AETECHRON

HVR 2000CS/RG

High-Voltage Ripple Test System

Operation Manual

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2507 Warren Street, Elkhart, IN 46516

Three-Year, No-Fault Warranty

SUMMARY OF WARRANTY

AE TECHRON INC., of Elkhart, Indiana (Warrantor) warrants to you, the ORIGINAL COMMERCIAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW **AE TECHRON INC.** ***product, for a period of three (3) years from the date of purchase, by the original purchaser (warranty period) that the product is free of defects in materials and workmanship and will meet or exceed all advertised specifications for such a product. We further warrant the new AE Techron product regardless of the reason for failure, except as excluded in the Warranty.***

ITEMS EXCLUDED FROM WARRANTY

This AE Techron Warranty is in effect only for failure of a new AE Techron product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, or loss which is covered under any of your insurance contracts. This warranty does not extend to any product on which the serial number has been defaced, altered, or removed. It does not cover damage to loads or any other products or accessories resulting from **AE TECHRON INC.** product failure. It does not cover defects or damage caused by the use of unauthorized modifications, accessories, parts, or service.

WHAT WE WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair or replacement, at our sole discretion. Warranty work can only be performed at our authorized service centers or at our factory.

Expenses in remedying the defect will be borne by **AE TECHRON INC.,** including one-way surface freight shipping costs within the United States. (Purchaser must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other customs fees for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE

When you notify us or one of our authorized service centers of your need for warranty service, you will receive an authorization to return the product for service. All components must be shipped in a factory pack or equivalent which, if needed, may be obtained from us for a nominal charge. We will take corrective actions and return the product to you within three weeks of the date of receipt of the defective product, or will make available to you a product of equal or better performance on temporary loan until your product can be repaired or replaced and returned to you. If the repairs made by us are not satisfactory, notify us immediately.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES

You are not entitled to recover from us any consequential or incidental damages resulting from any defect in our product. This includes any damage to another product or products resulting from such a defect.

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this warranty. The warranty is not extended by the length of time for which you are deprived of the use of this product. Repairs and replacement parts provided under the terms of this warranty shall carry only the unexpired portion of this warranty.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER

There is no warranty that extends beyond the terms hereof. This written warranty is given in lieu of any oral or implied warranties not contained herein. We disclaim all implied warranties, including, without limitation, any warranties of merchantability or fitness for a particular purpose. No action to enforce this Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.
This statement of warranty supersedes any others contained in this manual for AE Techron products.

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Contents

Figure 1.1 – HVR 2000CS Test System

1 About the HVR 2000CS & RG Test Systems

Congratulations on your purchase of an AE Techron **HVR 2000CS or RG** test system, designed for high-voltage ripple testing of electric vehicles to various EMC standards for the automotive and aerospace industries.

High-voltage electric vehicle testing is a rapidly growing automotive test requirement. With the HVR 2000, AE Techron introduces a complete ripple immunity test system. This powerful new test system will be very competitive with the few limited options in the market today.

Focused on standards compliance, this system offers ease of use, rugged construction, and comprehensive system protections and limits. The HVR 2000 is designed to be forgiving of accidental misuse while being safe for the user and for the equipment being tested.

When compared to other options, this system features reduced user training time, greater system up time, customizable test modifications, no recurring license fees (future updates to standards are included in the initial purchase price), and a small in-lab footprint.

1.1 Disclaimer

Although AE Techron has made substantial effort to ensure the accuracy of the Standards' test files that are included with the HVR 2000 test system, no warranty, expressed or implied, is made regarding accuracy, adequacy, completeness, legality, reliability or usefulness of the information provided. It is the responsibility of the user to ensure the accuracy and applicability of these test files for their intended purposes.

2 System Setup

2.1 Safety First

Throughout these instructions, special emphasis is placed on good safety practices. The following graphics are used to highlight certain topics that require extra precaution.

SHOCK HAZARD

SHOCK HAZARD represents life-threatening danger from electric shock. Extreme bodily harm or death will occur if these guidelines are not followed.

DANGER

DANGER represents the most severe hazard alert. Extreme bodily harm or death will occur if these guidelines are not followed. Note the explanation of the hazard and instruction for avoiding it.

WARNING

WARNING alerts you to hazards that could result in severe injury or damage to property or equipment. Note the explanation of the hazard and the instructions for avoiding it.

CAUTION

CAUTION indicates hazards that could result in potential injury or equipment or property damage. Once again, note the explanation of the hazard and the instructions for avoiding it.

NOTE

Symbol for general notices.

2.2 Unpacking and Installing

Your system will be delivered to the ship-to address enclosed in a wooden crate with special, shock-absorbing pads. With the addition of packaging, the unit can weigh several hundred pounds (kilograms).

To uncrate the product, follow the **Unpacking Your Product** instructions included with your shipment. The cabinet can be removed from the crate using the built-in hinged ramp or by using a forklift or other suitable equipment to glide the amplifier from the crate.

WARNING

Use caution when using a forklift to move this system. Crushing bodily injury can result if care is not taken during uncrating and installation.

Forklift provisions are provided in the base of the cabinet to facilitate this removal procedure (see **Figure 2.1**).

