASSY, RECTIFIER PWA LINK	1	3BC99	A1X15
16	198-14298-1	. MOV TRANSIENT, W/1” LEAD	2	3BC99	A1Z2 - A1Z3
17	198-14298-2	. MOV TRANSIENT, W/3” LEAD	1	3BC99	A1Z1

*** FUSES (F1-F3) ARE NOT SUPPLIED WITH INPUT/OUTPUT PANEL ASSEMBLY (198-14015-7). ORDER FUSES SEPARATELY.**

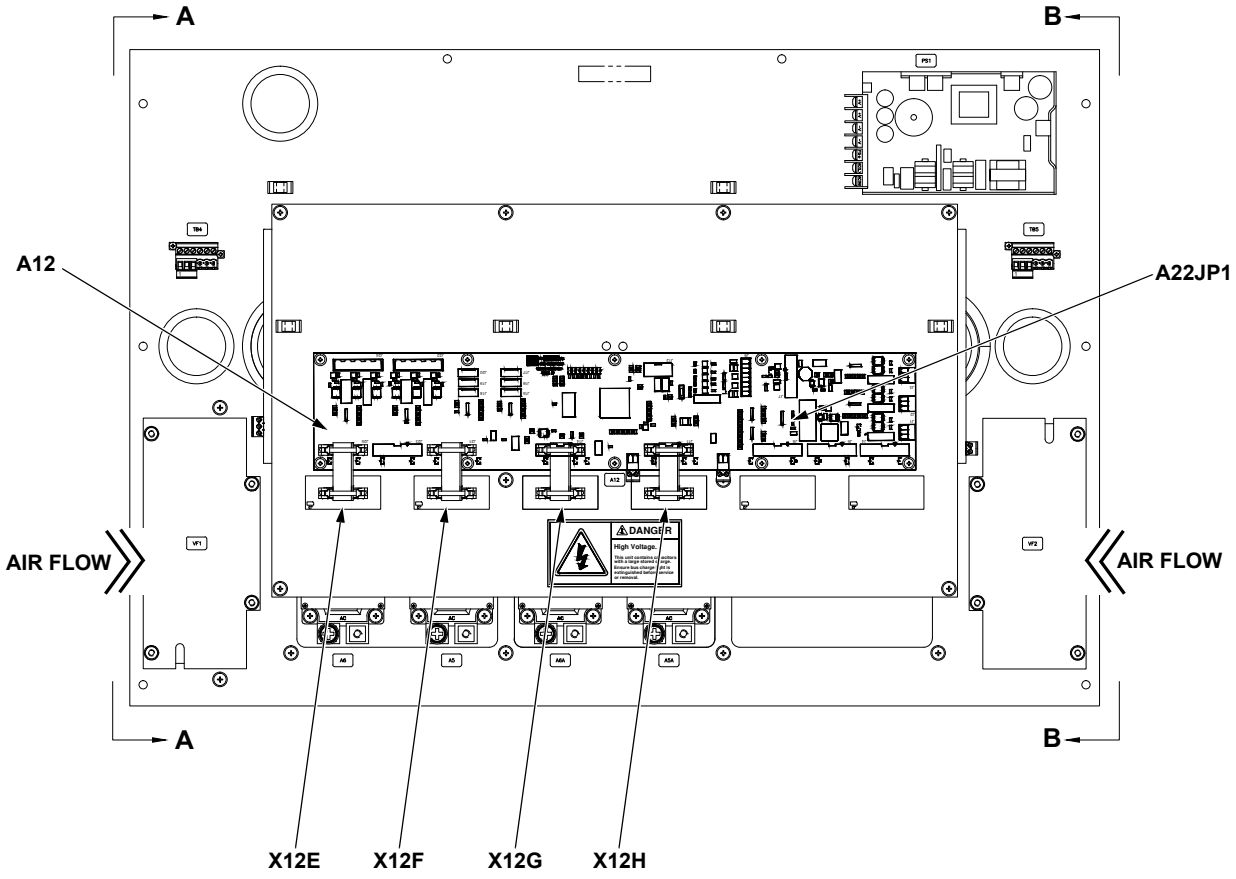


Figure 21. Power Module Assembly – A2, Sheet 1 of 3

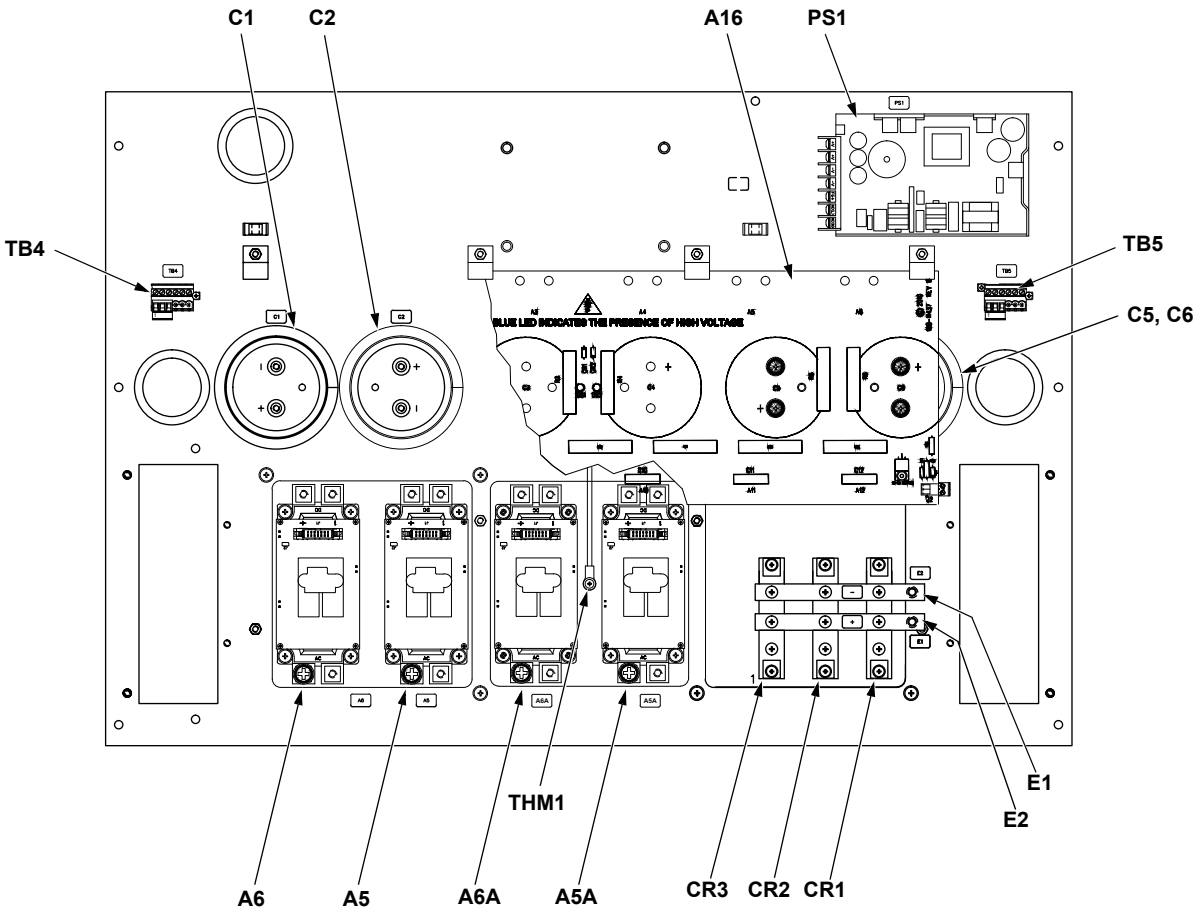


Figure 21. Power Module Assembly – A2, Sheet 2 of 3

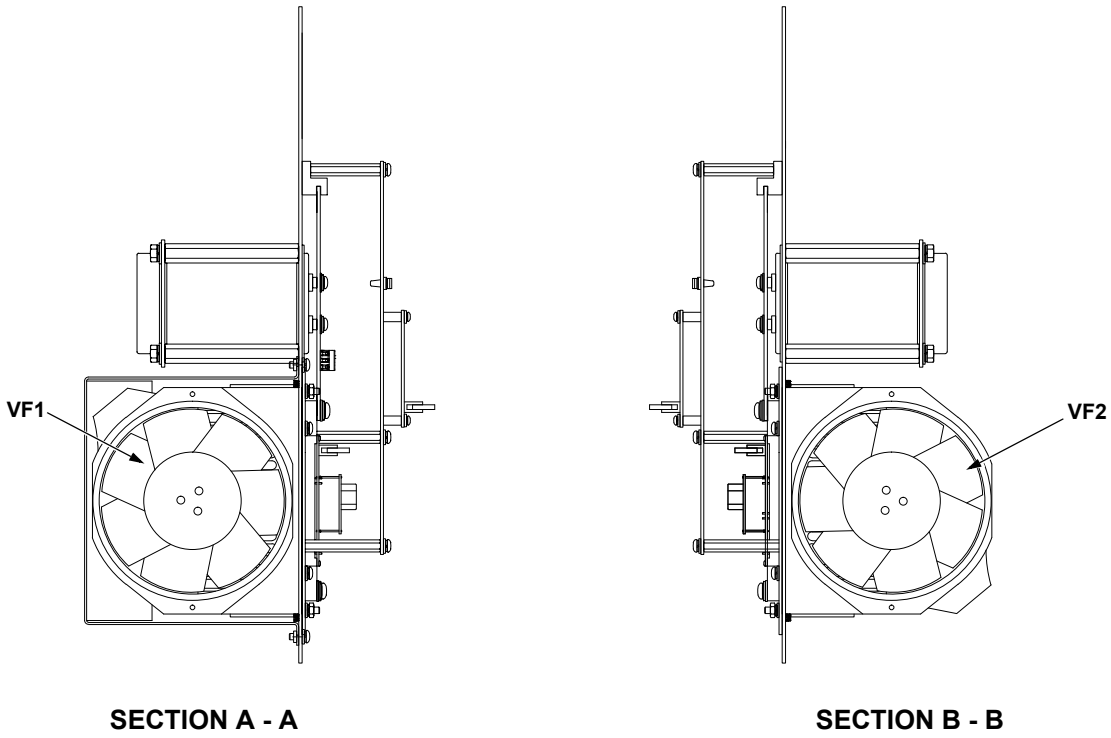


Figure 21. Power Module Assembly – A2, Sheet 3 of 3

