

# INSTRUCTIONS AND PARTS MANUAL

# STEPPER MODULE

**BUG-9870 120 VAC**

**BUG-9872 240 VAC**

**BUG-9874 42 VAC**

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-STPR-IPM-0719

Bug-O Systems is committed to empowering our customers by providing operator controlled mechanized solutions for their welding, cutting and custom applications.



**B U G - O   S Y S T E M S**

A DIVISION OF WELD TOOLING CORPORATION



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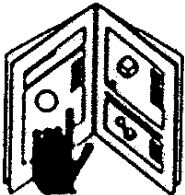
# SAFETY

**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. If 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 without 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 work site 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.

# STEPPER MODULE

**BUG-9870      120 VAC**  
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**BUG-9874      42 VAC**

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## INTRODUCTION

The BUG-O Stepper Module is an adjustable, timed output, power control, that is typically used to overlay the surface of a shaft mounted in a lathe or on turning rolls where a weld bead is continuously laid down, side by side, with each revolution.

Advance of the weld bead is a function of how long the BUG-O, or other tractor, is powered by the Stepper Module when limit switch is activated and the speed of the BUG-O.

## TECHNICAL DATA

**Voltages:**           BUG-9870 120/VAC/50-60Hz/1Ph  
                          BUG-9872 240/VAC/50-60Hz/1Ph  
                          BUG-9874 42/VAC/50-60Hz/1Ph

**Output Current Capacity:** 3.25 AMPs

**Net Weight:** 3.5 lbs. (1.5 kg)

**Dimensions:**            **L**            **W**            **H**  
                          5.75" x 5.75" x 3.5"  
                          (147 mm x 147 mm x 89.3 mm)

**Timer range:** 0.1 to 9.9 seconds

## ITEMS SUPPLIED

Complete Stepper Module Assembly including one (1) BUG-9875 Stepper Module Switch Assembly with 8' (2.4 m) long cable.

## SPECIFICATIONS

Set time is displayed digitally as ## and ranged from a minimum setting of 0.1 to a maximum setting of 9.9 seconds.

The Limit Switch must be securely mounted in-line with a trip mechanism (such as a weld bead, screw head or flag) that will actuate the limit switch once per revolution of the part. This trip mechanism actuates the limit switch and powers the BUG-O to move. Based on the Stepper Module's set time and the speed setting on the BUG-O tractor, the BUG-O will move and stop, advancing the weld. Welding does not stop when the BUG-O moves.

This sequence continues until the operator manually stops the BUG-O and/or the welding process.

NOTE: Limit Switch must be "released" to reset for the next sequence. If the limit switch is not "released", the BUG-O will not advance. Check setup and confirm the limit switch resets.