The system has been tested and inspected for damage before leaving the factory. Carefully unpack and inspect the product for damage. **Please note any damage for future reference and notify the shipping company immediately if damage is found.** Also, please save the shipping crate and pallet as evidence of damage and/or for returning the amplifier for repair.

Figure 2.1 – Provisions in Unit's Base for Forklifts

CAUTION

Use caution when inserting the forklift tynes into the unit's lifting base. Do not drag the tynes heavily against the bottom of the unit when entering or exiting the base. Keep the tynes level at all times while handling the unit.

2.3 Check Contents

In addition to the HVR 2000 system, your shipment should include the following:

1. LCD monitor
2. Monitor power cord
3. HDMI-to-DVI monitor cable
4. USB mouse
5. USB keyboard
6. Male pin-plug connectors (2)
7. Ethernet cable
8. Mouse pad
9. Quick Start Guide
10. HVR 2000CS/RG Operation Manual on USB drive

CAUTION

DO NOT use the system's wheels to transport the system over long distances. The system's wheels should be used only for moving the system over a short distance to position it in its permanent location.

2.4 HVR 2000 System Location

HVR 2000 test systems are mounted on wheels to allow rolling on a flat, smooth surface. The system's wheels should be used only for moving the system over a short distance to position the unit in its permanent location. DO NOT use the system's wheels to move the system over long distances. To avoid possible tipping, always push the system from the front and avoid rough or pitted surfaces.

Locate your system near a three-phase power source. Allow enough clearance at the front and back to allow adequate airflow and hot air discharge through the system's rear. See Figure 2.2 for clearance recommendations.

All of the wheels on the system are equipped with a leveling pad that can be used to adjust the height of each wheel (see Figure 2.3). This leveling mechanism will also act to lock each wheel in place and prevent unintentional movement of the unit.

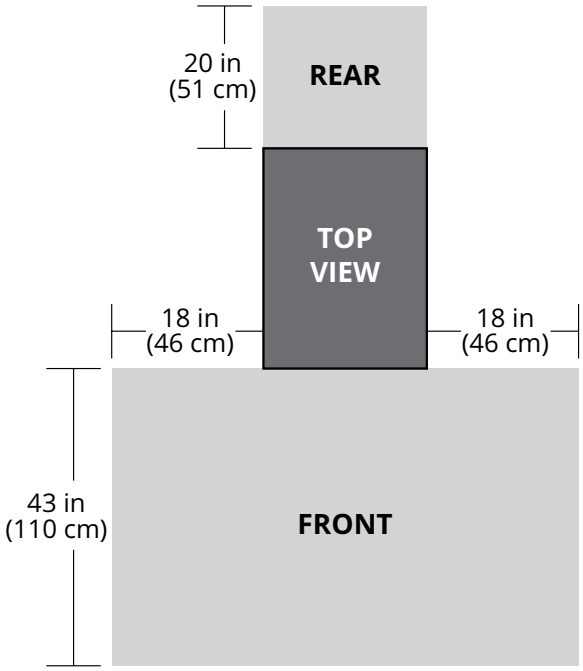

Figure 2.2 – Clearance Recommendations for System Placement

Figure 2.3 – Leveling Pads on System's Wheels

Two covers have been provided to insert into forklift openings at the front of the system once it has been set in its final location.

2.5 Connecting Peripheral Equipment

Complete the following steps to connect the peripherals and accessories provided to the HVR 2000 Peripheral Connections panel located on the back of the system. Refer to Figure 2.4 for component locations. Using the top row of connections labeled "PC":

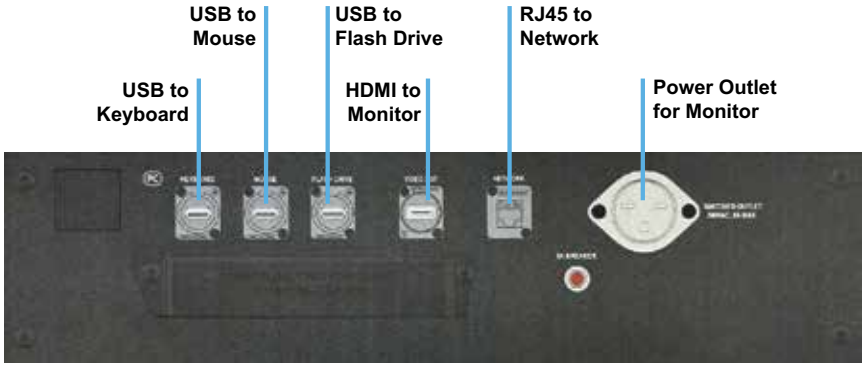

Figure 2.4 – Connecting Peripheral Equipment

1. Plug the USB keyboard into the USB port labeled KEYBOARD.
2. Plug the USB mouse into the port labeled MOUSE.
3. Plug the HDMI to DVI cable into the HDMI port labeled MONITOR and then connect the cable to the DVI port on the monitor.
4. Plug the monitor power cord into the power outlet on the panel.
5. **OPTIONAL:**
   a. To connect the HVR 2000 system to be accessed and controlled through a network: plug the Ethernet cable to the Ethernet port labeled NETWORK, and then plug the Ethernet cable into a router, switch or hub on the network.
   b. Use the USB port labeled FLASH DRIVE for software updates or to move test files to and from the HVR 2000 system.

