# INSTRUCTION MANUAL

# MDS-1004 PROGRAMMABLE STITCH MODULE

## FOR THE MODULAR DRIVE SYSTEM

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Model Number _____

Serial Number _____

Date of Purchase _____

Whenever you request replacement parts or information on this equipment, always supply the information you have recorded above.

**LIT-MDS-1004-IPM-0208**

**BUG-O SYSTEMS**
**A DIVISION OF WELD TOOLING CORPORATION**

**280 TECHNOLOGY DRIVE CANONSBURG, PENNSYLVANIA USA 15317-9564**
**PHONE: 1-800-245-3186 http://www.bugo.com FAX: 1-412-331-0383**

## SAFETY

**PROTECT YOURSELF AND OTHERS FROM SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.**

**ELECTRIC SHOCK CAN KILL.**

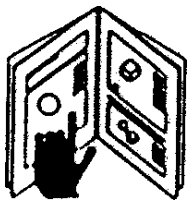
1) The equipment is not waterproof. Using the unit in a wet environment may result in serious injury. Do not touch equipment when wet or standing in a wet location.

2) The unused connectors have power on them. Always keep the unused connectors covered with the supplied protective panels. Operation of the machine without the protective panels may result in injury.

3) Never open the equipment without first unplugging the power cord or serious injury may result.

4) Verify the customer supplied power connections are made in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.

5) Never remove or bypass the equipment power cord ground. Verify the equipment is grounded in accordance with all applicable local and national electrical safety codes. In none exist, use International Electric Code (IEC) 950.



**READ INSTRUCTIONS.**

Read the instruction manual before installing and using the equipment.

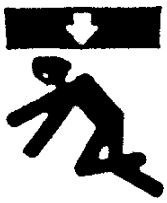
**EQUIPMENT DAMAGE POSSIBLE.**

1) Do not plug in the power cord with out first verifying the equipment is OFF and the cord input voltage is the same as required by the machine or serious damage may result.

2) Always verify both the pinion and wheels are fully engaged before applying power or equipment damage may occur.

3) Do not leave the equipment unattended.

4) Remove from the worksite and store in a safe location when not in use.



**FALLING EQUIPMENT can cause serious personal injury and equipment damage.**

Faulty or careless user installation is possible. As a result, never stand or walk underneath equipment.

**MOVING PARTS can cause serious injury.**

1) Never try to stop the pinion from moving except by removing power or by using the STOP control.

2) Do not remove any protective panels, covers or guards and operate equipment.

## HIGH FREQUENCY WARNINGS

**SPECIAL PRECAUTIONS ARE REQUIRED WHEN USING PLASMA, TIG OR ANY WELDING PROCESS THAT USES HIGH FREQUENCY TO STRIKE AN ARC.**


**WARNING:** HIGH FREQUENCY CAN EFFECT MACHINE OPERATION AND THEREFORE, WELD QUALITY.

**Read the precautions below before installing and using the equipment.**

**PRECAUTIONS:**

**1)** Some plasma or welding cables are strong sources of high frequency interference. NEVER lay a plasma or welding cable across the controls of the machine.

**2)** Always physically separate the plasma or welding cable leads from the machine cables. For example, the plasma or welding cable leads should NEVER be bundled with a pendant cable or the machine power cord. Maximize the separation between any machine cables and the plasma or welding cables.

**3)** Strictly follow the grounding procedures specified for the plasma or welding unit. NOTE: Some plasma and welding units produce exceptionally large amounts of high frequency noise. They may require a grounding rod be driven into the earth within six feet (2 meters) of the plasma or welding unit to become compatible with an automatic cutting or welding process.

**4)** If the high frequency is produced using a spark gap, adjust the points so the gap is as small as possible. The larger the gap, the higher the voltage and the higher the interference.

**5)** Some plasma or welding units will inject high frequency interference into the AC power line. Use separate power line branches whenever possible to power the plasma or welding source and the machine. Do not plug them into the same outlet box.

**6)** High frequency noise may enter the machine through the plasma or welding supply remote contactor leads. Some plasma and welding sources can produce noise spikes of up to several thousand volts. These sources are not compatible with automated cutting and welding equipment. It is recommended that the remote contactor leads on these plasma or welding sources not be connected to the machine. An alternate solution is to purchase a separate remote contactor isolation box.

