



XMS-MAG

Magnetic Arc Oscillator

Standalone System

Manual

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1. Foreword

Welcome to the AMET Inc. family of automated welding products. AMET Inc. systems are designed to meet the most demanding applications. The XMS-MAG Magnetic Arc Oscillator Standalone System (XMS-MAG) automation allows precision digital control of a magnetic field created to push and pull the welding arc from side to side along a weld seam. This manual is intended to provide users of the AMET XMS-MAG 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 XMS Magnetic Arc Oscillator Standalone 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 XMS-MAG, 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.

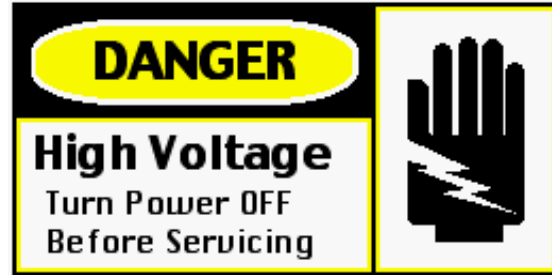


1. Wear gloves and put a rag over cap area when accessing system.
2. Allow pressure to escape before completely opening system.
3. Treat all hoses, hot or cold, with caution. Pressure can cause injury.

ELECTRICAL SHOCK CAN KILL

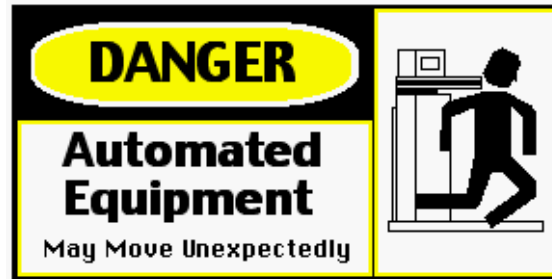
220 VOLTS

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. XMS-MAG General Description

The AMET XMS-MAG is designed to swing the welding arc on GTAW (TIG) and PAW (plasma) welding torch from side to side by the use of a magnetic field. The magnetic arc oscillator can also be programmed to deflect the arc in a maintained position, typically used in fillet welding.

AMET has a distinct advantage over “conventional” magnetic oscillators on the market. AMET uses Digital Signal Processing (DSP) technology to completely program the oscillation parameters. Many companies only allow the user to program one parameter, such as oscillation amplitude, while the rest of the parameters have to be set physically on an analog control panel. The AMET magnetic oscillator allows the operator to program and recall all oscillation parameters during welding. In addition, the XMS-MAG also allows the operator the ability to override all parameters during welding from the hand pendant.

The XMS-MAG can be mounted on an existing system and operated independently via a hand pendant. The XMS-MAG consists of an XM control module loaded with magnetic arc oscillation software, a single tip probe assembly, an interconnection cable between the module and the probe, and a hand pendant.

Figure 3-1, XMS-MAG Magnetic Arc Oscillator Display, Module and Foot



3.1. XMS-MAG System Features

3.1.1. XMS-MAG Applications

The magnetic arc oscillator is designed to provide a precisely controlled weaving motion to the weld bead. This type of oscillation motion is typically required for the following types of welding applications:

- Applying a “cap” pass on a multi-pass weld
- Small oscillation motion to improve sidewall tie-in on “deep” groove welds
- Fillet welds for fill and sidewall tie-in
- Single and dual-arc seam welding for reducing undercut
- Arc stiffening and direction capability

The XMS-MAG is ideally suited for GTA and PAW arc welding applications as a result of the following features and benefits:

- Programmed oscillation parameters. Eliminates risk of operator setting incorrect oscillation parameters.
- Stirring motion of weld puddle reduces porosity and minimizes undercut
- Easily mounts to most machine-type TIG or Plasma torches
- Able to override each oscillation parameter during welding
- Able to adjust “center” or arc position during welding
- Use on both magnetic and non-magnetic materials
- Reduces heat affected weld zone

3.1.2. XMS-MAG General Specifications

Table 3-1 lists the general specifications for the XMS-MAG. For more specific information on these features and options, please refer to Section 5, *Operations*.

