



XMS-LIN



Standalone Linear Motion Controller

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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 Standalone System automation allows precision digital control of Weld Current, Voltage, Wire Feed, and Travel Speed for any type of arc welding process application, large or small. This manual is intended to provide users of the AMET XMS Standalone Systems 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>
 Caution:	Caution - Highlight items, which can cause damage to the system and/or injury to operators.
 Note:	Note - Highlights or review important information and general points of interest.
 Tip:	Tip - Identifies programming suggestions and operational information for the XMS 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 Standalone Systems, 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.

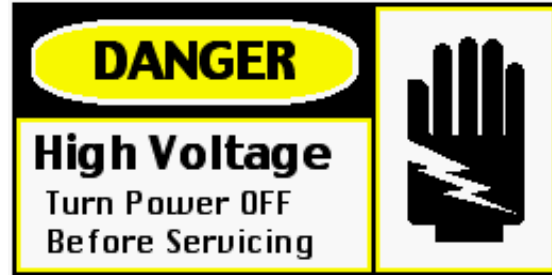


1. Wear gloves and put a rag over cap area when accessing system.
2. Allow pressure to escape before completely opening system.
3. Treat all hoses, hot or cold, with caution. Pressure can cause injury.

ELECTRICAL SHOCK CAN KILL

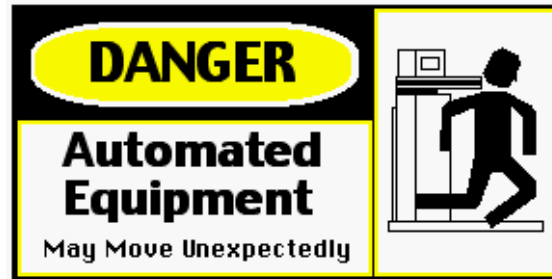
220 VOLTS

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 Standalone System General Description

The XMS Standalone Systems consist of a Hand Pendant used in conjunction with an XM Module and actuator assembly. The XM Modules can be programmed to control a variety of weld parameters controlled using the XMS Hand Pendant. The XMS Handheld Pendant also allows the operator to override certain programmed parameters. Figure 3-1 shows the basic components of the XMS-LIN Standalone Linear Motion Control System and Hand Pendant.

