



X-HW 200 Hot Wire Power Supply System Manual

© 2007 Advanced Manufacturing Engineering Technologies
35 North 1st East, Rexburg, ID 83445
208-356-7274

Table of Contents





1. Foreword.....	1-1
2. General Safety.....	2-1
3. X-HW 200 Hot Wire Power Supply System General Description.....	3-1
3.1. System Features	3-1
3.1.1. LCD Panel Display	3-1
3.1.2. Controls Cluster	3-1
3.2. Major System Components.....	3-2
4. Installation.....	4-1
4.1. Physical Description	4-1
4.2. Power Requirements	4-1
4.3. Environmental Considerations.....	4-1
4.4. Connections.....	4-2
5. Operation.....	5-1
5.1. Initial Setup.....	5-1
5.2. RUN Mode.....	5-1
5.2.1. How to Adjust the Weld Power Supply Voltage	5-1
5.2.2. How to Adjust the Weld Power Supply Frequency	5-2
5.2.3. Initiating a weld	5-2
5.2.4. Changing System Modes	5-2
5.3. CALIBRATION	5-2
5.4. Power Down and Securing the Equipment	5-2
6. General Maintenance	6-1
7. Troubleshooting	7-1
Appendix A – Amphenol Connector Wiring Diagram.....	A-1
Appendix B – X-HW 200 Exploded View	B-1

1. Foreword

Welcome to the AMET Inc. family of automated welding products. AMET Inc. systems are designed to meet the most demanding applications. The X-HW 200 Hot Wire Power Supply system allows for precision digital control of Hot Wire Voltage and Frequency which is used to provide current to the filler wire. This manual is intended to provide users of the AMET Hot Wire Power Supply system with general information on the setup, operation, and care of their systems.

Important Information About This Manual

Throughout this manual, these icons will highlight specific information related to each category.

<i>Icon</i>	<i>Function</i>
 Note:	Note - Highlights or reviews important information and general points of interest.
 Caution:	Caution - Highlights items, which can cause damage to the system and/or injury to operators.
 Tip:	Tip - Identifies programming suggestions and operational information for the HOT WIRE POWER SUPPLY Controls System.
	Safety - Identifies specific safety concerns. These items may vary depending on how the system is equipped; however, general safety practices remain constant in all situations and environments.

Customer Service Assistance

If you are experiencing difficulty with your system or for specific technical issues or questions concerning the setup, operation, calibration or maintenance of the Hot Wire Power Supply system, please contact AMET Technical Support at 208-356-7274.

2. General Safety

Arc Welding Safety Precautions



Arc Welding May Be **HAZARDOUS**.

PROTECT YOURSELF and others from possible serious injury or death!

KEEP CHILDREN AWAY at all times!

PACEMAKER WEARERS KEEP AWAY until such time as you have consulted your doctor.



Welding exposes you to certain hazards. However, welding is safe when precautions are taken. The following safety information only summarizes the more complete safety information found in the Principal Safety Standards manuals listed at the end of this section (p. 6).

Read and follow all Safety Standards!

ELECTRIC SHOCK CAN KILL

Touching live electrical parts may cause fatal shocks or severe burns. The electrode and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire and torch are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.



1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Use dry insulating mats or covers to insulate yourself from work and ground.
4. Disconnect input power before installing or servicing the equipment.
5. Properly install and ground any equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use.
7. Ground the work piece to a good electrical (earth) ground.
8. Do not touch electrodes while you are in contact with the work (ground) circuit.
9. Use only well maintained equipment. Repair or replace damaged parts at once.
10. Keep all panels and covers securely in place.

**ARC RAYS CAN BURN EYES AND SKIN
NOISE MAY DAMAGE HEARING**

Arc rays from the welding process produce intense heat and strong ultraviolet rays that will burn eyes and skin. Noise from some processes can damage hearing.



1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in the Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Face shields are recommended.
3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
5. Use approved earplugs or earmuffs if the noise level is high.

**FUMES AND GASES CAN BE HAZARDOUS TO
YOUR HEALTH**

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.