Table 3-1, XMS-MAG General Specifications	
Oscillation Amplitude	0 to 100%, approximately 2 times the arc length up to a maximum of 3/8” Note: for most applications 0% is equal to 0 amps of current to the magnetic oscillator foot and 100% is equal to 3 amps of current to the magnetic oscillator foot.
Slew Time	0 to operator configured value in seconds (defaults to 3seconds), adjustable during oscillation
Oscillation Start Delay	0 to 100 seconds
Oscillation Stop Delay	0 to 999 seconds
Amplitude	0 to 100% where maximum is the maximum calibrated output to the magnetic oscillator foot.
In Dwell Time	0 to operator configured value in seconds (defaults to 3seconds)
Out Dwell Time	0 to operator configured value in seconds (defaults to 3seconds)
Remote Start	Available
Remote Stop	Available

3.2. XMS-MAG Major System Components

3.2.1. Emergency Stop (E-Stop)

The **Emergency Stop** button immediately ends the selected program and stops critical functions. The system remains inactive until an operator pulls the **Emergency Stop** button and pushes the **ESTP** Soft Control Button to clear the Emergency Stop.



Caution:

CAUTION - As the name implies, the Emergency Stop button should be used to avoid damaging the system or to avoid personal injury. It is not intended, nor is it a good practice for stopping the system during normal operations.

3.2.2. Sequence Buttons

The **Start** Sequence Button initiates the selected program or function. If the XMS-MAG is setup as a slave module and the Arc Sense Mode is set to “Input”, the **Start** Sequence Button will flash while in the *Start-up* screen indicating that the module is waiting for an external input to start the sequence.

The **Stop** Sequence Button ends the selected program. If the XMS-MAG is setup as a “slave” module and the Arc Sense Mode is set to “Input,” the STOP Sequence Button will not end the program. A loss of the digital input that started the program is required.

3.2.3. Soft Buttons

Each **Soft Button** has a corresponding label on the LCD screen (EDIT, DISABLE, and STATUS on the *Start-up* screen). The function of the button changes depending on the screen display. When an **Emergency Stop** is activated, the DISABLE Soft Button changes to an ESTP Soft Button.



The Hand Pendant also has LEFT/RIGHT Arrow Soft Buttons and UP/DOWN Arrow Soft Buttons to navigate the Split Screen Display and select parameters in the *Edit* screen. In the center of the Arrow Soft Buttons is the ENTER Soft Button, used to confirm selections.

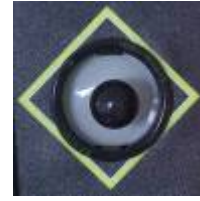
3.2.4. Adjustment Knob

The **Adjustment Knob** changes parameter values on the *Edit* Screen and toggles between settings. It also changes override values during a process.



3.2.5. Joystick

The **Joystick** has no function for the XMS-MAG Standalone System.



3.2.6. Flash Memory Port

The **Flash Memory Port** accepts Secure Digital memory cards. Firmware from an external source may be loaded to the Hand Pendant. However, programs cannot be saved to the Secure Digital card from the Hand Pendant. The Secure Digital port is adjacent to the E-Stop (see section 3.2.1).

3.2.7. LCD Display

The LCD Display shows different displays depending on which mode or function has been selected. The LCD Display also shows different Soft Button functions depending on which mode or function you have selected.



4. Installation

4.1. Physical Description

The basic XMS-MAG consists of a XMS-MAG Magnetic Arc Oscillator Hand Pendant, XMS-MAG Magnetic Arc Oscillator Module, and a XMS-MAG Magnetic Arc Oscillator Single Tip Probe Assembly. 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
XMS-MAG Standalone Hand Pendant	6"	4"	2"	2 lbs
XMS-MAG Module	8"	7"	10-1/2"	10 lbs
XMS-MAG Single Tip Probe Assembly	7"	4"	4"	4.0 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 XMS-MAG and they are properly tightened. Connection point labels are provided to assure correct installation.

The electrical service requirements for the XMS-MAG are listed in Table 4-2, *Electrical Service Requirements* below. The XMS-MAG Hand Pendant Display is powered from the XMS-MAG Magnetic Arc Oscillator Controller Enclosure.

Table 4-2, Electrical Service Requirements

Electrical Service	Requirement
Input Voltage	120/240 VAC, 50/60 Hz
Input Current	5 A
Power Consumption	575 W

4.3. Environmental Considerations

Locate the XMS-MAG near a properly rated power source. The use of a power source with a separate power disconnect is recommended. XMS-MAG equipment is designed to operate in a dry, indoor environment. Do not place the XMS-MAG components outside or in an area where water leakage is frequent.