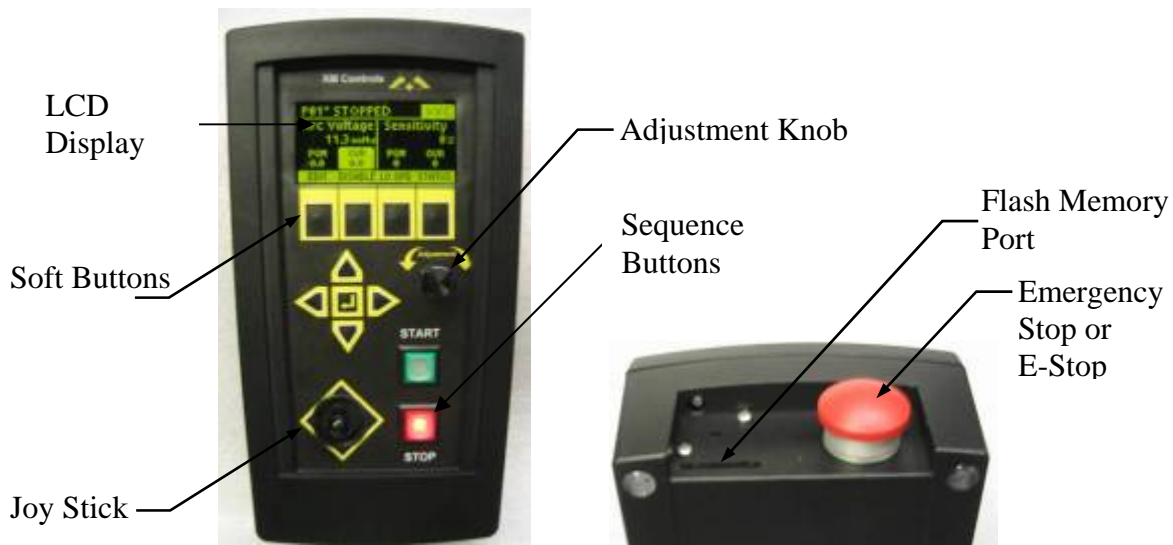


Figure 3-1 – XMS-LIN Linear Motion Control Standalone Hand Pendant

3.1. XMS Standalone System Features

AMET linear motion controllers are designed to move a GMAW (MIG/MAG), FCAW (flux-core arc welding), SAW (Submerged Arc), GTAW (TIG) and PAW (plasma) welding arc in a linear path. They accomplish this motion using a mechanical slide to physically move the welding torch or gun.

The AMET XMS-LIN has a distinct advantage over “conventional” mechanical linear motion controllers on the market. AMET uses digital signal processing (DSP) technology to provide the ability to completely program the motion parameters. Many companies only allow you to program one parameter while the rest of the parameters have to be set physically on an analog control panel. The AMET linear motion controller allows your operator to program and recall all motion parameters during welding, which reduces the chance of an incorrect parameter being set on the control. In addition, the XMS-LIN also allows the operator the ability to override all of the parameters from the hand pendant.

AMET uses optical encoder feedback on its mechanical positioners. This type of device has a long life span. Some companies in the welding industry use potentiometer feedback, because they are using an analog control circuit or cannot handle position

based motion. A potentiometer is a mechanical device and will wear-out after number of cycles, increasing downtime and replacement costs.

AMET Linear Motion Controllers are currently presented to the market in two models, the X-LIN and XMS-LIN. The X-LIN is designed to mate with AMET XM series of controls. The XMS-LIN is our “Stand-Alone” version, which can be mounted on an existing system and operated independently via a hand pendant. At any time in the future, the XMS-LIN can be integrated with the XM system control.

The XMS-LIN can be supplied with different slide configurations. The “standard” slide has a 7.25 inches (180 mm) stroke with a weight capacity of 30 lbs (13.5 kgs) out 6 inches (150 mm). This is a sealed slide, which is excellent for all arc welding applications. We can provide this slide in strokes from 1.5 to 19.0 inches. (30 to 480 mm) If you need to go heavy-duty, AMET can meet this demand as well. We can supply a slide with strokes of 11.8 to 59 inches (300 to 1500 mm) with a weight capacity of 135 lbs (60 kgs), out 6 inches (150 mm). AMET can also supply an extra heavy-duty slide if required.

All of our positioning slides are ball screw, driven by a Servo motor with encoder feedback, to insure accurate and precise oscillation.

3.2. XMS Standalone System Major Components

3.2.1. Emergency Stop (E-Stop)

The **Emergency Stop** button immediately ends the selected program and stops critical functions and all motion. 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-LIN is setup as a slave module, 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.

3.2.3. Soft Buttons

Each **Soft Button** has a corresponding label on the LCD screen (EDIT, DISABLE, LO SPD, 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.

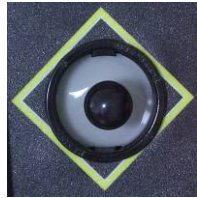
3.2.4. Adjustment Knob

The **Adjustment Knob** changes parameter values on the *Edit* Screen and toggles between settings (i.e., enable/disable). It also changes override values during a process.



3.2.5. Joystick

The **Joystick** gives the user manual control of torch position

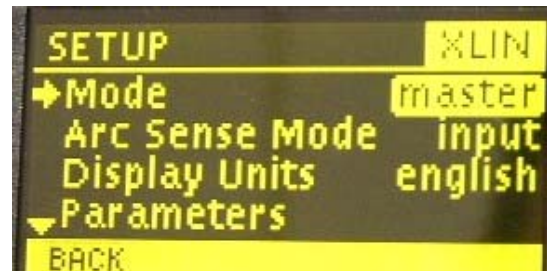


3.2.6. Flash Memory Port

The **Flash Memory Port** accepts Secure Digital memory cards. Firmware from an external source may be loaded to the Hand Pendant. However, programs can not be saved to the Secure Digital card from the Hand Pendant.