Note on Network Control of the HVR 2000: After network control of the HVR 2000 has been implemented, the monitor, keyboard and mouse can be disconnected from the HVR 2000 and the system can be operated remotely. See the topic "Remote Operation" in the ***HVR System Software Manual*** for more information.

2.6 Connect the Test Supply to the DUT

Make sure the HVR 2000 system is turned off and AC power is disconnected. Remove the TOP safety cover by loosening the two red knobs on top

Figure 2.5 – Test Supply Connections Safety Cover

Figure 2.6 – Test Supply Connections (HVR 2000 System Output)

and then pulling out and up to clear the lip at the bottom (See figure 2.5).

Using wiring appropriate for your application, run the wiring from the device under test through the cable grommet and connect to the HVR 2000 system's positive and negative test supply connectors (See Figure 2.6). Reinstall the safety cover by engaging the bottom lip and then moving the top into place and re-tighten the red knobs. **NOTE: The system will not power up if this safety cover is not properly installed.**

2.7 Connect the Power Source

Complete the following steps to connect the unit to a 480V three-phase power source:

WARNING

ELECTRIC SHOCK HAZARD.

Output potentials can be lethal. Make connections only with AC Power unplugged or switched off at the source and the system's AC power switch in the OFF position.

1. Wear safety goggles.
2. Disconnect your AC power source.
3. Open the access door on the back of the product cabinet to access the power connections, which can be found at the bottom of the cabinet, behind the panel containing the breaker and AC inlet.
4. Route the AC power input cable into the cabinet through the cable strain relief, located on the AC inlet panel (See Figure 2.7).
5. Locate the power distribution block at the bottom of the cabinet. Open the distribution block cover and connect the AC power line to the AC input terminals as shown (see Figure 2.8).
6. If connecting to an AC power cord, verify connector wiring for phases, neutral, and safety ground. Verify that proper phase, neutral, and safety ground connections have been made at the AC mains breaker.

WARNING

ELECTRIC SHOCK HAZARD. Power supply wiring should only be performed by a qualified, licensed electrician.

Figure 2.7 – Routing the AC Power Input Cable

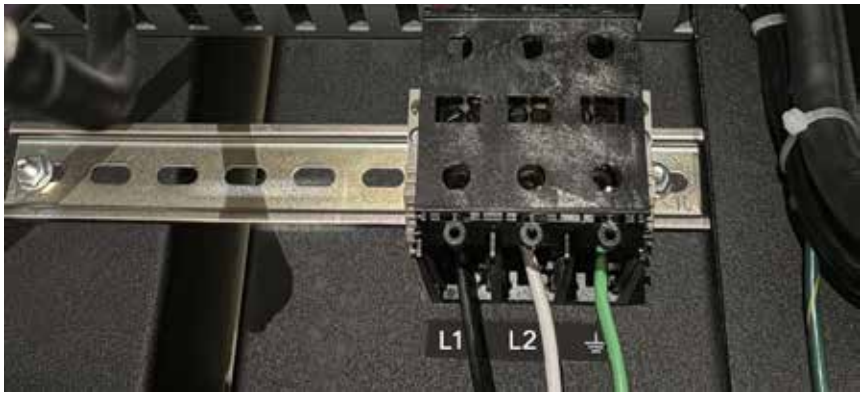

Figure 2.8 – Wiring the AC distribution block

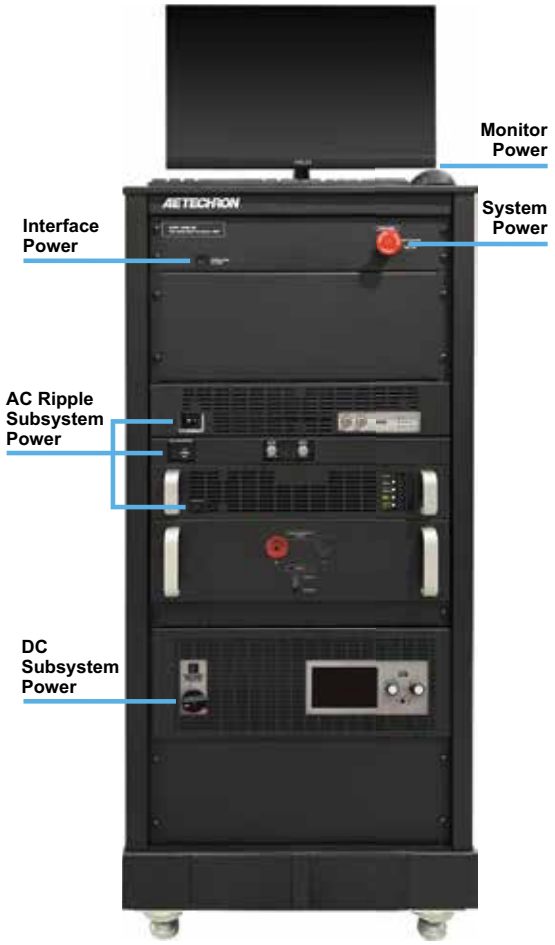

Figure 2.9 – Startup and Shutdown Procedure Power Switches

2.8 Startup Procedure

Complete the following steps to power up the HVR 2000 system.