1. Keep your head out of the fumes. Do not breathe fumes.
2. If indoors, ventilate the area and/or exhaust welding fumes and gases from the arc.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheet (MSDS) and the manufacturer's instructions for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air, causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals (such as galvanized, lead, or cadmium plated steel) unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coating and any metals containing these elements can give off toxic fumes if welded.

FLYING SPARKS AND HOT METAL CAN CAUSE INJURY

Chipping and grinding cause flying metal. As welds cool, they can throw slag.



1. Wear approved face shields or safety goggles. Side shields are recommended.
2. Wear proper body protection to protect skin.

WELDING CAN CAUSE FIRE OR EXPLOSION

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot work piece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.



1. Protect yourself and others from flying sparks and hot metals.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within a minimum of 35 ft. (10.7m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
5. Watch for fire and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Welding sealed containers such as tanks or drums is very dangerous. Expanding gases within the container can cause explosions.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Remove stick electrode from holder or cut off welding wire contact tip when not in use.
10. Wear oil-free protective garments such as leather gloves, heavy shirt, cuff-less trousers, high shoes, and a cap.

CYLINDERS CAN EXPLODE IF DAMAGED

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.



1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinders are in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.
9. Near the top of the tank each cylinder has a label, which identifies its contents by name, and a brief symbol, which identifies safety concerns.

It is very important you read and understand all the Material Safety Data Sheets (MSDS) for all substances you work with and around. This is your responsibility!

MOVING PARTS CAN CAUSE INJURY

Moving parts, such as fans, rotors, and belts can cut fingers and hands or catch loose clothing.



1. Keep all doors, panels, covers, and guards closed and secured in place.
2. Have only qualified people remove guards or covers for necessary maintenance and troubleshooting.
3. To prevent accidental starting during servicing, shutdown the entire system, which includes turning off the power supply.
4. Keep hands, hair, loose clothing, and tools away from moving parts.
5. Reinstall panels or guards and close doors when servicing is finished and before starting equipment.

HOT PARTS CAN CAUSE SEVERE BURNS

Avoid any contact with all HOT materials and substances.



1. Allow a cooling period before handling, moving or servicing.
2. Use approved techniques, tools, and safety clothing (gloves, shields, shoes, eye protection, etc.).

STEAM AND PRESSURIZED HOT COOLANT CAN BURN FACE, EYES, AND SKIN

The coolant in the radiators and pressurized hoses is under pressure and can be very hot.

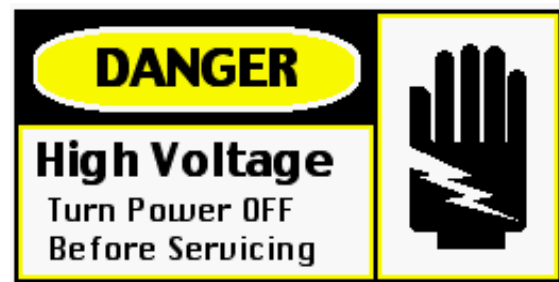


1. Wear gloves and put a rag over cap area when accessing system.
2. Allow pressure to escape before completely opening system.
3. Treat all hoses, hot or cold, with caution. Pressure can cause injury.

ELECTRICAL SHOCK CAN KILL

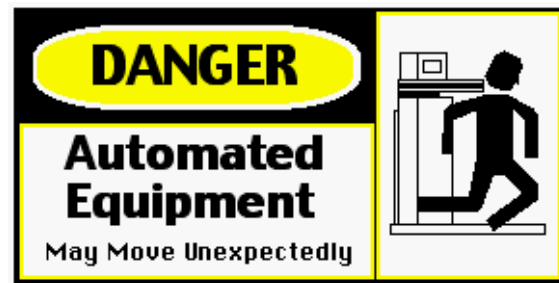
220 VOLTS

This identification label is used to call attention to immediate or imminent conditions, which if not avoided, will result in serious injury or death. Have only QUALIFIED personnel install, operate, repair, or perform any maintenance on this equipment.