Figure/ Item	Part Number	Description	Qty.	CAGE Code	Ref. Des.
21 –	198-15022-4	**POWER MODULE ASSY, 600 A, UDC, 6(P), 450A**	**REF**	**3BC99**	**A2**
1	198-16042-2	. ASSEMBLY, IGBT, 225 A, GEN 7	4	3BC99	A2A5, A2A6, A2A5A, A2A6A
2	198-11032-3	. PWA, UDC, INV/REC CONTROL	1	3BC99	A2A12
3	198-11037-1	. PWA, DC FILTER (45 kVA)	1	3BC99	A2A16
4	1-382811-6	. JUMPER, SHUNT, 2-POSITION, 0.1” PITCH	1	77342	A2A22JP1
5	198-19042-1	. CAPACITOR KIT ASSY, 3300 uF, 450 VDC, 3”, CORNELL, X4	1	7M138	A2C1, A2C2, A2C5, A2C6
6	SKKD100/16	. MODULE, DUAL DIODE	3	1NT30	A2CR1-A2CR3
7	195-85118-1	. BUSBAR, DC RECTIFIER	2	3BC99	A2E1, A2E2
8	PBA100F-24-C	. POWER SUPPLY, 24 VDC, 100 W, w/COATING	1	1DAT2	A2PS1
9	1788570	. HEADER, 5.08 PITCH, PANEL MOUNT, 6-POS.	2	5Y407	A2TB4, A2TB5
10	PANR103395-408	. THERMISTOR, NTC, 10k OHM, #6 LUG	1	021P3	A2THM1
11	6424H	. FAN, TUBIAL AXIAL, 24 VDC, 282 CFM	1	62292	A2VF1
12	A59-B15A-23T3-000	. FAN, TUBEAXIAL, 230 V, 60 HZ	1	62292	A2VF2
13	198-11012-1	. RIBBON CABLE ASSY, IGBT DRIVE	4	3BC99	A2X12E, A2X12F, A2X12G, A2X12H