1. Use the monitor's power switch (last button on the right) to turn on the monitor.
2. Turn on the three power switches of the AC Ripple subsystem.
3. Turn on the power switch of the DC Power subsystem (CS Model only).
4. Confirm all subsystems are switched ON.
5. Twist the SYSTEM POWER switch to release it and turn the HVR system ON.
6. Depress the Internal micro PC Power button on the front top panel to turn the system control on.
7. Wait for the system interface to load (loading will take up to 30 seconds).
8. (RG Model only): Turn on the power switch on the external DC Power Supply.

2.9 Shutdown Procedure

IMPORTANT: All components of the AC Ripple and DC Power subsystems must be turned off before shutting down the HVR 2000 System.

Failure to follow the proper shutdown procedure can result in damage to the subsystems or any connected load/DUT.

Complete the following to safely shut down the HVR 2000 System:

1. Turn off the power switch of the DC Power subsystem (CS Model) or the external DC Power Supply (RG Model).
2. Turn off the three power switches of the AC Ripple subsystem.
3. After the subsystems have been disabled, turn off the Internal micro PC Power.
4. Finally, turn the system OFF by pressing in the System Power button.

CAUTION

IMPORTANT: Any powered amplifiers that are connected to the 3110A must first be disabled before shutting down the 3110A or the HVR 1000 System. Failure to follow the proper shutdown procedure can result in damage to the amplifiers or any connected load/DUT.

3 Operation

IMPORTANT: The HVR 2000 system has been calibrated for factory settings. Please consult the ***HVR System Software Manual*** to verify the correct System Gain and DC Offset settings for your system.

3.1 System Overview

Your HVR 2000CS system provides an integrated AC Ripple subsystem and a DC Power subsystem, both controlled through the convenient user interface software. The location of each module is specified in Figure 3.1.

NOTE: The RG model only has the integrated AC Ripple subsystem and uses an external DC power supply.

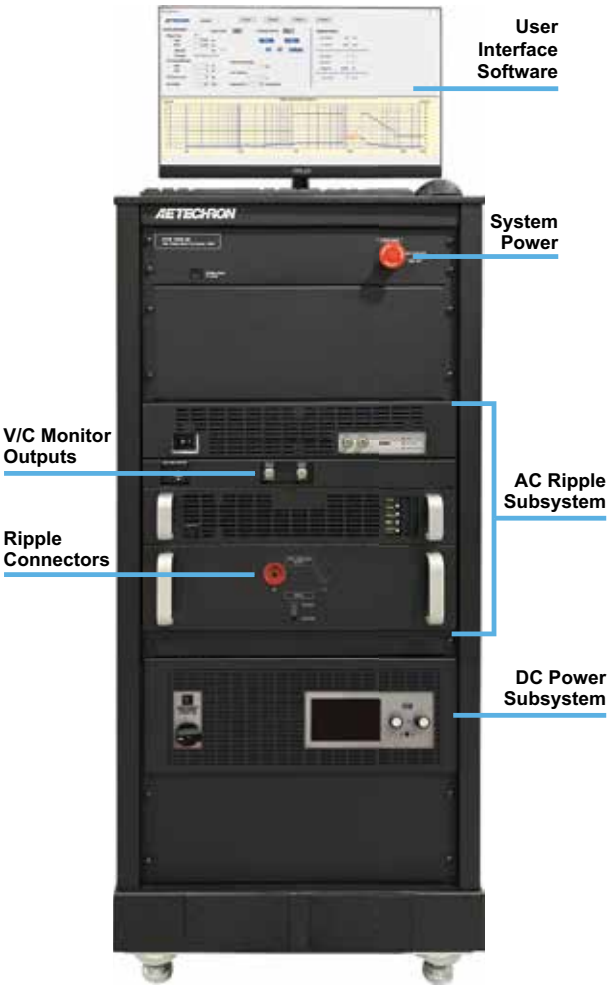

Figure 3.1 – HVR 2000CS System Controls and Components

3.2 System Controls and Connectors

Refer to Figure 3.1 for component locations.

System Power: A power/emergency stop switch is provided which controls the power supply to the system and all system components. Twist it to release and turn on the system. Push in the switch to power off the system.

Current Monitor: An unbalanced BNC connector is provided for current monitoring.
1V=10A (Not ripple only)

Voltage Monitor: An unbalanced BNC connector is provided for voltage monitoring.
1V=10V (Ripple only)

Ripple Output: High current pin connectors are provided to connect directly to the Ripple generator output for low-voltage tests where the DC supply is not required. A Ripple Switch allows the user to bypass the DC supply and use the ripple generator separately or have it coupled to the full system output.

Test Supply (System Output): A pair of high-current bus bars are provided on the back of the cabinet to supply the test signal to the DUT (see Figure 3.2). Use appropriately sized wires and terminals to bolt to the bus bars.

Figure 3.2 – Test Supply Connection

3.3 Signal Generation Components

3.3.1 HVR Control Software Operation

The HVR System provides an intuitive interface for waveform sequence creation and generation.