AUTOMATED AND ROBOTIC EQUIPMENT MAY MOVE UNEXPECTEDLY AND CAUSE SERIOUS INJURY OR DEATH AT ANY TIME

Observe all perimeter boundaries for all automated equipment at all times.



1. Keep all guards, doors, covers, panels, and shields securely attached at all times.
2. Stop entire system when performing any maintenance, repair, installation, or inspections.
3. Observe all Safety Lines and Limits at all times.
4. Wear appropriate safety gear when operating any function of this equipment.
5. If a malfunction occurs:
6. Shut down the entire system.
7. Contact the system manager immediately.
8. If the standard system motion becomes obstructed, DO NOT ATTEMPT to clear the obstruction yourself. Follow procedures described in #5.
9. Shortcuts can cause serious injury or death and may damage the system.
10. In all situations **THINK** before you act.

Principal Safety Standards

⚡ Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

- ✦ Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
- ✦ Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
- ✦ National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
- ✦ Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202
- ✦ Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3
- ✦ Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018
- ✦ Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch, Quincy, MA 02269

3. X-HW 200 Hot Wire Power Supply System General Description

The AMET X-HW 200 Hot Wire Power Supply is a precise but powerful 200 amp hot wire feed AC power supply. It has an adjustable frequency range of 50 to 300 Hz and is capable of maintaining a constant weld voltage from 0 to 20 volts.

The X-HW 200 Hot Wire Power Supply is intended to be used as an integrated component of an AMET ADVENT or XM Controls Intelligent Welding System and is compatible with GTAW and Plasma welding processes.

3.1. System Features

3.1.1. LCD Panel Display

The LCD Panel Display (Figure 3-1) is used to display system information. The top line of the display shows the system firmware version and system status. The second and third lines display the weld power supply voltage and frequency set points. The bottom line displays the remote sensed weld voltage and current.

Figure 3-1, X-HW 200 LCD Display



3.1.2. Controls Cluster

The Controls Cluster (Figure 3-2) is a grouping of the **Contactor** Button, **Adjustment** Knob, and the Power On indicator. The **Contactor** Button is used to open and close the weld contactor which will provide output from the Hot Wire Power Supply. The **Contactor** Button is illuminated when the contactor is closed (power applied to the weld leads). The **Adjustment** Knob is used to access and adjust the various weld parameters.

Figure 3-2, X-HW 200 Controls Cluster



3.2. Major System Components

The X-HW 200 Hot Wire Power Supply is designed and manufactured as a single, simple to operate and maintain unit. Exploded views of the enclosure assembly are included as appendices to this manual for reference.

4. Installation

4.1. Physical Description

The basic Hot Wire Power Supply System consists of a Hot Wire Power Supply controller and 200 amp weld power source in a single enclosure. The physical characteristics of the basic system components are shown in Table 4-1, *Physical Characteristics* below:

Table 4-1, Physical Characteristics

System Component	Height	Width	Depth	Weight
Hot Wire Power Supply	20" (51 cm)	18 1/8" (46 cm)	25 3/4" (65 cm)	210 lbs

4.2. Power Requirements

Prior to energizing the power supply and operating the controller check that all cables and hoses are correctly connected to the Hot Wire Power Supply system and they are properly tightened. Connection point labels are provided to assure correct installation.

The electrical service requirements for the Hot Wire Power Supply system are listed in Table 4-2, *Electrical Service Requirements* below.

Table 4-2, Electrical Service Requirements

Electrical Service	Requirement
Input Voltage	480 VAC, 60 Hz
Input Current	20 A
Power Consumption	9,600 W

4.3. Environmental Considerations

Locate the X-HW 200 Hot Wire Power Supply system near a properly rated power source. The use of a power source with a separate power disconnect is recommended. X-HW 200 Hot Wire Power Supply system equipment is designed to operate in a dry, indoor environment. Do not place the X-HW 200 Hot Wire Power Supply system components outside or in an area where water leakage is frequent.

Locate the X-HW 200 Hot Wire Power Supply Controller Housing in an unobstructed location to allow for proper air flow through the X-HW 200 Hot Wire Power Supply Enclosure. The enclosure cover of the X-HW 200 Hot Wire Power Supply Controller must be able to lift off in the event that access to the inside of the Hot Wire Power Supply enclosure is required.