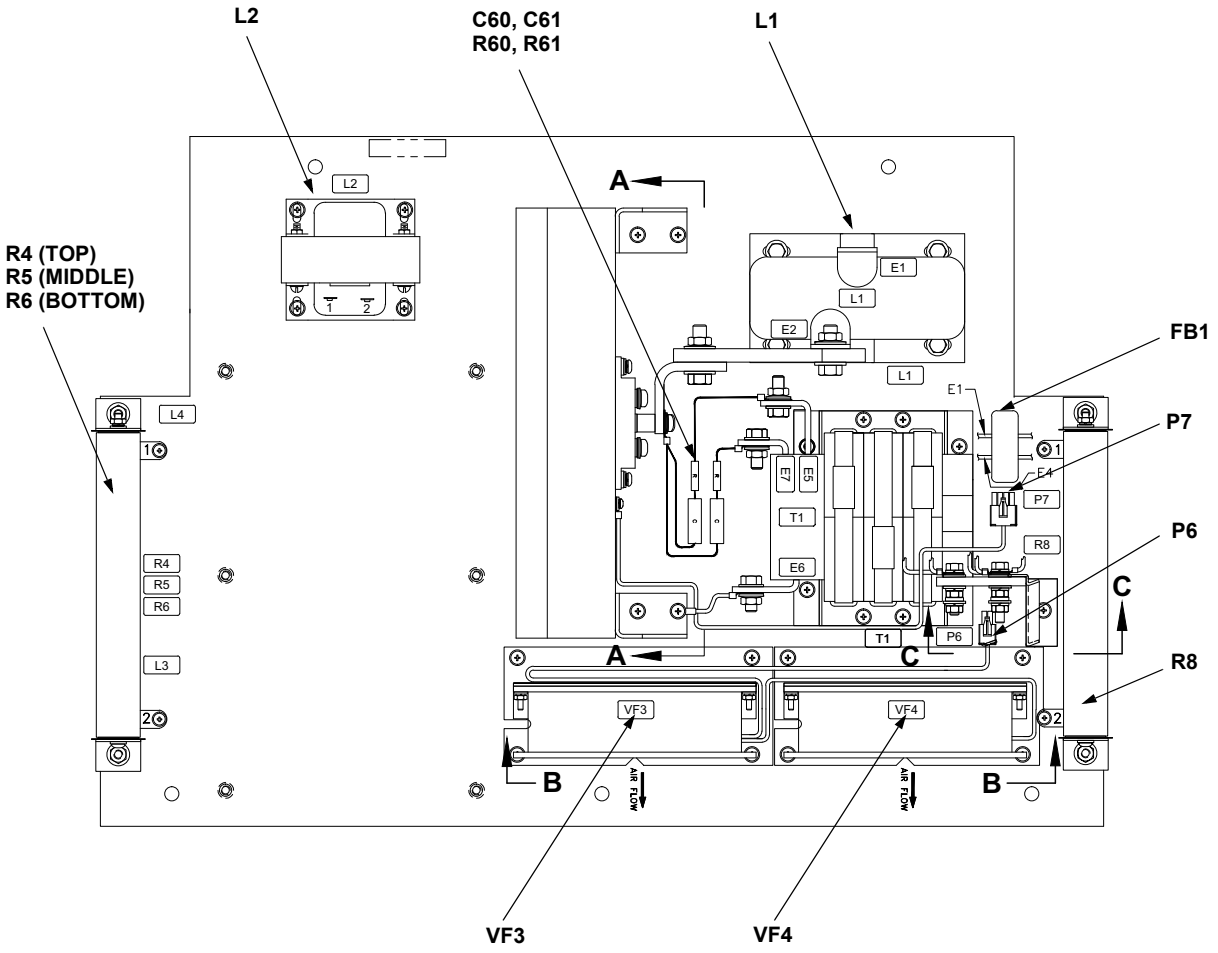
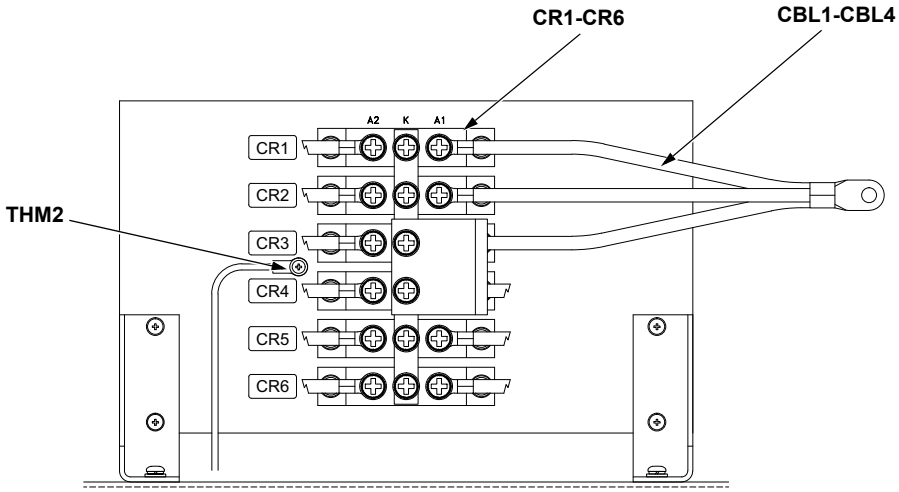
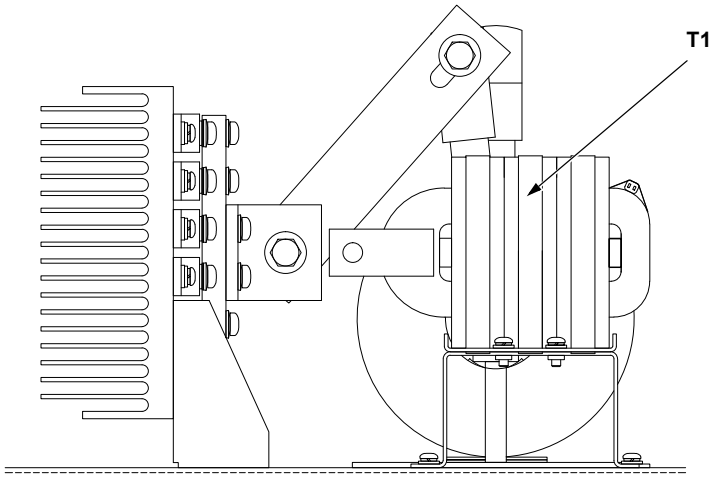