# PROGRAMMABLE STITCH MODULE

## INSTRUCTIONS MANUAL

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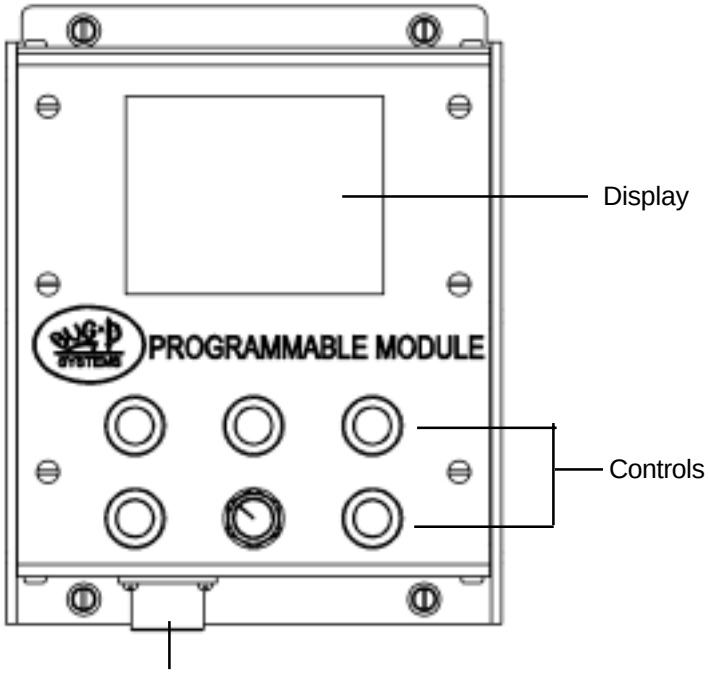
Patents Pending

# INTRODUCTION

The MDS-1004 PROGRAMMABLE MODULE provides stitch controls for welding or cutting with the Modular Drive System. The graphic display interface allows the user to view the exact value of each stitch parameter for precise and repeatable configuration. The Programmable Module contains an extra weld contactor output which can be enabled or disabled independent of the Modular Drive Unit contactor.




# FEATURES

- Exact, repeatable stitch configuration. Each stitch parameter is displayed while being set; allowing each parameter to be exactly set each time a job is set up.
- Two contactor outputs. Programmable Module includes a 2-pin contactor output which can be enabled or disabled independent of the Modular Drive Unit contactor.
- User defined home position. Module can be configured to return the machine to a position before the weld start location for work piece change-out without gun interference. One button will start the whole welding program again.
- No external limit switches. User defines whether module will stop the machine or return it to the home position upon completion of the last weld of the program.
- Resume mode. Stitch welds stopped mid-job can be restarted without interrupting the weld pattern.
- Independent timers for Puddle-buildup and Crater-fill.
- Closed loop feedback ensures the traveled distances match the set distances.

# GETTING STARTED

The MDS-1004 PROGRAMMABLE MODULE is a controller for the Modular Drive Unit, and must be installed on a Modular Drive Unit. Please refer to the Modular Drive Unit instruction manual for further instructions on setting up the Modular Drive Unit.

> **NOTE**: BUG-O Systems recommends becoming familiar with the controls through programming and dry-running the machine several times before welding or cutting.

Begin by powering up the Modular Drive Unit. During power-up, a boot screen similar to figure 1 is displayed. This screen provides software and hardware version information.


*Figure 1: Boot Screen.*

The boot screen is promptly followed by the Main Operating Screen (figure 2). This screen is divided in two sections, with machine status information displayed in the upper section and control functions displayed in the lower section. These functions change from screen to screen and vary depending on machine status. When the machine is stopped, its position is displayed on the left side of the lower section. The status information shown on the Main Operating screen includes tractor speed during welding, the weld contactor status (not shown in figure 2), and the mode of operation.

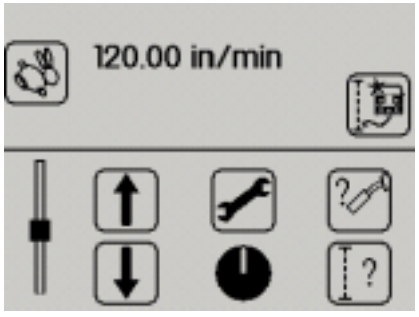



*Figure 2: Main Operating Screen.*

# BASIC SETUP

From the Setup Menu (figure 3), the User will select measurement units and which weld contactors to use, as well as configure the stitch parameters.

From the Main Operating Screen, use  button to access the Setup Menu.

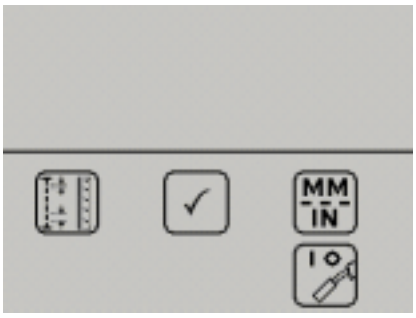



*Figure 3 Setup Menu.*

The following controls are available in the Setup Menu:

Unit selector. Select between English (in) and Metric (mm) units.