3.2.7. LCD Display

The XMS-LIN 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 Standalone System consists of a XMS Standalone Hand Pendant, XM Controls Module and an actuator (slide). This is the minimum number of XMS Standalone System components required to control a welding function such as arc voltage, wire feed or travel axis. 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 Standalone Hand Pendant	6"	4"	2"	2 lbs.
XM Module	8"	7"	10-1/2"	10 lbs.
Actuator Assembly	Dependant upon system configuration.			

4.2. Power Requirements

Prior to energizing and operating the XMS Standalone System check that all electrical cables and hoses are properly connected and tightened. Connection point labels are provided to assure correct installation.

The electrical service requirements for the XMS Standalone System are listed in Table 4-2, *Electrical Service Requirements* below. The XMS Standalone Hand Pendant is powered from its associated XM Module.

Table 4-2 – Electrical Service Requirements

Electrical Service	Requirement
Input Voltage	115 VAC (220 VAC models available)
Input Frequency	50/60 Hz
Input Current	5 A
Power Consumption	575W

4.3. Environmental Considerations

Locate the XM Module in an unobstructed location to allow for proper air flow through the module enclosure and near a properly rated power source. The use of a power source with a separate power disconnect is recommended. XMS Standalone System equipment is designed to operate in a dry, indoor environment. Do not place the XMS Standalone System components outside or in an area where water leakage is frequent.

Avoid installations where the XMS Standalone System is subject to temperature extremes. The XMS Standalone 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 XMS Standalone Systems.

The XMS Standalone System utilizes sensitive and sophisticated microprocessor technology. Avoid the use of hand held radio transmitters in close proximity of the XMS Standalone System Hand Pendant or Controller housing.

4.4. Connections

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

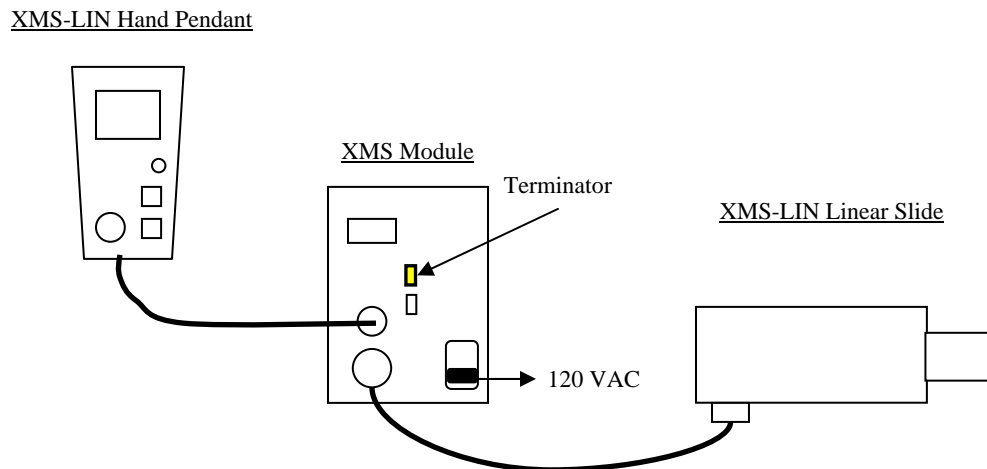


Figure 4-1 XMS-LIN Connection Diagram

5. Operation

5.1. Initial Setup

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

Upon startup, the XMS-LIN 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-LIN Standalone 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 module type (XLIN).