Figure 22. Magnetics Assembly – A3, Sheet 1 of 3

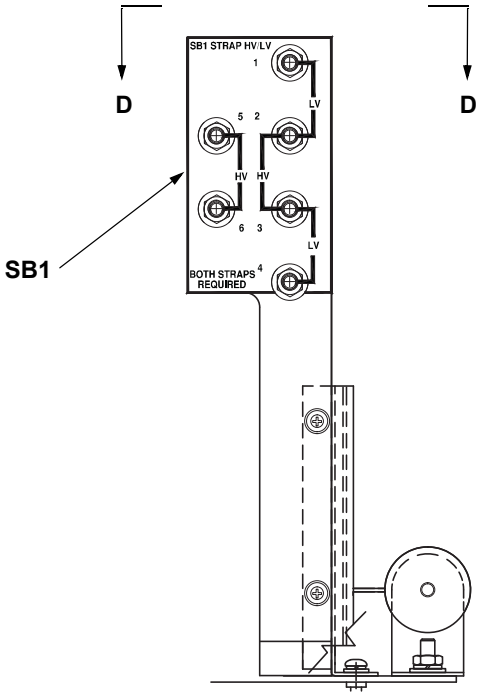


SECTION A - A

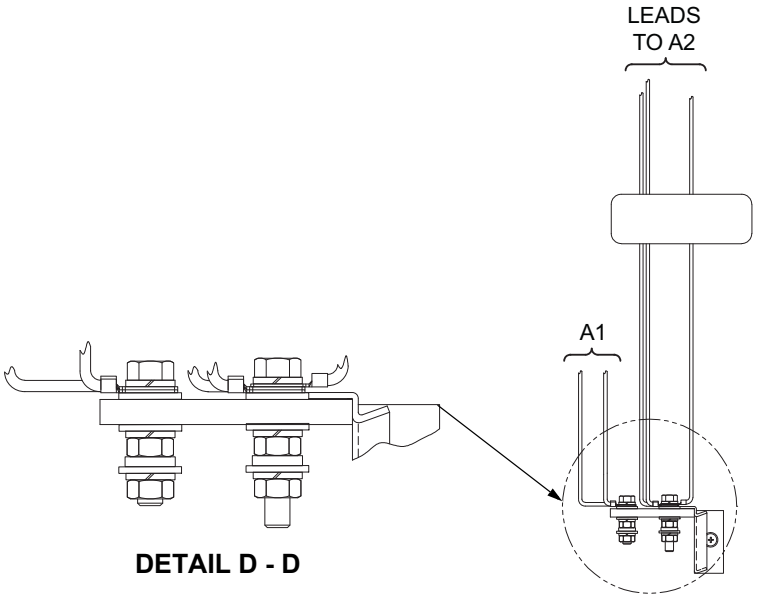


SECTION B - B

Figure 22. Magnetics Assembly – A3, Sheet 2 of 3



SECTION C - C



DETAIL D - D

SECTION D - D

Figure 22. Magnetics Assembly – A3, Sheet 3 of 3

Figure/ Item	Part Number	Description	Qty.	CAGE Code	Ref. Des.
22 –	198-15042-3	**MAGNETICS ASSY, UDC, AC FANS, 6P,**	**REF**	**3BC99**	**A3**
1	198-15043-1	. CABLE ASSY, SCHOTTKY DIODES, UDC	4	3BC99	A3CBL1 - A3CBL4
2	BKA400AA10	. BARRIER DIODE MODULE, 400 A, 100 V	6	60991	A3CR1 - A3CR6
3	TX51/32/19-3C90	. FERRITE BEAD	1	0WBJ2	A3FB1
4	198-12511-1	. INDUCTOR, 2.5 uH, UDC	1	3BC99	A3L1
5	150-87280-1	. INDUCTOR, DC INPUT, UDC, 35 A	1	3BC99	A3L2
6	03-09-2022	. PLUG, 2-PIN	1	27264	A3P6
7	03-09-2042	. CONNECTOR PLUG, 4-PIN	1	27264	A3P7
8	C300K10R	. RESISTOR, 10 OHM, 300 W	3	62292	A3R4 - A3R6
9	L175J10R	. RESISTOR, 10 OHM, 175 W, 10%	1	44655	A3R8
10	942C20S1K-F	. CAPACITOR, 0.01 uF, 2000 VDC	2	14655	A3C60, A3C61
11	RS-5-3.9-5%	. RESISTOR, 3.9 OHM, 5W, 5%	2	57027	A3R60, A3R61
12	198-15122-1	. UDC, T1 STRAP BOARD 1	1	3BC99	A3SB1
13	150-87293-1	. TRANSFORMER, OUTPUT, 28 VDC, 20 kHz, TAPPED 6P	1	3BC99	A3T1
14	PANR103395-408	. THERMISTOR, 10k OHM, #6 LUG	1	021P3	A3THM2
15	A59-B15A-23T3-000	. FAN, TUBEAXIAL, 230 V, 60HZ	2	62292	A3VF3, A3VF4
16	C45-2DC	. FAN CORD, DAISY CHAIN, 2 PLUGS	1	1VEL5	(A3VF3-A3VF4)