Locate the XMS-MAG Module housing in an unobstructed location to allow for proper air flow through the XMS-MAG Module enclosure. Ensure the front of the XMS-MAG Module enclosure has unrestricted access equal to the depth of the module enclosure, as access to the internals of the XMS-MAG Module is accomplished by sliding the Module out the front of the enclosure.

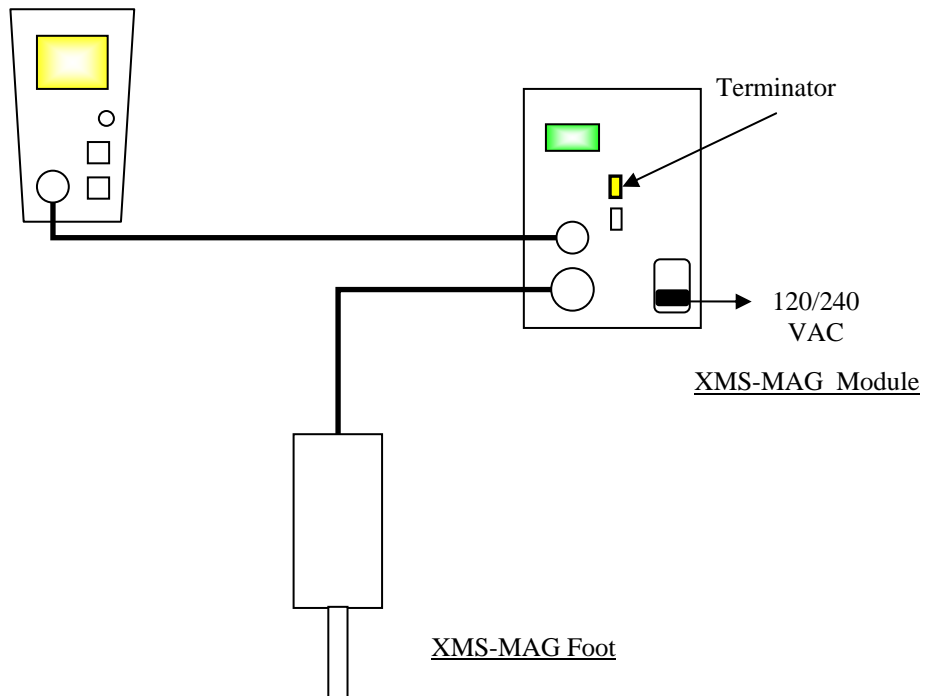
Avoid installations where the XMS-MAG is subject to temperature extremes. The XMS-MAG should be operated at temperatures between 40° F and 120° F. Installations in dusty environments or areas of high vibration should be avoided to assure the full operational life of the XMS-MAG.

The XMS-MAG utilizes sensitive and sophisticated microprocessor technology. Avoid the use of hand held radio transmitters in close proximity of the XMS-MAG Hand Pendant Display or Module housing.

4.4. Connections

1. Install the **Terminator** in the IN or OUT Ethernet port on the **XMS-MAG Module**.
2. Connect the XMS-MAG **Hand Pendant** cable to the **XMS-MAG Module**.
3. Connect the **Control Cable** between the **XMS-MAG Module** and the XMS-MAG Magnetic Oscillator Foot.
4. Connect the XMS-MAG Module **Power Cord** to an appropriate power source.
5. Place the **On/Off** switch (located above the power cord input) to the **On** position.

XMS-MAG Hand Pendant



5. Operation

5.1. Initial Setup

Check to be sure the XMS-MAG electrical and hose connections (and any connected peripheral equipment) are proper and tight. Ensure the XMS-MAG Module is connected to an adequate electrical source (refer to Table 4-2). Turn on the XMS MAG at the power switch on the XMS-MAG Module adjacent to the power cord connector.

Upon startup, the XMS-MAG Hand Pendant display will briefly show the unit's serial number (lower left) and the firmware version loaded on the pendant (lower right). The display will then switch to the normal operating display.