Avoid installations where the X-HW 200 Hot Wire Power Supply System is subject to temperature extremes. The X-HW 200 Hot Wire Power Supply System should be

operated at temperatures between 40° F and 120° F. Installations in dusty environments or areas of high vibration should be avoided to assure the full operational life of the X-HW 200 Hot Wire Power Supply Systems.

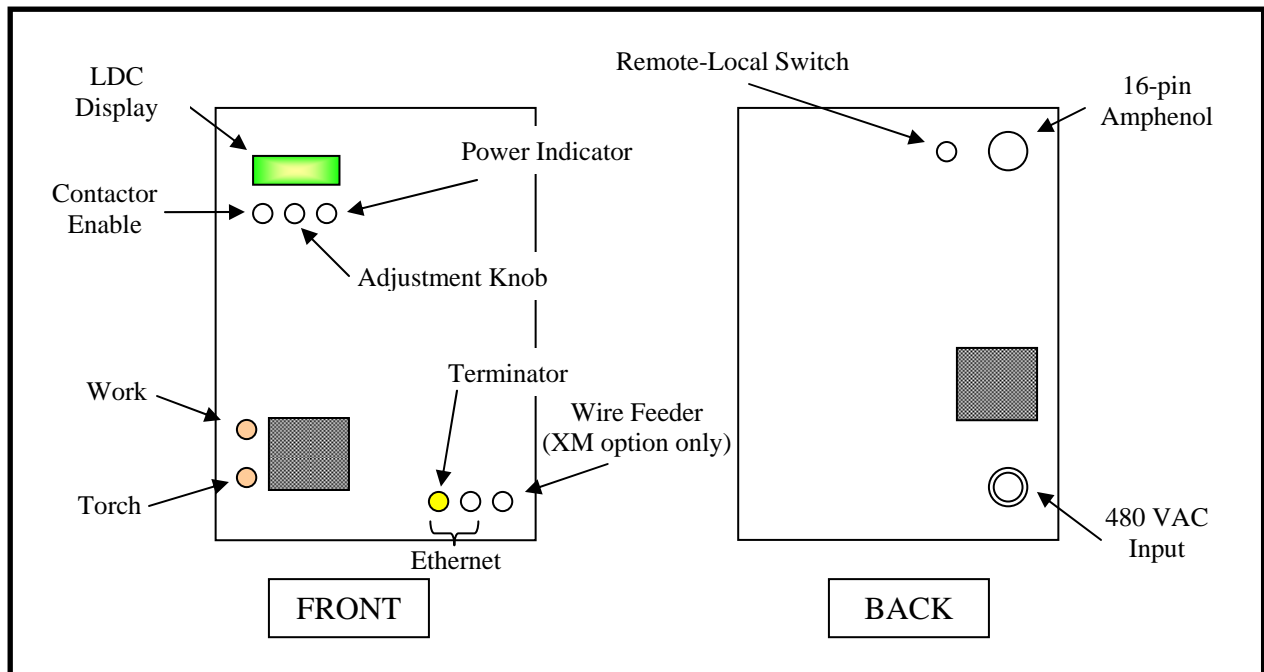
The X-HW 200 Hot Wire Power Supply System utilizes sensitive and sophisticated microprocessor technology. Avoid the use of hand held radio transmitters in close proximity of the X-HW 200 Hot Wire Power Supply System enclosure.

4.4. Connections

Refer to Figure 4-1, *X-HW 200 Hot Wire Power Supply Connections*:

- 1) Connect the Output Leads (+ and -) from the front of the Hot Wire Power Supply to the proper location. The Positive Lead should be connected to the Work and the Negative lead should be connected to the proper hot wire pickup connection, this is usually close to the wire nozzle or output of the wire feeder unit.
- 2) Connect the 16 pin Amphenol connector and associated cable to the interface connector on the back of the Hot Wire Power Supply. For information on this cable see Appendix A Amphenol Connector Wiring Diagram.
- 3) If the Hot Wire Power Supply will be used on an XM System, make sure that the Ethernet cable is plugged into the front of the Hot Wire Power Supply (In or Out connection). If the Hot Wire Power Supply is connected to an XM System and is the last unit in the Ethernet chain then a terminator must be plugged into one of the Ethernet Connectors on the front of the Hot Wire Power Supply (In or Out connection).
- 4) Connect the 480VAC Power Connector to the back of the Hot Wire Power Supply. When this connector is plugged in the Hot Wire Power Supply will be energized.