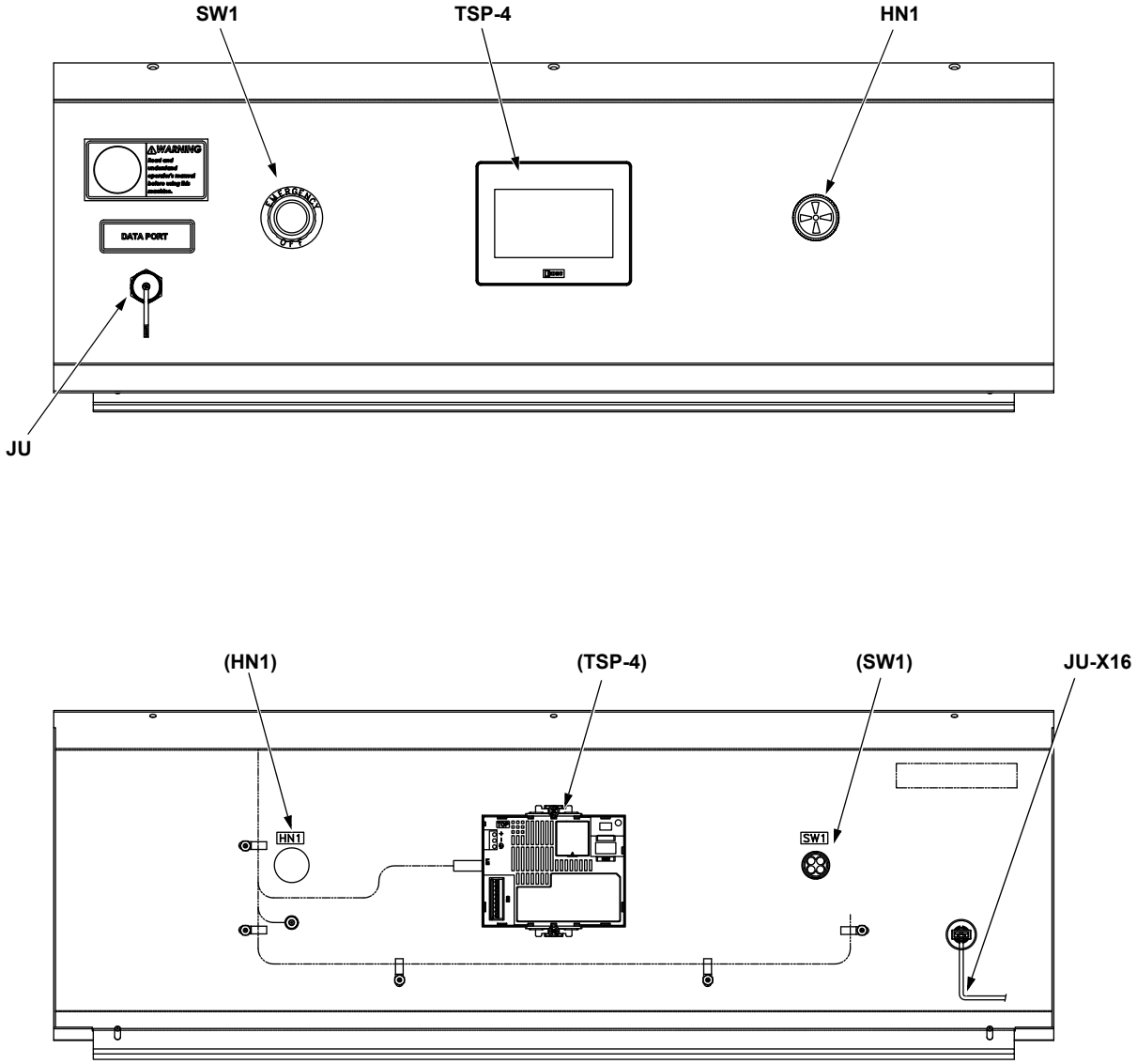


Figure 23. Meter Panel Assembly – A4

Figure/ Item	Part Number	Description	Qty.	CAGE Code	Ref. Des.
23 –	198-19029-9	**METER PANEL ASSY, TS, 4", TEX WHT**	**REF**	**3BC99**	**A4**
1	HG1G-4VT22TF-B	. TOUCHSCREEN,4.3,TFT-LCD,BLK BEZEL	1	SHX73	A4TSP-4
2	CE4P-10R-02	. PUSHBUTTON, COMPACT, 40 mm, MUSHROOM	1	32353	A4SW1
3	MW09-550-Q	. AUDIBLE ALARM, 15-50 VAC	1	56493	A4HN1
4	WPUSBAX-2M	. USB CABLE, TYPE A, MALE/FEMALE	1	43321	A4(JU - X16)
5	WPCVR-USB-1394	. WATERPROOF CP FOR USB + IEEE-1394	1	43321	A4JU

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CHAPTER 5 - SCHEMATIC DIAGRAMS

This chapter provides details schematic diagrams for the unit. The following schematic is provided:

198-15300-60T Schematic, Ground Power Unit, UDC-420M, TSP-4, T-3(MT)