5.2. STARTUP Mode

The STARTUP Mode is the default mode and is displayed on power up of the system. This mode is selected to execute a program. Figure 5-1 shows the XMS-MAG Hand Pendant display in STARTUP Mode. The top line of the display shows the currently loaded program number (P01 through P10), the program status (STOPPED), and the XMS Module type (XMO).

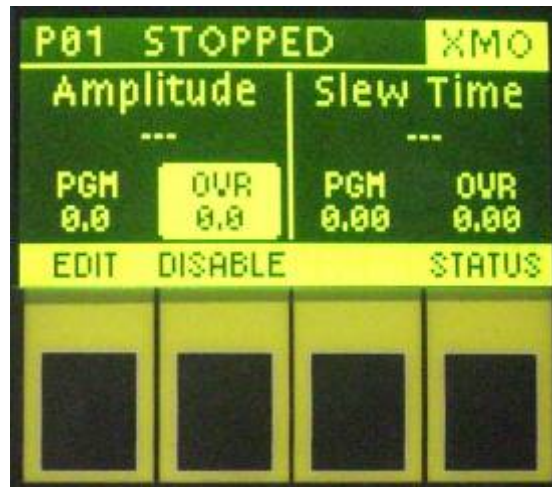


Figure 5-1 XMS-MAG Startup Screen

The next section of the XMS-MAG Hand Pendant display is a split screen showing the Amplitude on the left and the Slew Rate on the right along with their programmed values and the override values. The bottom line of the display shows the Soft Button labels for EDIT, DISABLE (disables the Magnetic Oscillator during a program), and STATUS (shows module status).

To override the programmed value use the Adjustment Knob to change the value. Override values can be positive or negative, increasing or decreasing the programmed setting.

5.2.1. How to Load a Program

From the Start-up screen, press the EDIT Soft Button, then, press the LOAD Soft Button. Use the LEFT/RIGHT Arrow Buttons to select the desired program (P01 to P10). Press the LOAD Soft Button again to load the program.

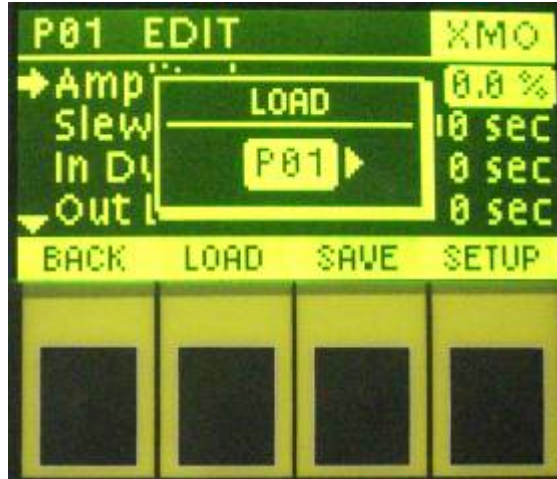


Figure 5-2, XMS-MAG Hand Pendant *Load* Screen.

5.2.2. How to Start a Program

Once the desired program has been loaded and you are ready to start welding, press the **Start** Sequence Button. The program status is displayed on the top line of the XMS-MAG Hand Pendant display.

If your XMS-MAG is set up for Slave Mode and the “Arc Sense Mode” is set to “Input” when you enter the StartUp Mode, the **Start** Sequence Button will flash indicating that the system is waiting for a digital input in order to start the selected program. This mode is used when the XMS-MAG is interfaced with another piece of equipment that acts as the Master Module. In this mode you cannot start the sequence by pressing the **Start** Sequence Button.

5.2.3. Error Messages

When the XMS-MAG encounters an error, a message window pops up in the center of the display describing the error. To acknowledge the message press the ENTER Soft Button.

Table 5-1, Common Error Messages

Error Message	Meaning and Remedy
E-Stop activated	This error message is present when either the E-Stop Button has been pressed or the Terminator in the front of the XMS-MAG Module is damaged or removed. To clear this fault simply press the enter button to clear the message, pull out the E-stop button, verify the Terminator is installed, and then press the “Estp” Soft Button to reset the E-stop.

5.2.4. How to Stop a Program

A weld program can be stopped at anytime by pressing the **Stop** Sequence Button on the XMS-MAG Hand Pendant. The weld program will be halted at the point the **Stop** Sequence Button is pressed.