Figure 4-1, X-HW 200 Hot Wire Power Supply Connections



5. Operation

5.1. Initial Setup

Check to be sure the X-HW 200 Hot Wire Power Supply electrical connections (and any connected peripheral equipment) are proper and tight. Ensure the X-HW 200 Hot Wire Power Supply is connected to an adequate electrical source (refer to Table 4-2). The X-HW 200 Hot Wire Power Supply System is energized when the 480 VAC power cord is connected to the power input receptacle. There is no separate power (ON/OFF) switch. Check to make sure that the Local/Remote Switch on the back of the Hot Wire Power Supply is in the correct mode. Local implies that the Hot Wire Power Supply will be run from the front panel. Remote implies that the Hot Wire Power Supply will be run from an external reference and weld contactor. In the Remote Mode the Contactor Button on the front of the Hot Wire Power Supply will not function.

5.2. RUN Mode

The X-HW 200 Hot Wire Power Supply is intended to operate as an integrated component in an AMET ADVENT or XM Controls Intelligent Welding System. Whether the X-HW 200 is operated in ADVENT or XM Controls Modes is determined by a jumper setting in the 16-pin Amphenol connector on the rear of the enclosure see Appendix A Amphenol Connector Wiring Diagram. The LCD display indicates whether the system is set to operate in ADVENT Mode or XM Controls Mode when power is applied to the system. If set to operate in ADVENT Mode the display will read “XHW 2.4 AMET Inc.”. If set to operate in the XM Mode the display will read “XHW 2.4 ready”.

5.2.1. How to Adjust the Weld Power Supply Voltage

Rotate the **Adjustment** Knob until the blinking arrow is next to the “Voltage:” label on the LCD display. To adjust the weld voltage to the desired value, press in on the **Adjustment** Knob. The blinking cursor will switch to allow for adjustment of the voltage value. To change the voltage set point, turn the **Adjustment** left or right. When the desired voltage is set, press in on the **Adjustment** Knob to activate the new value. The display cursor should be on the left side of the display.

Figure 5-1, X-HW 200 LCD Display



5.2.2. How to Adjust the Weld Power Supply Frequency

Rotate the **Adjustment** Knob until the blinking arrow is next to the “Frequency:” label on the LCD display. To adjust the weld frequency to the desired value, press in on the **Adjustment** Knob. The blinking cursor will switch to allow for adjustment of the frequency value. To change the frequency set point, turn the **Adjustment** left or right. When the desired frequency is set, press on the **Adjustment** Knob to activate the new value. The display cursor should be on the left side of the display.

5.2.3. Initiating a weld

When the desired weld power supply voltage and frequency have been set, Hot Wire Power Supply Output is initiated by pressing the **Contact** Button to close the weld contactor and apply voltage to the Hot Wire Output leads, the **Contact** Button only works if the Hot Wire Power Supply is set to Local Mode. The **Contact** Button will be illuminated. Pressing the **Contact** Button again will open the weld contactor and remove voltage from the Hot Wire Output leads. The light on the **Contact** Button will turn off.

5.2.4. Changing System Modes

The X-HW 200 Hot Wire Power Supply can be integrated with either an AMET ADVENT or XM Controls Intelligent Welding system. To operate the X-HW 200 Hot Wire Power Supply with an ADVENT system, install a jumper between pins N and P in the 16-pin Amphenol cable connector at the rear of the enclosure, see Appendix A Amphenol Connector Wiring Diagram. For use with an XM Controls system, ensure there is no connection between these pins.