Contact selector. Choose which contactor(s) will be used - Drive unit contactor, Programmable module contactor, both or neither.


Stitch Parameter setup. Configure and save stitch parameters.


Exit. Return to Main Operating screen.

# STITCH PROGRAM SETUP

To configure the stitch parameters use  button from the Setup menu. The User will be prompted to set the stitch parameters one at a time. Each setup screen shows the parameter to be set and its current value. The setup screen for travel speed while welding is shown in figure 4.

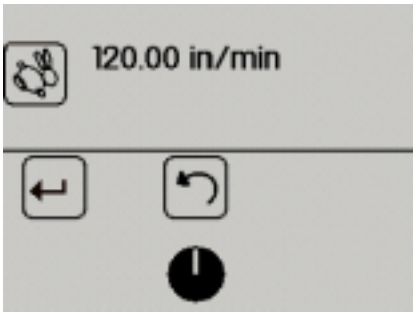



*Figure 4: Setup screen for travel speed while welding.*

# STITCH PROGRAM SETUP (CONT'D.)

The following controls are used when configuring the stitch parameters:

 Increase or Decrease value

 Enter. Accept value and proceed to next parameter

 Undo. Reset current parameter

 Save.

The stitch parameters are listed below in the order that they appear during setup.

 Travel speed of the tractor when welding.

**NOTE:** This is the default speed setting when the unit is powered up. Tractor speed can also be changed while welding or from the Main Operating screen, but those changes will NOT be saved.

 Puddle buildup time.

 Weld length.

 Back-step distance after the weld.

 Crater-fill time.

 Skip distance.

 Number of welds to perform before stopping.

 Home Distance. User defines Home position relative to the start of the first weld. Use this feature to minimize machine interference when changing work pieces.

# STITCH PROGRAM SETUP (CONT'D.)

 End of Cycle Action. Select between Stop at Limit or Rapid Return mode. With Stop at Limit, the machine will stop in place upon completion of the last weld in the program. In Rapid Return mode, the machine will return to Home upon completion of the last weld.

# MODES OF OPERATION

The MDS-1004 offers three operating modes - New, Resume, and Manual. The current mode is displayed in the lower right corner of the upper screen portion for any operating screen (see figure 2).

From the Main Operating screen, use  button to change the operating mode.

**New Stitch Weld Mode** 

Use New stitch weld mode when setting up a new weld start position or a new weld pattern. This is the default operating mode for the MDS-1004. After setting-up the stitch program, position the drive unit so that the welding gun is positioned at the beginning of the first weld. To begin welding, ENABLE the weld contactor(s) then START the machine in forward.

**NOTE**: It is not necessary to ENABLE and START at the same time.

**Resume Mode** 

Resume mode can only be used after a stitch weld has been started in New stitch weld mode. Resume mode allows the User to stop the machine during a weld pattern and resume welding in the same location or move the machine anywhere within the weld pattern then resume welding at the machine's current position. This is useful if a previous weld was not complete or has to be re-welded.

Resume mode is also used when the same weld pattern is to be performed on multiple work pieces. To do this, the User should set an appropriate Home Distance and select Rapid Return for the End of Cycle Action. Upon completion of the last weld, the machine will return to the Home position and the operating mode will default to Resume mode. Position the new work piece and START the machine in forward to repeat the stitch weld pattern. The machine will advance to the start of the first weld then begin welding.

**Manual Mode** 

Manual mode gives the User full control over the weld process and allows the User to weld without configuring a stitch program. This is useful for creating continuous welds. When operating in Manual mode, ENABLING the weld contactor will immediately turn it ON. Motion must be started and stopped separately. DISABLE the weld contactor to turn it OFF.

**CAUTION:** In manual mode, enabling the contactor will turn it ON, immediately!

# ENABLING CONTACTOR(S)

From the Main Operating screen, use  button to enable or disable the selected weld contactor(s). An icon will appear in the upper right hand corner of the display, indicating that the contactor is ON or ENABLED. When the contactor is DISABLED, no status icon appears on the operating screen (refer to figure 2).

**NOTE**: User must ENABLE weld contactor before STARTING in New or Resume mode.

 Contactor ENABLED. Contactor will cycle ON and OFF according to the stitch weld program after the machine is started.

**CAUTION**: In manual mode, enabling the contactor will turn it ON!

 Contactor ON.

# MOTION CONTROL

The Modular drive unit can operate in forward or reverse. Motion control options vary based on the current state of the machine. An overview of the motion control options is provided below.

 START machine in the forward direction.

 Start machine in the reverse direction.

 Increase or Decrease value. This icon indicates that the setting in the top half of the screen can be adjusted by turning the corresponding knob.