If the XMS-MAG is setup as a “slave” module and the Arc Sense Mode is set to “Input,” the **Stop** Sequence Button will not end the program. A loss of the digital input that started the program is required

5.3. SETUP Mode

To enter SETUP Mode from the Start-Up Screen press the EDIT Soft Button and then press the SETUP Soft Button.

Parameters in the SETUP Mode establish system settings for all programs. Some options include factory set calibrations that **SHOULD NOT** be changed unless specifically instructed to do so by AMET Technical Support personnel.

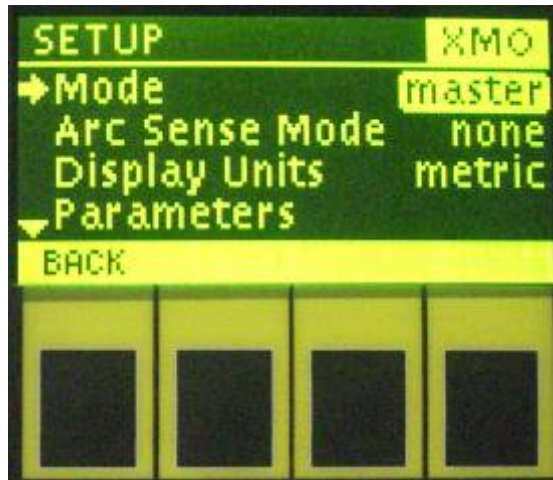


Figure 5-3, XMS-MAG Hand Pendant Setup Screen.

The Setup screen display is shown in Figure 5-3. The top line of the Setup screen displays the programming mode (SETUP) and module type (XMO). The Setup screen menu options include module Mode (set to master), Arc Sense Mode (none), Display

Units (Metric), Parameters, Analog Out Cal, Digital In, Digital Out, and Download Firmware. Table 5-2 describes the SETUP Mode options and their corresponding parameters and values.

All XMS-MAG systems are calibrated at the factory prior to shipment. AMET strongly recommends that access to the SETUP Mode be limited to only those individuals with the proper technical qualifications and training. Serious performance problems can jeopardize the quality of the weld process. Please call the AMET Inc. Technical Support hotline at 208-356-7274 for assistance if you are experiencing difficulty with any of the functions of your unit.

Table 5-2 – SETUP Mode Options

Setup Option	Parameter/Value	
Mode	<p>Master – With multiple Stand Alone systems connected you must choose one to be the Master. If multiple Standalone systems are used then the Standalone system that is set to Master will be the system that is responsible for initializing and terminating the programmed sequence. If only one Stand Alone system is present and you require this system to initialize and terminate the programmed sequence then you must set the mode to Master. Slave – With multiple Stand Alone systems connected you must set all modules except for one to Slave. If you set a Standalone system to Slave mode the system will wait for an input to start a programmed sequence.</p>	
Arc Sense Mode(Digital Input)	<p>None – Ignores Arc Sense Digital Input therefore the program is started by using the START Button. Input – Looks for the Arc Sense Digital Input in order to start the program. If in the “Master” Mode then you will press the START Button which will start to flash signifying that it is waiting for a digital input on the Arc Sense Signal. If in the “Slave” Mode then when you enter into the Startup Mode the START Button immediately starts to flash signifying that it is waiting for a digital input on the Arc Sense Signal.</p>	
Display Units	<p>English – English units of measure Metric – Metric unit of measure</p>	
Parameters DO NOT CHANGE	Amplitude	<p>Minimum – Sets the minimum value of the parameter. Maximum – Sets the maximum value of the parameter. Default – Sets the default value of the parameter that will be used when a new program is created. Increment – Sets the incremental value of the above parameter attributes from 0.000001 to 1,000,000.</p>
	Slew Time	
	In Dwell	
	Out Dwell	
	Offset	
Analog Out Calibration DO NOT CHANGE	Set Output	Sets a percentage of the maximum output for calibration purposes. Once the value is entered it automatically sets the output of the amplifier to the magnetic oscillator foot.
	Course Gain	0-255
	Fine Gain	0-255
	Coarse Offset	0-255
	Fine Offset	0-255
	Min	Scaling for analog output
	Max	Scaling for the analog output.
Digital In	Digital In – Displays digital input status received by the XMS-MAG system from an external source.	
Digital Out	Digital Out – Adjusts the status of digital outputs (1 thru 8) to an external source. This option can be used to manually toggle the digital output for troubleshooting or testing.	