The accessories (Monitor, Mouse, & Keyboard) required for operation of the control software program are connected using the connections labeled PC on the Accessories panel located at the top rear of the cabinet. Refer to Figure 3.3 for connector locations.

If nothing is displayed on the monitor, make sure the Interface Power button is pressed on the upper front panel of the system.

Please refer to the ***HVR System Software Manual*** for details on the operation of the interface and control software. The software manual is also provided in pdf format on the USB drive shipped with your HVR 2000 system, or on the AE Techron website at aetechron.com.

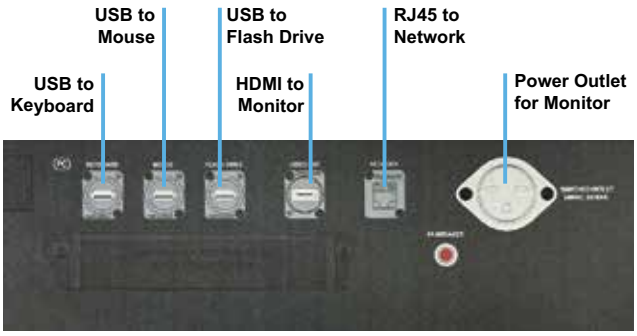

Figure 3.3 – Back-panel Peripheral Equipment Connectors

3.4 Control & Monitoring Operation

This module works mostly in the background providing the interface to control and monitor the system. The power switch on the left side controls the power for this unit and should be on whenever the system is on. This unit also provides BNC connectors for analog monitoring of the Ripple output voltage and current.

3.5 AC Ripple Subsystem Operation

This subsystem provides the high-current ripple output. This section provides an overview of Front-Panel controls found on the HVR 2000 AC Ripple subsystem. Refer to Figure 3.4 for details.

3.5.1 Run / Standby Switch

This switch releases the subsystem to Run Mode or forces it into Standby.

3.5.2 Run / Standby Indicator

Run mode: The indicator will be lit solid green. The high-voltage power supply is energized and the unit will amplify the input signal.

Standby mode: The indicator will be lit solid amber. The unit will be placed in Standby when one of the following conditions occurs:

1. Power Supply condition
2. Overtemp condition
3. Over Current condition
4. The user sets the front-panel Standby-Run switch to the Standby (left) position.

In Standby mode, the low-voltage power supply is energized but the high-voltage power supply is not.

To release the unit from Standby mode:

1. **Power Supply condition:** If the Power Supply indicator is lit, the unit is trying to absorb too much power. Turn the unit's front Standby-Run switch to the Standby position, and then either adjust the input signal or the load to lower the power being returned to the unit. Turn the Standby-Run switch to the Run position to resume operation. If both the Power Supply and Overload indicators are lit, too much power is being drawn from the power supply. This condition often occurs due to high-current operation into a very small load. Turn the front Standby-Run switch to the Standby position, then reduce the input signal or increase the load impedance to lower the current requirements. Turn the Standby-Run switch to the Run position to resume operation.
2. **Overtemp condition:** This condition often occurs when the required power exceeds the unit's capabilities. Disconnect the input signal from the unit and leave the Standby-Run

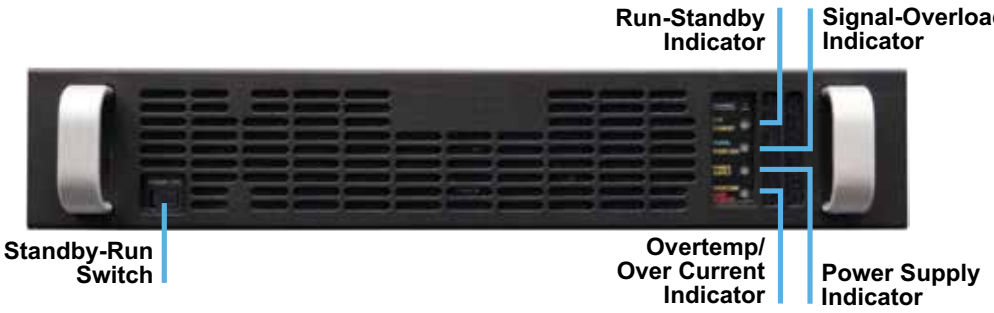

Figure 3.4 – AC Ripple Subsystem Front-Panel Controls and Indicators

switch in the Run position, with the fans operating to cool the unit. When the subsystem's internal temperature drops to less than 100°C, the unit will resume operation. If it continues to overheat while operating within the it's capabilities, the unit may require maintenance. See the Troubleshooting section for more information.

3. **Over Current condition:** This condition can occur when a very high current is being drawn from the unit. Lower the operating level, then turn the front panel Standby-Run switch to Standby. and then turn back to Run to reset the unit. If the fault condition reoccurs or does not clear, the unit may require servicing. See the Troubleshooting section for more information.
4. **Standby-Run switch pressed:** When the unit is operating (Run mode), setting the front-panel Standby-Run switch to the Standby position (left) will place it in Standby mode. Set the switch to Run (right) to release from Standby and return to Run mode.

3.5.3 Signal / Overload Indicator

Signal Presence: When an input signal is presented at an active signal input on the unit at a level greater than 0.5V, the Signal/Overload indicator will light solidly green.