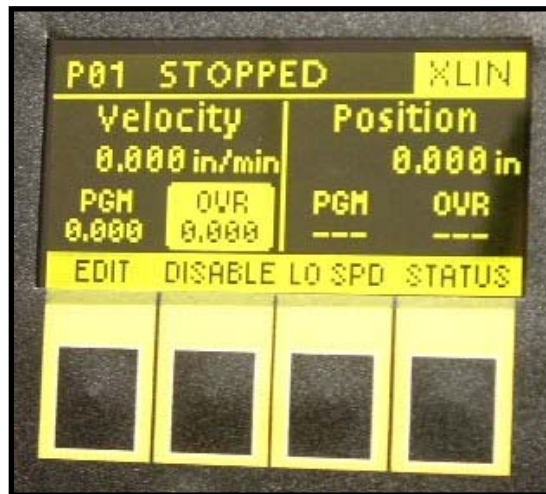


Figure 5-1 – XMS-LIN Hand Pendant Startup Screen

The next section of the XMS-LIN Standalone Hand Pendant display is a split screen showing Velocity on the left and Position on the right, along with their programmed values and override values. The bottom line of the display shows the Soft Button labels for EDIT, DISABLE (disables the axis during a program), LO SPD (low speed jog), and STATUS (shows module status).

To override either programmed value use the LEFT/RIGHT Arrow Buttons to highlight the desired parameter and the **Adjustment** Knob to change the value. Override values can be positive or negative, increasing or decreasing the programmed setting.

5.2.1. Downloading Firmware

The XMS Standalone Pendant can be used to control a variety of XM Firmware Programmable Modules. The firmware is loaded onto the XMS Pendant using the Secure Digital (SD) Flash Card slot.

Insert the SD Flash Card with the desired firmware into the SD Flash Card slot. From the *Start-up* screen, press the EDIT Soft Button then the SETUP Soft Button. Use the UP/DOWN Arrow Soft Buttons to select Download Firmware on the *Setup* screen menu. Press the ENTER soft Button. The display will list the firmware available for downloading. Use the UP/DOWN Arrow Soft Buttons to select the desired firmware and press the ENTER Soft Button to begin the download. The display will show the status of the download and display “done” when the download is complete. When the download has completed press the RESET Soft Button to reset the XMS Standalone Hand Pendant and XMS Module.

5.2.2. 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.

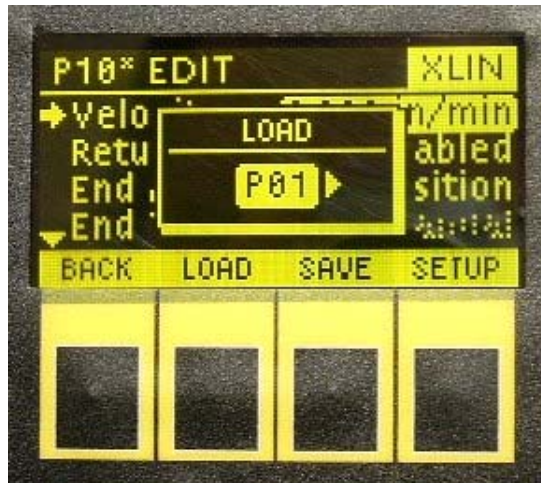


Figure 5-2 – XMS-LIN Hand Pendant *Load* Screen

5.2.3. How to Start a Program

Once the desired program has been loaded and the work piece is ready for the welding operation to begin, press the **Start** Sequence Button. The program status is displayed on the top line of the XMS-LIN Standalone Hand Pendant display.

5.2.4. Error Messages

When the XMS-LIN system 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.

5.2.5. How to Stop a Program

A weld program can be stopped at anytime by pressing the **Stop** Sequence Button on the XMS-LIN Standalone Hand Pendant. The weld program will be halted at the point the **Stop** Sequence Button is pressed. Pressing the **Start** Sequence Button will restart the weld program from the beginning.

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-LIN 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 (XLIN). The Setup screen menu options include module Mode (set to master), Arc Sense Mode (input), Display Units (English), Parameters, Servo Cntl, Servo Cal, Joystick, Digital In, Digital Out, and Download Firmware. Table 5-1, *SETUP Mode Options*, lists the SETUP Mode options and their corresponding parameters and values.