Table 5-2 – SETUP Mode Options

Setup Option	Parameter/Value
Download Firmware	Download Firmware – Allows the user to download firmware to the XMS-MAG Hand Pendant or to the XMS-MAG Module to which it is connected.

5.4. EDIT Mode

To enter the EDIT Mode from the Startup Screen, press the EDIT Soft Button. The parameters available in the EDIT Mode are used to build a program sequence. These parameters determine how the program will run, how it will end, and all other associated functions related to the program.

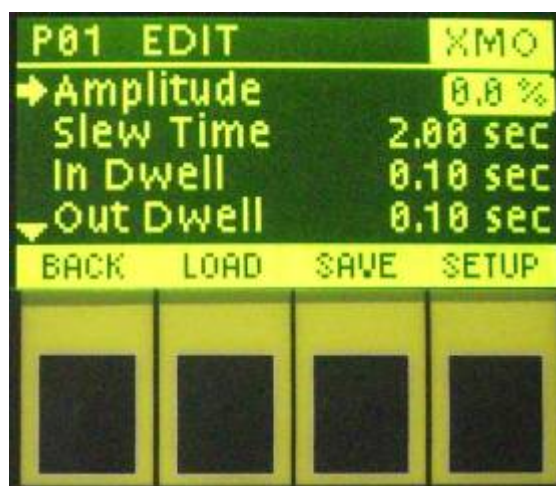


Figure 5-4, XMS-MAG Hand Pendant *Edit* Screen.

Figure 5-4 shows the EDIT screen. The top line of the display shows the loaded program (P01 to P10), the program status (EDIT) and the XM Module (XMO) type. The middle of the display are parameters that can be edited, these include: Amplitude, Slew Time, In Dwell, Out Dwell, Offset, Start Delay, Early Stop, Stop Delay, Pre Purge, and Post Purge.

To select a parameter for editing, use the UP/DOWN Arrow Buttons to highlight the parameter and the Adjusting Knob to change the value to the desired setting. Table 5-3, EDIT Mode Options, describes the EDIT Mode parameters, their corresponding descriptions and range of settings available.

Table 5-3 – EDIT Mode Options

Parameter	Description	Range/Settings
Amplitude	Defines the oscillation width (in percent) for the segment.	0 to 100%
Slew Time	Sets the time (in seconds) to travel from In Dwell to Out Dwell.	Minimum and Maximum are set in Setup Mode under Parameters see section 5.3
In Dwell	Sets the time (in seconds) spent on either extreme side from the center, respectively.	Minimum and Maximum are set in Setup Mode under Parameters see section 5.3
Out Dwell		Minimum and Maximum are set in Setup Mode under Parameters see section 5.3
Offset	Sets the offset of the weld from the centerline (left or right).	Minimum and Maximum are set in Setup Mode under Parameters see section 5.3
End Time	Sets the end of the weld segment to either MANUAL or a specific time (in seconds). NOTE: When set to MANUAL this option deactivates the EARLY STOP option and requires the operator to press the STOP button to stop the program.	Manual 0.1 to 999.0 sec
Start Delay	Sets the time (in seconds) from the beginning of the program until the programmed Magnetic Oscillation begins.	0.0 to 100.0 seconds
Early Stop	Sets the amount of time (in seconds) before the program ends, at which time the Magnetic Oscillation stops. NOTE: When set to greater than 0.00 seconds (active). This option deactivates Stop Delay when set to greater than 0.0 seconds.	0.0 to 100.0 seconds
Stop Delay	NOTE: This option is NOT active when Early Stop is set to greater than 0.0 seconds. Sets the amount of time (in seconds) Magnetic Oscillation continues after the program ends.	0.0 to 999.0 seconds
Pre Purge	Sets the time (in seconds) for the purge gas to run prior to the beginning of the program.	0.0 to 999.0 seconds
Post Purge	Sets the time (in seconds) for the purge gas to run after the program stops.	0.0 to 999.0 seconds

5.4.1. How to Load a Program

From the *Startup* screen, press the EDIT Soft Button, then, press the LOAD Soft Button. Use the LEFT/RIGHT Arrow Buttons to select the desired program (P01 to P10). Press the LOAD Soft Button again to load the program. (See Figure 5-2.)