Overload (clipping): The indicator will flash amber intermittently. When the indicator flashes amber, this indicates that the output of the system could not follow the input signal due to voltage or current limits. The amber Overload indicator will begin flashing when distortion is greater than 0.1%.

3.5.4 Power Supply Indicator

This amber indicator will illuminate, and the unit will be placed in Standby under two conditions:

1. The unit is sinking too much power. Under these conditions, typically only the Power Supply indicator will be lit.
2. Too much power is being drawn from the power supply. This condition often occurs due to high current operation into a very small load. Under these conditions, both the Power Supply and the Overload indicators will typically be lit.

To remove the unit from Standby, first change the Standby-Run switch to the Standby position. Then adjust the input signal or the load to lower the power requirements or the power being returned. Change the Standby-Run switch to the Run position to resume operation. If the Power Supply indicator does not turn off or if the unit does not return from Standby, it may require servicing. See the Troubleshooting section for more information.

3.5.5 Overtemp / Over Current Indicator

Overtemp Condition: The unit monitors the temperature inside the high-voltage power supply and in the output stage heat sinks. The Overtemp / Over Current indicator will light amber and the unit will be placed in Standby mode when the temperature sensors detect a condition that would damage it. If the Overtemp pulse is extremely short, as in the case of defective wiring or switches, this indicator may be lit too briefly to observe.

To remove the unit from Standby and return it to normal operation after an Overtemp fault has oc-

curred, make sure the Standby-Run switch is in the Run position and the fans are running. Then disconnect the input signal from the unit. Allow the fans to run until the unit automatically returns to Run mode. See the Troubleshooting section for information on identifying and correcting the cause of an Overtemp fault condition.

Over Current Condition: The unit monitors the current levels produced at output. The Overtemp / Over Current indicator will light red and the unit will be placed in Standby mode when the current sensors detect operation at the peak current level for more than 500 ms. An Over Current condition can occur when the unit is operated at high levels into very-low impedance loads (below 0.25 ohms).

To remove the unit from Standby and return it to normal operation after an Over Current fault has occurred, complete the following steps:

1. Turn off the signal source.
2. Set the front-panel Standby-Run switch to the Standby position (left).
3. Turn off the AC mains.
4. Turn AC mains power back on. If the Over Current (red) LED doesn't illuminate again, press the Standby-Run switch to place the unit in Run mode and turn the signal source on.
5. If the Over Current LED is still illuminated and the Fault condition doesn't clear, return the unit for Factory Service. See the Factory Service information at the end of the Troubleshooting section of this manual.

3.6 Coupling Transformer Module Operation

The Coupling Transformer Module provides the means to combine the Ripple output with the high-voltage DC output to create the proper test signals to the DUT.

A selector switch is provided to allow the signals to be combined (Coupled) or separated (Bypassed). In the Bypassed mode, the Ripple output is provided directly via the high-current Supercon pin connectors on the front of the Coupling Transformer Module (see Figure 3.5). This configuration can be used for low-voltage tests where only the amplifier output is required.

Figure 3.5 – Coupling Transformer Module

3.7 DC Power Subsystem Operation

3.7.1 HVR 2000CS

Your HVR 2000CS system contains a high-voltage DC Power Supply subsystem to provide the high-voltage DC output.

The power subsystem contains a power switch on the left side of the front panel that is rotated to turn the subsystem on. An LCD screen is provided on the right side to display the status of the unit. If any errors are displayed, please refer to the Troubleshooting section of the Power Supply Manual for further details.

3.7.2 HVR 2000RG

The RG model requires an external DC power supply. To connect the external DC power supply, make sure the HVR 2000RG system is turned off and AC power is disconnected. On the back of the unit, remove the BOTTOM safety cover, by loosening the two red knobs on top and then pulling out and up to clear the lip at the bottom, to access the DC Supply Input connections.

Figure 3.6 – DC Power Supply Connector Safety Cover

Using wiring appropriate for your application, connect the DC Supply outputs to the HVR 2000RG system's positive and negative DC Input connectors.

NOTE: If preliminary testing is done without a DC Supply, the DC input connections must be shorted with a wire connecting between the two.

Reinstall safety cover by engaging the bottom lip and then moving the top into place and re-tighten the red knobs. **NOTE: The system will not power up if this safety cover is not properly Installed.**

Figure 3.7 – DC Power Supply Input Connectors

3.8 HVR Software Operation

Once the HVR 2000 system has been powered up, the interface software should automatically open and be ready for use. Please consult the ***HVR System Software Manual*** for instructions on using the software.

3.9 System Calibration

System calibration is performed on the HVR 2000 system before it is shipped. To calibrate the unit to your specific requirements, please consult the ***HVR System Software Manual.***

Figure 3.8 – HVR Software Homescreen

3.10 System Safety Controls

Your HVR 2000 system provides several controls to help protect the system and the user from electrical faults or unsafe operation. These controls include the following:

Power/Emergency Stop: This switch is located on the system's front near the top of the cabinet. When in the OFF position, the system's high-power circuits are disabled (See Figure 3.9). Twist and release the switch to power the system on; press the switch in to power the system off.