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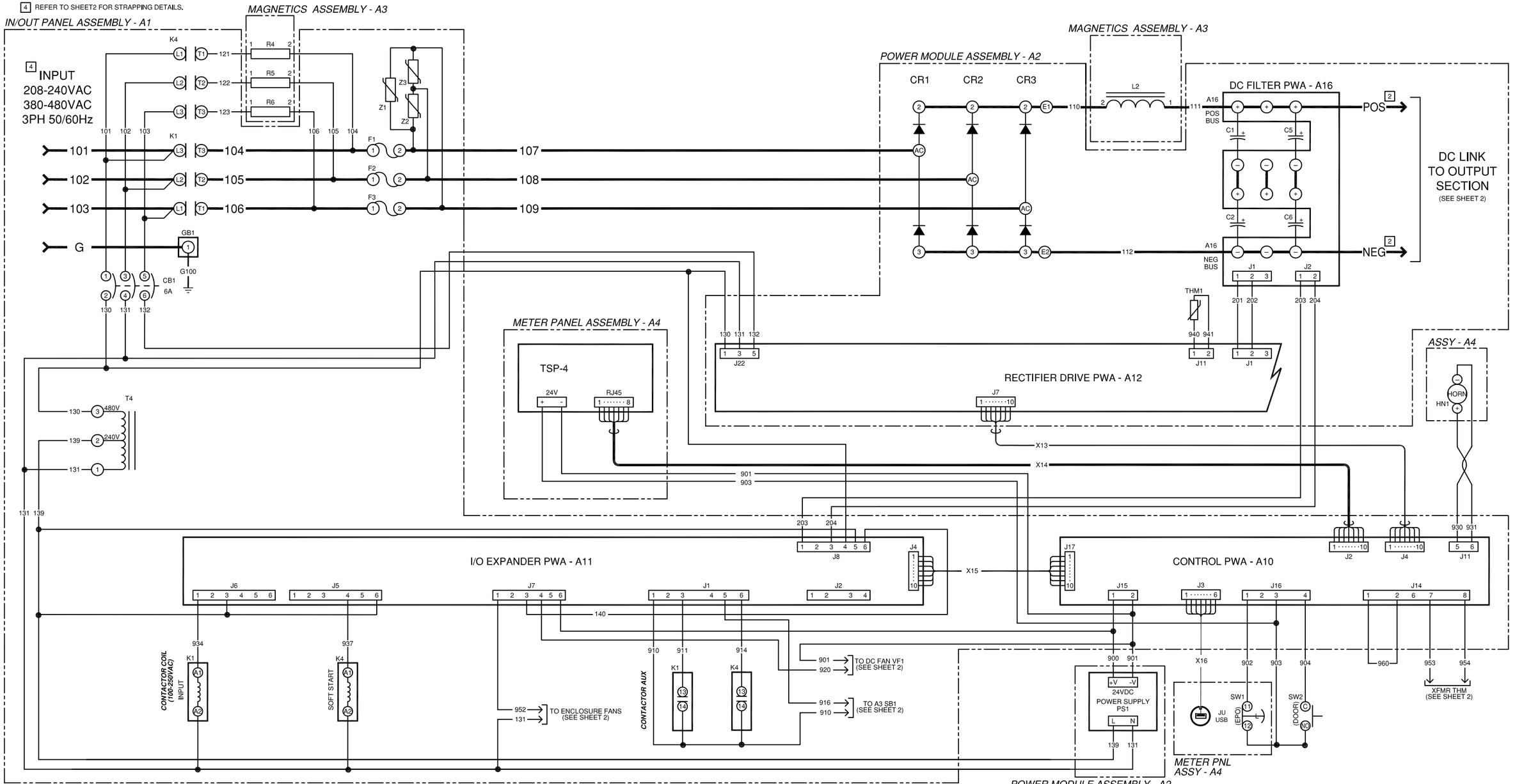
DWG NO 198-15300-60T SH 1

INPUT SECTION

NOTES: UNLESS OTHERWISE SPECIFIED

1. REFER TO POWER MODULE SCHEMATICS FOR DETAIL OF IGBTS.
2. CONNECTIONS "POS" AND "NEG" ARE PART OF DC FILTER PWA.
3. SEE SHEET 2 FOR LEGEND.
4. REFER TO SHEET2 FOR STRAPPING DETAILS.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	FORMAL RELEASE	7/26/18	R.B.
B	REV PER ECN E8487	1/7/20	R.B.
C	REV PER ECN F1785	8/2/22	R.B.



QTY REQD	QTY REQD	ITEM NO.	PART NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
- ANGLES ±1°
- FRACTIONS ±1/16
- 1 PLACE DECIMAL ±.1
- 2 PLACE DECIMALS ±.02
- 3 PLACE DECIMALS ±.010

REMOVE BURRS & SHARP EDGES

HOLE TOLERANCE PER AND10387

DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH

INTERPRET DRAWING IN ACCORDANCE WITH DOD-STD-100

MATERIAL: N.A.

FINISH: N.A.