A weld program is created by editing the weld parameters in the SETUP Mode and EDIT Mode to the desired values (See sections 5-3 and 5-4). The new settings are then saved to the current program or to a new program number. The XMS-MAG Hand Pendant can store up to ten different programs.

5.4.2. How to Save a Weld Program

After entering desired program settings, save the program from the *Edit* screen. Press the SAVE Soft Button. Select the desired program number (P01 to P10) by pressing the LEFT/RIGHT Arrow Buttons and press the SAVE Soft Button again.

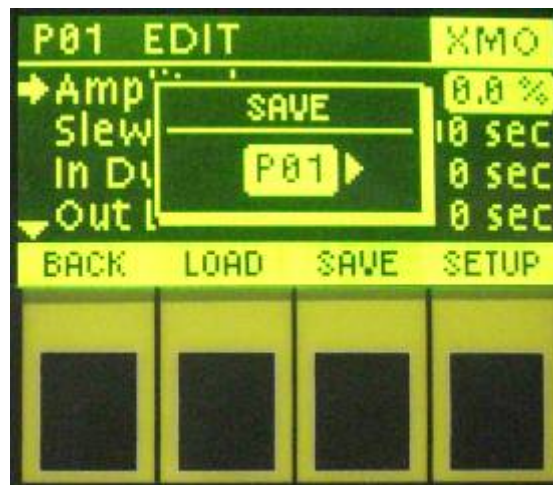


Figure 5-5, XMS-MAG Hand Pendant *Save* Screen.

5.5. 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. Press the **Stop** Button. Check to ensure any connected peripherals or assemblies are properly shutdown and secured. Remove power from the XMS-MAG by turning the power switch to OFF.

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, and cooling water and pneumatic sources are isolated from the system.

6. General Maintenance

Although the XMS-MAG components are designed for typical industrial environments and use, some inspection and maintenance is suggested to insure reliable use and long life of the equipment. Table 6-1, *Maintenance Recommendations* should be used as a guide. Users should also check with their local maintenance organizations for any unique requirements based upon the installation specific needs and adjust the maintenance schedule as necessary.

Table 6-1 – Maintenance Recommendations

Frequency	Task	Comment
Pre-Operation & Each Operation	Connections	Visually check that all electrical connections and hoses are tight and that wear or damage is not evident.
	Cooling/Air Filtration	Insure that the air intake and exhaust on the sides of the Control Enclosure are not blocked.
Weekly	Connections	Inspect and tighten all connections and hoses. Inspect for tightness and that wear or damage is not evident
	Cooling/ Air Filtration	Inspect the air intake and exhaust filters in the holders on the sides of the Control Enclosure. Clean or replace if needed.
	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.
	Magnetic Oscillator Probe	Inspect probe for damage from collision or heat. Repair or replace if needed.
Monthly		Visually check that all electrical connections and hoses are tight and that wear or damage is not evident. Replace the XMS-MAG Controller Enclosure air filter.
Quarterly	Calibration	Perform a calibration check to verify that the XMS-MAG is providing the correct magnitude of oscillation. 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 XMS-MAG failure or to request information on a technical issue with the XMS-MAG, please contact AMET Technical Support hotline at 208-356-7274.

Table 7-1 – Troubleshooting Guide

Trouble or Problem	Suggested Resolution
The XMS-MAG System does not turn on when the power switch on the Controller Enclosure is turned to ON.	<p>Check that the XMS-MAG System is connected to an adequate power source and power is available at the power source.</p> <p>Check that the 115/220 Volt selector is positioned to the correct input voltage.</p> <p>After removing the power cord, check the fuse in the XM Module and replace if necessary.</p>
Cannot clear E-Stop	<p>Check to make sure that the E-Stop Button has been pulled out.</p> <p>Make sure that you press the “ESTP” Soft Button once you have pulled out the E-Stop Button.</p> <p>Make sure that the terminator is installed in one of the Ethernet ports on the front of the XMS-MAG Module.</p>
“START” Button will not activate a program	Check the settings in the “Setup” Mode to make sure that the “Mode” and the “Arc Sense Mode” are set properly (See section 5.3).