System Circuit Breaker: This switch is located on the system's rear near the bottom of the cabinet (see Figure 3.10). When in the OFF position, all power to the system is disabled. To turn the System Circuit Breaker off, move the switch to the DOWN position.

Cabinet Door / Safety Cover Switches: These magnetic switches are located on the system's rear door and on the safety cover over the output terminals. When the rear door to the system's cabinet is opened, or the safety cover is removed from the output terminals, the system's high-power circuits are disabled. Close the door or reinstall the cover to return power to the system.

Figure 3.9 – System Power Switch

Figure 3.10 – System Circuit Breaker

4 Maintenance

Simple maintenance can be performed by the user to help keep the equipment operational. The following routine maintenance is designed to prevent problems before they occur. See the "Troubleshooting" section for recommendations for restoring the equipment to operation after an error condition has occurred.

Preventative maintenance is recommended after the first 250 hours of operation, and every three months or 250 hours thereafter. If the equipment environment is dirty or dusty, preventative maintenance should be performed more frequently.

The procedures outlined in this section are directed towards an experienced electronics technician; it assumes that the technician has knowledge of typical electronics safety and maintenance procedures.

CAUTION

Before you begin, make sure your unit is disconnected from the power source, with power switch in the OFF position

4.1 Clean Filters and Grills on AC Ripple Subsystem

Tools Required

The recommended equipment and supplies needed to perform the functions required for this task are described below.

- Vacuum cleaner
- Damp cloth (use water only or a mild soap diluted in water)

To ensure adequate cooling and maximum efficiency of the internal cooling fans, the amplifier's front and rear grills should be cleaned periodically. To clean the amplifier grills and filter, complete the following steps:

1. Follow the procedure to completely turn the system OFF. Then disconnect the system from its power source.
2. Using a vacuum cleaner, vacuum the front ventilation grill and the back ventilation exit grill.
3. Remove the front grill by pulling the grill firmly away from the unit.
4. Remove the filter and vacuum. You can also clean the filter using mild soap and water. **IMPORTANT:** Make sure the filter is completely dry before reinstalling on the unit.
5. Using a damp cloth, clean the front and rear ventilation grills. Dry with a clean cloth or allow to air dry. **IMPORTANT:** Grills should be completely dry before plugging in or restarting the unit.
6. Reinstall the filter and replace the unit's front grill.

CAUTION

The front grill is held on by strong magnets. When replacing the front grill, hold the grill by its side edges and be sure to keep fingers clear of the grill back. Pinching injuries can occur if the grill is replaced improperly.

4.2 Clean Cabinet Interior

Tools Required

The recommended equipment and supplies needed to perform the functions required for this task are described below.

Vacuum cleaner

1. Using a vacuum cleaner, remove any dust that has accumulated within the cabinet interior.
2. Close the cabinet rear door and restart the test system. Check for any problems such as inoperative fans that might cause overheating.

5 Applications

5.1 Low-Voltage Tests

For tests requiring less than +/-200Vp, the AC Ripple Subsystem can be separated from the rest of the system and run similarly to the AE Techron DSR 100 system. To configure the system for this mode:

1. Verify that the system power is OFF.
2. Turn off the power switch on the DC Power Subsystem.
3. Select the "Bypassed" mode with the RIPPLE switch on the front of the Coupling Transformer Module.
4. Connect the DUT to the RIPPLE Output connectors using the pin connectors supplied with the system with appropriately sized wires for the current required (Up to 100Ap). See Figure 5.1 for reference.
5. Power up the system and open the 3110A SWG software.

Figure 5.1 – Coupling Transformer Module

5.2 Operating the 3110A Remote Client

On the HVR 2000 user desktop, there is an icon for the 3110A SWG Client. With this application, the 3110A inside the unit can be run remotely. For example, in DSR mode.

Exiting the HVR application and starting the 3110A SWG allows connection to the 3110A and remote operation without any other physical changes.

5.3 AE Techron Low-Voltage Testing Operation

The AE Techron AC Ripple Subsystem can now be operated independently to provide waveform sequence creation and generation interface with the DUT directly.

To select a pre-programmed test from the Standard's Library, simply use the Files button to open the files window and select the test file. Refer to Figure 5.2 for on-screen controls' locations.

Custom test files can be created by adding waveforms and controls to the test sequence display. For help in getting up and running quickly on the software, please see the "3110A Tutorials" section in the ***3110A Help*** files.

Please also refer to the ***3110A Help*** files for general operation and troubleshooting information, The Help files are available by selecting the Help button from the software's main window. They are also provided in pdf format on the USB drive shipped with your HVR 2000 system, or on the AE Techron website at aetechron.com.