5.3. CALIBRATION

The X-HW 200 Hot Wire Power Supply is calibrated prior to leaving the manufacturing facility. The calibration process is complex and should only be accomplished by properly trained individuals knowledgeable of the X-HW 200 Hot Wire Power Supply operation and the test instrumentation needed to complete the procedure. The calibration procedure can be obtained from AMET’s website, www.ametinc.com, or by contacting AMET Technical Support at 208-356-7274.

5.4. Power Down and Securing the Equipment

Ensure any hot work has been removed from the system, or is safe to leave “as is” and no safety hazards exist. Check that the light around the **Contact** Button is OFF. If not, press the **Contact** Button to remove power from the weld leads. Check to ensure any connected peripherals or assemblies are properly shutdown and secured. Remove power from the Hot Wire Power Supply System by removing the 480 VAC power cord from the receptacle at the rear of the enclosure.

If the system will be left for any appreciable time, provide protection from dust or other environmental impacts appropriately, such as by using a dust cover after ensuring the

system is cool. Ensure any cover (or other) gasses, cooling water and pneumatic sources are isolated from the system.

6. General Maintenance

Although the X-HW 200 Hot Wire Power Supply System components are designed for typical industrial environments and use, some inspection and maintenance is suggested to insure reliable use and long life. Table 6-1 below should be used as a guide, although each system, facility, and installation may be unique and users and maintenance procedures should be adjusted for local needs and procedures.

Table 6-1 – Maintenance Recommendations

Frequency	Item	Comment
Pre-Operation & Each Operation	Connections	Visually check that all electrical connections are tight and that wear or damage is not evident.
	Cooling/Air Filtration	Insure the air intake and exhaust on the front and back of the Enclosure are not blocked.
Weekly	Cooling/ Air Filtration	Inspect the air intake and exhaust filters in the holders on the sides of the Control Enclosure. Clean or replace if indicated.
	Display	With a clean soft cloth and a mild liquid detergent, wipe the display clean. NOTE: Abrasives and acid/solvent or harsh cleaning agents may damage the display overlay. Use care in cleaning that area.
	Connections	Visually check that all electrical connections are tight and that wear or damage is not evident.
Monthly	Cooling/Air Filtration	Replace air filter material.
	Calibration	Perform a visual calibration check to verify that voltage and current are accurate and within specifications.
Quarterly	Calibration	Calibration procedures are available from AMET Technical Support (208) 356-7274 and on http://www.ametinc.com/literature.html .