 STOP machine motion.

**CAUTION**: STOPPING the machine in manual mode will NOT turn weld contactor OFF. User must DISABLE contactor.

 Return to Home.

After the machine is started and is moving, the unnecessary controls are removed from the bottom half the display as shown in figure 5. Notice how the Select Mode button is now the Stop button.

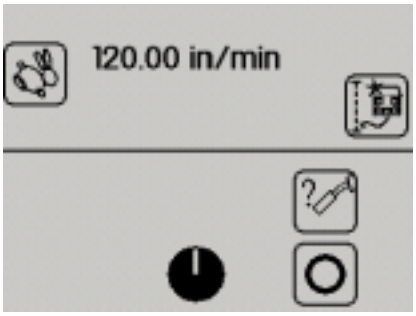



*Figure 5: Machine Running Screen*

# STITCH PROGRAM EXAMPLE

The following is a step-by-step example for setting up and using the MDS-1004 to perform stitch welding.

Program the MDS-1004 to weld 6 stitches, 3.5 in. long and spaced 9.0 in. apart. Set puddle build-up and crater fill times both at 0.3 seconds, and back-step distance to 0.1 inch. Assume this pattern will be used on several work pieces, so the machine should be set to return 6.0 in. beyond the start of the first weld to allow change-out of work pieces.

1. Connect MDS-1004 to Modular Drive Unit.
2. Set-up the Modular Drive Unit on the appropriate rail.
3. Connect weld contactor on Modular Drive Unit to welding feed system.
4. Turn Modular Drive Unit ON.
5. Change Operating Mode to MANUAL . Use Mode Select button .
6. Use Motion Controls to position welding gun at start of first weld .
7. Change Operating Mode to NEW STITCH WELD . Use Mode Select button .
8. Go to the Setup menu .
9. Set Units to ENGLISH (IN).
   a. Open the Unit Selector menu .
   b. Use control knob to select desired units.
   c. Press ENTER to accept changes and return to Setup menu.

10. Select Contactor(s) to be used.
    a. Open Contact Selector menu  .
    b. Use control knob to select desired contactor arrangement.
    c. Press ENTER  to accept changes and return to Setup menu.
11. Setup Stitch Parameters.
    a. Open Stitch Parameter Setup  .
    b. Press ENTER  after each parameter is set.
    c. Set Tractor speed  . Use control knob to adjust speed to 10 in/min.
    d. Set Puddle buildup time  . Use control knob to adjust time to 0.3 sec.
    e. Set Weld length  . Use control knob to adjust length to 3.5 in.
    f. Set Back-step distance  . Use control knob to adjust distance to 0.1 in.
    g. Set Crater fill time  . Use control knob to adjust time to 0.3 sec.
    h. Set Skip distance  . Use control knob to adjust distance to 9 in.
    i. Set Number of welds  . Use control knob to adjust number of welds to 6.
    j. Set Home distance  . Use control knob to adjust distance to 6.0 in.
    k. Select End of cycle action. Use control knob to select Rapid Return mode  .
    l. Save Stitch Parameters  .
12. EXIT  Setup Menu and return to Main Operating screen.
13. Enable weld contactor. Use Contactor Enable button  from Main Operating Screen. Look for the ENABLED icon in upper right corner of display  .
14. Start welding. Use Start forward motion button  to begin weld program.
15. Adjust machine speed while welding. From the Main Operating screen, use the control knob to adjust this speed.

    **NOTE**: This example assumes the use of FCAW, 0.045" diameter wire; 75 Ar/25 CO2 shielding gas; 220 ipm wire feed; 24V.

# WARRANTY

## Limited Warranty

**Model** _____
**Serial No.** _____
**Date Purchased:** _____

For a period of twelve (12) months from delivery, BUG-O Systems warrants to the original purchaser (does not include authorized distributors), that a new machine is free from defects in material and workmanship and agrees to repair or replace, at its option, any defective parts or machine. This warranty does not apply to machines, which after our inspection, are determined to have been damaged due to neglect, abuse, overloading, accident or improper usage. All shipping and handling charges will be paid by customer.

BUG-O Systems makes no warranty of merchantability and makes no other warranty, expressed or implied, beyond the warranty expressly set forth above. Buyer's remedy for breach of warranty, hereunder, shall be limited to repair or replacement of non-conforming parts and machines. Under no circumstances shall consequential damages be recoverable.

***HOW TO OBTAIN SERVICE:***
***If you think this machine is not operating properly, re-read the instruction manual carefully, then call your Authorized BUG-O dealer/distributor. If he cannot give you the necessary service, write or phone us to tell us exactly what difficulty you have experienced. BE SURE to mention the MODEL and SERIAL numbers.***

**NOTES:**