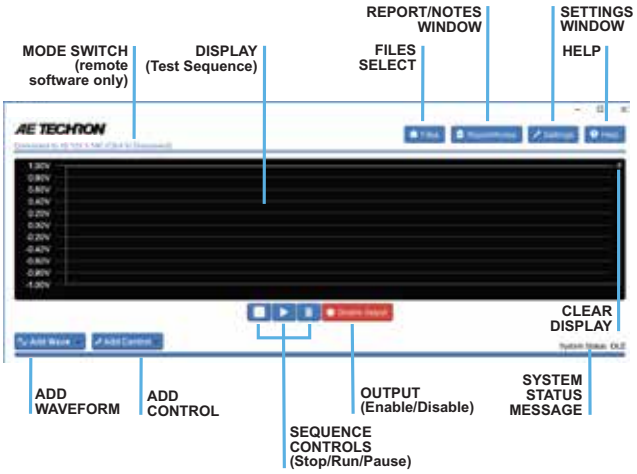

Figure 5.2 – AE Techron 3110A SWG Software On-screen Controls

6 Troubleshooting

If the HVR system is not operating correctly, review the topics below for help with troubleshooting the problem. If the condition or error you are experiencing is not listed below, please contact AE Techron Technical Support at 574-295-9495 for additional help.

PROBLEM: Cabinet does not power on; no LEDs are lit on the AC Ripply Subsystem.

A: Check that the AC mains are connected to the cabinet and the AC mains is switched on. Next, check that the rear cabinet door of the HVR 2000 is closed and the Test Supply safety cover is properly installed.

Also check that the system's rear circuit breaker is in the ON (UP) position (see Figure 6.1). Finally, check to make sure the system's front System Power switch is in the ON position (see Figure 6.2).

Figure 6.1 – System Circuit Breaker

Figure 6.2 – System Power Switch

PROBLEM: The system has no signal output.

A: Check the following:

1. Check to make sure the DC Power Subsystem is on and no error displayed.
2. Check that all power switches for the AC Ripple Subsystem are turned on.
3. Check that the AC Ripple Subsystem is in RUN mode indicated by a solid green Run/Standby indicator LED. See the sections below to resolve any error conditions.
4. Check the output connections for any loose wires.
5. Check that the User Interface is able to control both the AC Ripple and DC Power subsystems.
6. Verify AC ripple voltage by monitoring at the Ripple Output connectors on the Coupling Transformer Module.

PROBLEM: On the AC Ripple Subsystem, no LEDs are lit and/or fans are inoperative.

A: Check the Standby-Run Switch on the unit to make sure it is in the on position (See Figure 6.3).

Figure 6.3 – Amplifier Module Standby-Run Switch

PROBLEM: The AC Ripple Subsystem is displaying the Overtemp Warning message/LED.

A: The subsystem may overheat due to one or both of the following conditions:

7. Excessive power requirements and/or
8. Inadequate air flow.

The AC Ripply Subsystem will overheat if the required power exceeds the system's capabilities. High duty cycles and low-impedance loads are especially prone to cause overheating. To see if excess power requirements are causing overheating, check the following:

1. Check the "Specifications" information provided on the product's datasheet to verify that your application's requirements fall within the capabilities of this system.
2. Check for faulty output connectors and/or load.
3. Check for undesired DC offset at the output and on the input signal.

If the AC Ripple Subsystem chronically overheats with suitable power and load conditions, then the unit may not be receiving adequate airflow. Check the following to determine the cause of inadequate airflow:

1. Check air filters for excess dirt and dust. Perform the steps outlines in the "Maintenance" section to clean the filters and cabinet.
2. Visually inspect fans to assure correct operation while the system is on. Any inoperative, visibly slow, or reverse-spinning fans should be replaced. Please see the Factory Service information at the end of this section.

An Overtemp condition places the unit in Standby mode. If the Overtemp pulse is extremely short, as in the case of defective wiring or switches, the Overtemp pulse may be too brief to observe.

Resetting After Overtemp: To reset the unit after an Overtemp has occurred, make sure fans are running and allow the fans to run until the unit has cooled sufficiently and the system automatically returns to Run mode.

NOTE: Typically, overheating that occurs in the unit's outputs due to inadequate airflow or very low impedance loads will clear within 5 minutes. Timing the cool-down period for the unit may help to determine the cause of the overheating.

If the fault condition does not clear, contact AE Techron for additional technical support.

PROBLEM: The AC Ripple Subsystem is displaying the Over Current Warning message/LED.

A: The unit contains protection circuitry that disables the unit if an output current exceeding the peak current level is sensed for more than 500 ms.

To clear the Fault condition, follow these steps:

1. Turn off the signal source.
2. Turn off the system AC mains.
3. Turn AC mains power back on. If the Over Current (red) LED doesn't illuminate again, switch the Standby-Run switch back to Run and turn the signal source on.
4. If the Over Current LED is still illuminated and the Fault condition doesn't clear, contact AE Techron for additional technical support. Please see the Factory Service information at the end of this section.

6.1 Factory Service:

If the troubleshooting procedures are unsuccessful, the HVR 2000 system may need to be returned for Factory Service. All units under warranty will be serviced free of charge (customer is responsible for one-way shipping charges as well as any custom fees, duties, and/or taxes). Please review the "Warranty." for more information.

All service units must be given Return Authorization Tickets by AE Techron, Inc. before being returned. Return Authorization Tickets can be requested on our website or by contacting our Customer Service Department.

Please take extra care when packaging your unit for repair. It should be returned in its original packaging or a suitable alternative. Replacement packaging materials can be purchased for a nominal fee.

Please send all service units to the following address and be sure to include your Return Authorization Ticket Number on the box.

AE Techron, Inc.
Attn: Service Department / RMA#
2507 Warren Street
Elkhart, IN 46516