All XMS-LIN Standalone 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 and axis control motor life can be drastically

affected if erroneous settings are employed. 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 5-1 – SETUP Mode Options				
Setup Option	Parameter/Value			
Mode	<p>Master – With multiple Stand Alone systems connected you must choose one to be the Master. The system and Hand Pedant set to Master executes the weld program. If only one Stand Alone system is present and you want it to start the program sequence by pressing the Start button then you must set the mode to Master.</p> <p>Slave – With multiple Stand Alone systems connected you must set all modules except for one to Slave. If you set the module to Slave mode it will wait for an input to start its program.</p>			
Arc Sense Mode	<p>None – Voltage sensor ignores voltage data.</p> <p>Input – Operator specifies voltage data.</p>			
Display Units	<p>English – English units of measure</p> <p>Metric – Metric unit of measure</p>			
Parameters DO NOT CHANGE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">Velocity</td> <td rowspan="2"> <p>Minimum – Sets the minimum value of the parameter.</p> <p>Maximum – Sets the maximum value of the parameter.</p> <p>Default – Sets the default value of the parameter.</p> <p>Increment – Sets the incremental value of the above parameter attributes from 0.000001 to 1,000,000.</p> </td> </tr> <tr> <td style="text-align: center;">Position</td> </tr> </table>	Velocity	<p>Minimum – Sets the minimum value of the parameter.</p> <p>Maximum – Sets the maximum value of the parameter.</p> <p>Default – Sets the default value of the parameter.</p> <p>Increment – Sets the incremental value of the above parameter attributes from 0.000001 to 1,000,000.</p>	Position
Velocity	<p>Minimum – Sets the minimum value of the parameter.</p> <p>Maximum – Sets the maximum value of the parameter.</p> <p>Default – Sets the default value of the parameter.</p> <p>Increment – Sets the incremental value of the above parameter attributes from 0.000001 to 1,000,000.</p>			
Position				
Servo Cntl DO NOT CHANGE	<p>Servo Control - Adjusts Coarse and Fine settings for Gain and Offset parameters. Also sets minimum and maximum values.</p> <p>Coarse gain – 0 to 255</p> <p>Fine gain – 0 to 255</p> <p>Coarse offset – 0 to 255</p> <p>Fine offset – 0 to 255</p> <p>Min – -999.9 to +999.9</p> <p>Max – -999.9 to +999.9</p>			
Servo Cal DO NOT CHANGE	<p>Servo Calibration - These settings change pre-set Servo calibration parameters.</p> <p>K_p – Proportional Gain</p> <p>K_d – Derivative Gain</p> <p>K_i – Integral Gain</p> <p>K_i Limit –Integral Gain Limit</p> <p>Bias – Bias output either side of zero</p> <p>Friction -</p> <p>Counts/Unit – Number of encoder counts per unit of measure</p> <p>Default Velocity – Used for home sequence and program default</p> <p>Default Acceleration – Used for home sequence and program default</p> <p>Direction – Selects which direction is positive or negative</p> <p>Limit direction – Phases the limits with the axis direction</p> <p>Home direction – Selects the direction of the home axis</p>			

Table 5-1 – SETUP Mode Options	
Setup Option	Parameter/Value
Joystick	Up action – jog neg, jog pos, none, output 1 thru 8 Down action – jog neg, jog pos, none, output 1 thru 8 Right action – jog neg, jog pos, none, output 1 thru 8 Left action – jog neg, jog pos, none, output 1 thru 8 Jog high speed – adjusts the velocity of the high speed jog Jog low speed – adjusts the velocity of the low speed jog
Digital In	Digital In – Displays digital status information 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.
Download Firmware	Download Firmware – Allows the user to download firmware to the Hand Pendant or to the XM 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 set how the program will run, how it will end, and all associated values related to this sequence.