DO NOT SCALE DRAWING

3RD ANGLE PROJECTION

	SIGNATURE	DATE
DR	S.BRYANT	7/20/18
CHK	L.SKIBICKI	7/26/18
ENGR		
APVD	R.BERRY	7/26/18

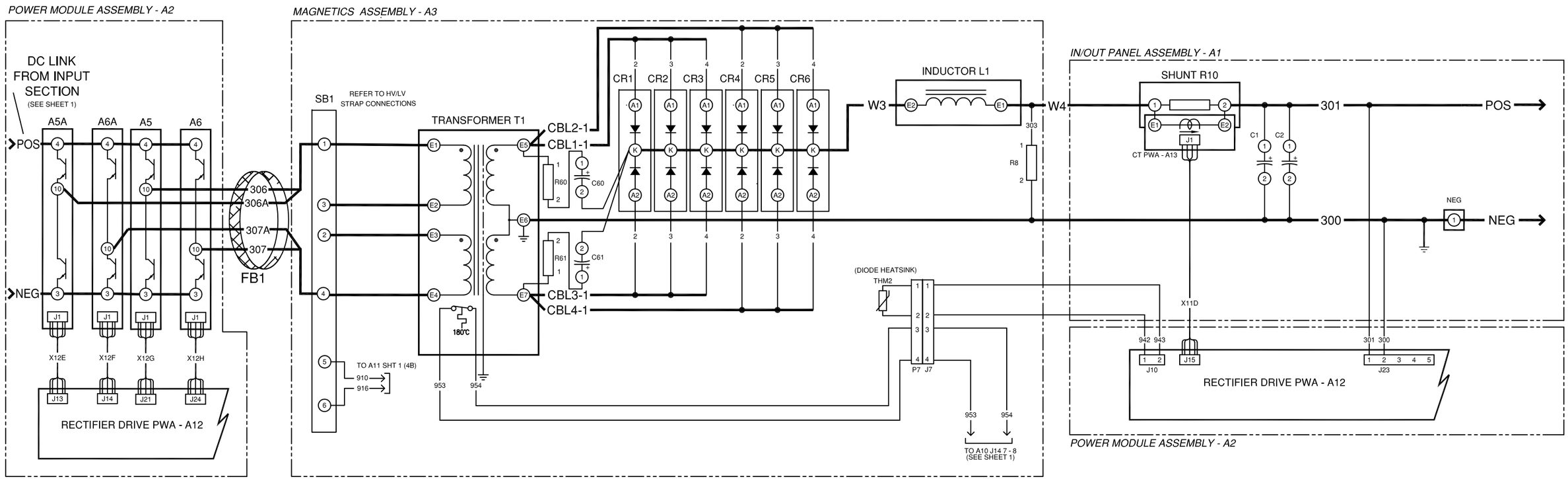
Unitron, LP
DALLAS, TEXAS 75238

TITLE
SCHEMATIC, SYSTEM
GROUND POWER UNIT
UDC-420M,TSP-4,T-3(MT)

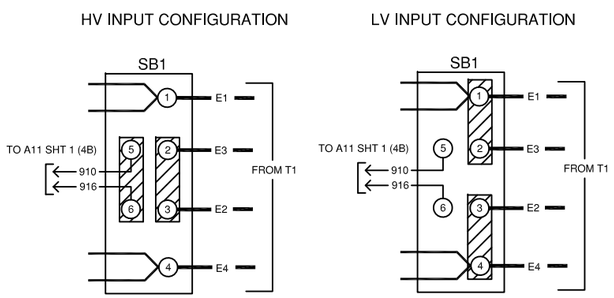
SIZE	CODE ID NO.	DWG NO.	REV
D	3BC99	198-15300-60T	C

SCALE 1/1 SHEET 1 OF 2

OUTPUT SECTION

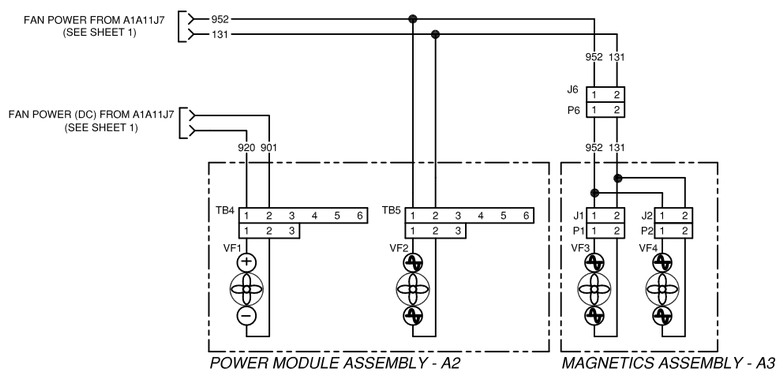


HV/LV STRAP CONNECTIONS



NOTE: MV OPTION VIA STRAPS AS HATCHED

FANS CONNECTIONS



SIZE	CODE IDENT NO	DRAWING NO	REV
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SCALE 1/1		SHEET 2 OF 2	