7. Troubleshooting

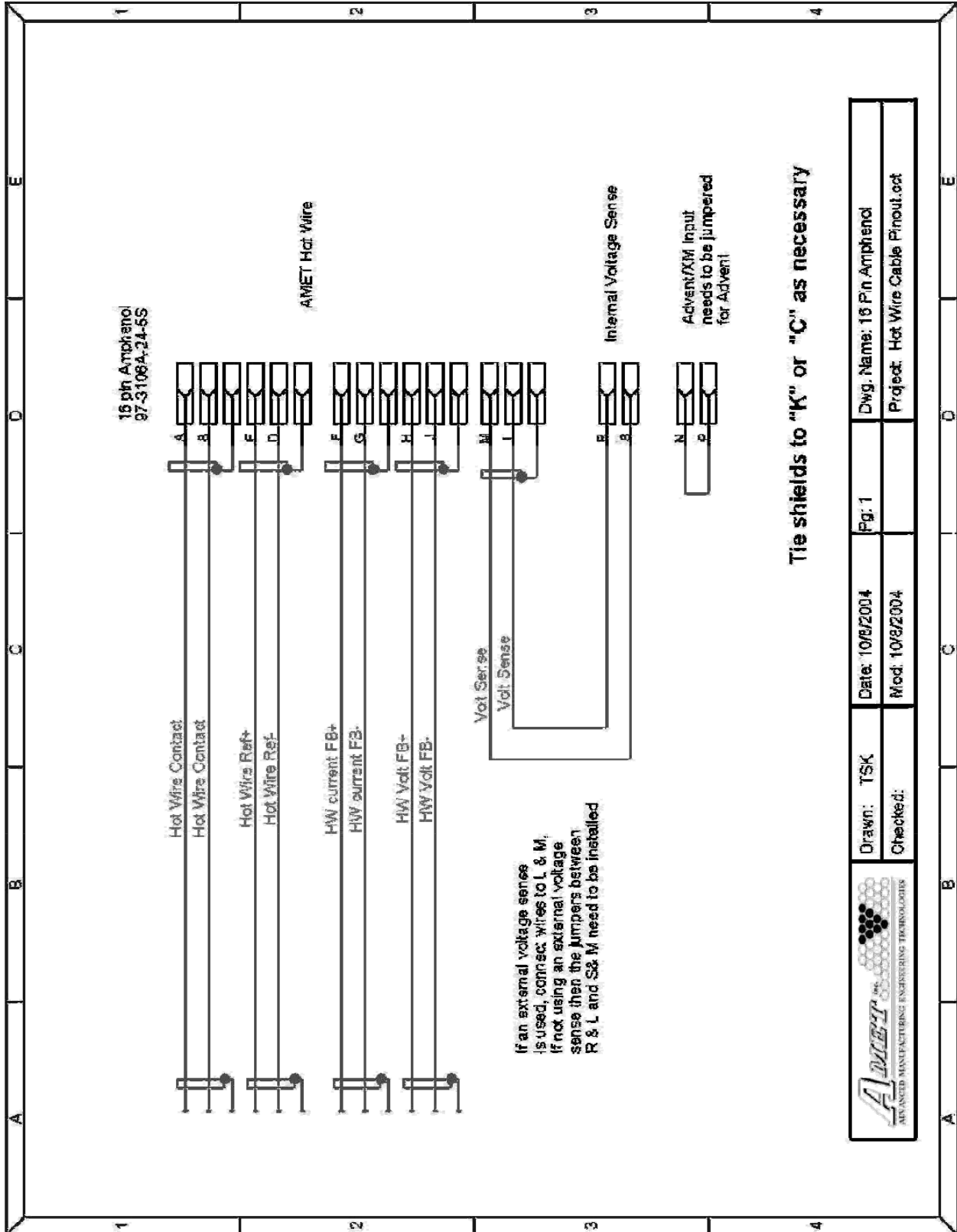
This troubleshooting guide is intended to provide *general* assistance for common problems. For assistance with a specific Hot Wire Power Supply System failure or to request information on a technical issue with the Hot Wire Power Supply System, please contact AMET Technical Support hotline at 208-356-7274.