The *Edit* screen shows the loaded program (P01 to P10), the program status (EDIT) and the XM Module type (XLIN) on the top line of the display. The middle of the displays the parameters that can be edited, including: Velocity, Return to Start, End At, End Time, End Position, Start Delay, Early Stop, Stop Delay, Pre Purge, and Post Purge.



Figure 5-4 – XMS-LIN Hand Pendant *Edit* Screen

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 5-2,

EDIT Mode Options, describes the EDIT Mode parameters, their corresponding descriptions and range of settings available.

Table 5-2 – EDIT Mode Options

Parameter	Description	Range/Settings
Velocity	Sets the linear velocity of the axis for a specific program.	0.0 to 1.00 inches 0.0 to 1.00 cm
Return to Start	Enabled – Returns the axis to the starting point after the program ends. Disabled – The axis remains at the stopping point at the end of the program.	Enabled Disabled
End At	Time – Activates the <i>End Time</i> option and deactivates the <i>End Position</i> and <i>Early Stop</i> options. Position – Activates the <i>End Position</i> option and deactivates the <i>End Time</i> option. End Input – Deactivates the <i>End Time</i> , <i>End Position</i> and <i>Early Stop</i> options. Sets the end of the weld segment according to an external input.	Time Position End Input
End Time	NOTE: <i>This option is only active when End At option is set to Time.</i> Sets the end of the weld segment to either MANUAL or a specific time (in seconds). 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 seconds
Start Delay	Sets the time (in seconds) from the beginning of the segment until the programmed linear motion begins.	0.0 to 100.0 seconds
Early Stop	NOTE: <i>This option is only active when the End Time option is set to time in seconds.</i> Sets the amount of time (in seconds) before the program ends, at which time the linear motion stops. NOTE: <i>When active, this option deactivates Stop Delay when set to greater than 0.0 seconds.</i>	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) linear axis motion continues after the weld stops.	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 *Start-up* screen, the four (4) Soft Buttons below the Split Screen Display read EDIT, DISABLE, LO SPD, and STATUS. Press the EDIT Button, then, press the LOAD Button. Use the LEFT/RIGHT Soft buttons to select the desired program (P01 to P10). Press the LOAD Button again to load the program. (See Figure 5-2.)

5.4.2. How to Create a Weld Program

A weld program is created by editing the weld parameters in the SETUP Mode and EDIT Mode to the desired values. The new settings are then saved to the current or other program number. The XMS-LIN Standalone Hand Pendant can save or load up to ten different weld programs.

5.4.3. 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. The XMS-LIN Standalone Hand Pendant can save up to 10 programs.



Figure 5-5 – XM Linear Motion 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** Sequence Button. Check to ensure any connected peripherals or assemblies are properly shutdown and secured. Remove power from the XMS Standalone System 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, cooling water and pneumatic sources are isolated from the system.

6. General Maintenance

Although the XMS Standalone 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, *Maintenance Recommendations* 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 requirements.

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.
	Connections	Inspect and tighten all connections and hoses. Inspect are tight 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 indicated.
Weekly	Hand Pendant	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.
		Visually check that all electrical connections and hoses are tight and that wear or damage is not evident.
Monthly	Connections	Check the tightness of all mechanical connections on the XMS Linear Positioner.
Quarterly	Calibration	Perform a calibration check to verify that the XMS Linear slide is being positioned properly. 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 Standalone System failure or to request information on a technical issue with the XMS Standalone System, please contact AMET Technical Support hotline at 208-356-7274.

Table 7-1 – Troubleshooting Guide

Trouble or Problem	Suggested Resolution
The XMS Linear Standalone System does not turn on when the power switch on the Controller Enclosure is turned to ON.	<p>Check that the XMS System is connected to an adequate power source and power is available.</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 had 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 Linear 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).
Hand Pendant Displays “Following Error”	<p>Check to make sure that the motor cable is plugged into the XMS Linear Slider.</p> <p>Check to make sure that E-Stop has been cleared</p>