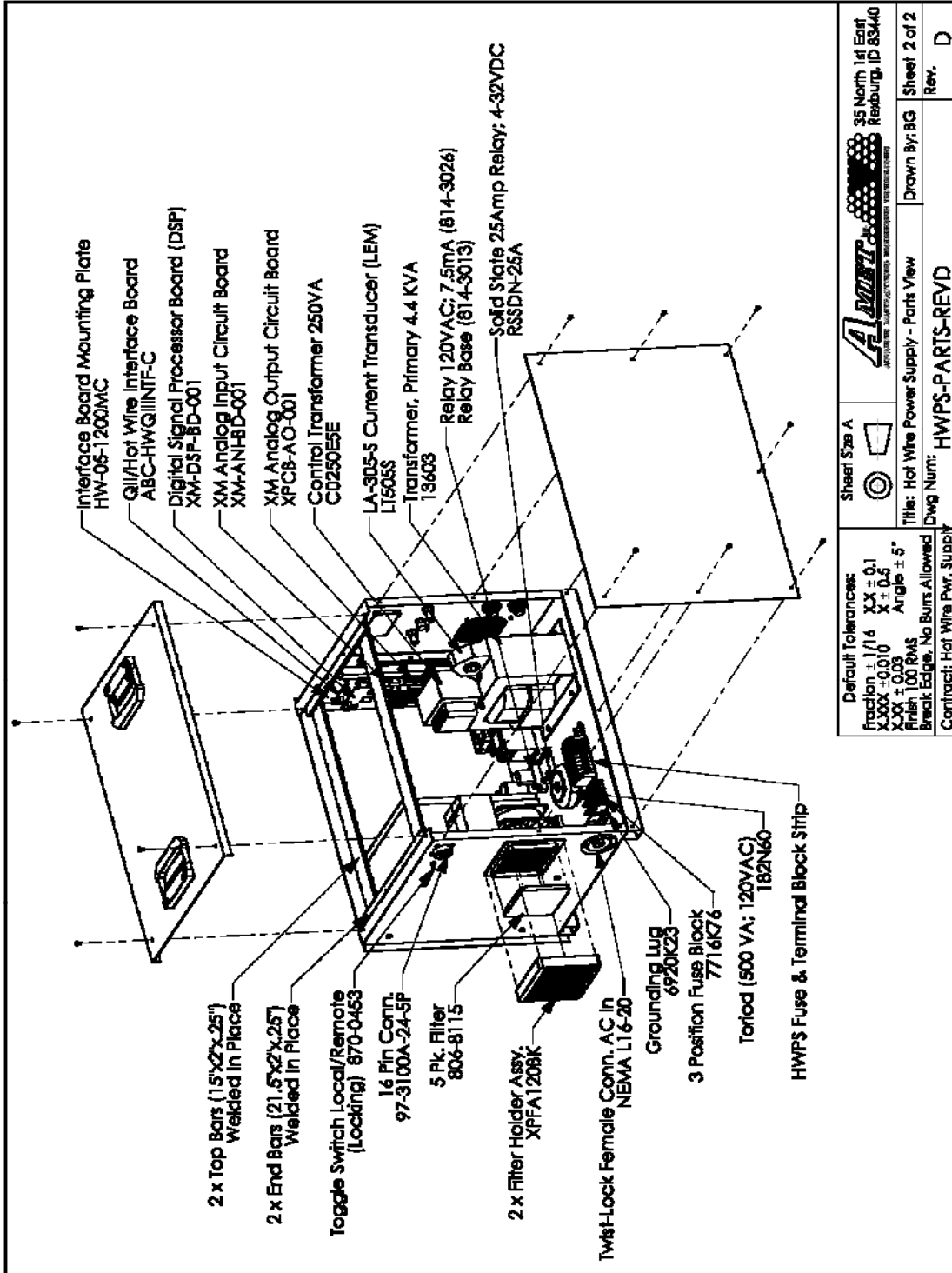
Table 7-1 – Troubleshooting Guide

Trouble or Problem	Suggested Resolution
The X-HW 200 HOT WIRE POWER SUPPLY System does not turn on when the power cord is connected.	<p>Check that the X-HW 200 HOT WIRE POWER SUPPLY System is connected to an adequate power source and power is available at the power source.</p> <p>After removing the power cord, check the internal fuses and replace if open. If the fuses blow a second time, contact AMET Technical Support at (208) 356-7274 for assistance.</p>
Hot Wire Power Supply connected to an XM System reads E-Stop on the display.	<p>Check to make sure that the E-Stop has been cleared on the XM System.</p> <p>Check to make sure that there is a terminator in the Ethernet circuit and then try to clear the E-Stop.</p> <p>If the problem still persists contact AMET Technical Support at (208)356-7274.</p>
The Display on the front of the Hot Wire Power Supply is blank.	Make sure that the Hot Wire Power Supply is power up properly.
Voltage or Current Readings on the Hot Wire Power Supply Display are not accurate.	<p>Check the Hot Wire Power Supply Calibration.</p> <p>Calibration procedures are available from AMET Technical Support (208) 356-7274 and on http://www.ametinc.com/literature.html.</p>

Appendices

Appendix A – Amphenol Connector Wiring Diagram





Default Tolerances: Fraction $\pm 1/16$ X.XXX ± 0.010 X.XX ± 0.05 X.X ± 0.09 Finish 100 RMS Break Edges, No Burrs Allowed Contract: Hot Wire Pwr. Supply	Sheet Size A 	 35 North 1st East Reburg, ID 83440
	Title: Hot Wire Power Supply - Parts View	Drawn By: BG
	Dwg Num: HWPS-PARTS-REVD	Sheet 2 of 2
		Rev. D

Appendix B – X-HW 200 Exploded View