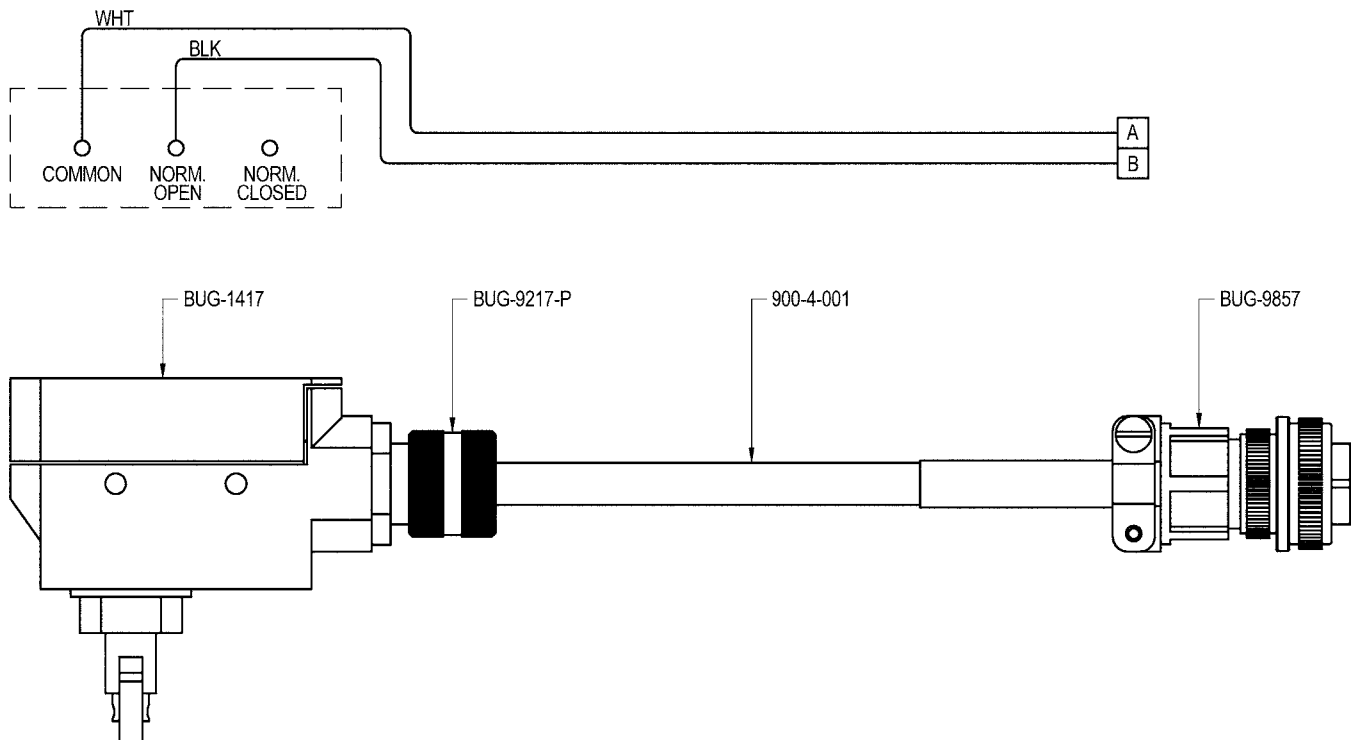
## SETUP

Mount Stepper module to the BUG-O tractor using two (2) ¼-20 x screws, hex head, socket head or cap screws (not supplied), using the mounting holes on the BUG-O carriage.

Mount Limit Switch to work where a trip mechanism will actuate the limit switch with each revolution of the work piece. "Trip" can be a screw head, flag, spot weld or any other item that will activate the limit switch / BUG-O. Mounting brackets used to install the Limit Switch are of your own make or purchase that is appropriate to the specific application.

Plug power cord of Stepper Module into main power supply.

## BUG-9875 STEPPER MODULE SWITCH ASSEMBLY / PARTS LIST / WIRING DIAGRAM

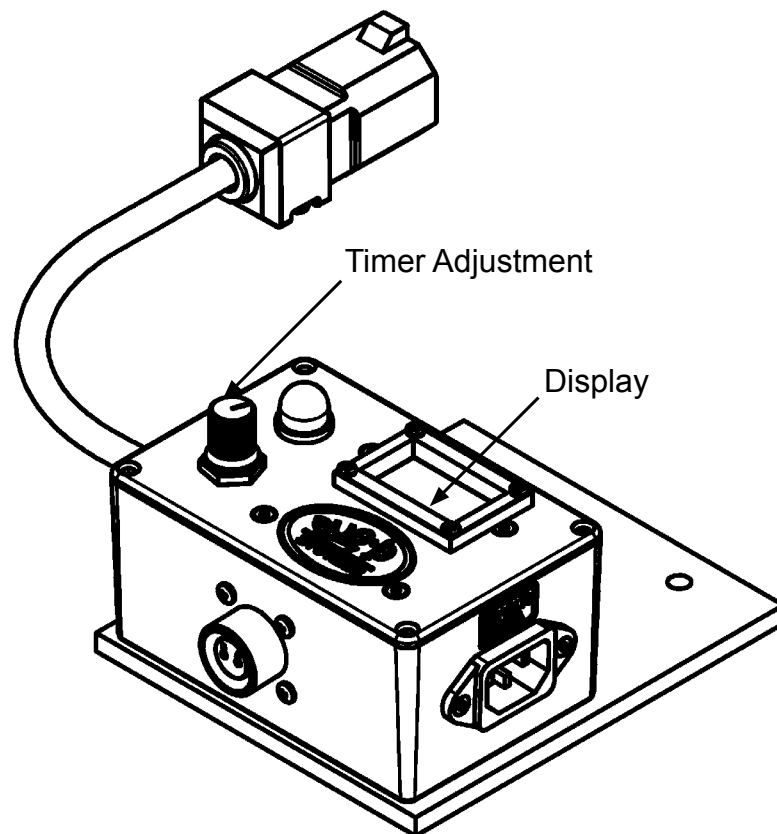


<b>PART NO.</b>	<b>QTY</b>	<b>DESCRIPTION</b>
900-4-001	96"	Power Cord, SJO 18/2-250, 300V
BUG-1417	1	Cross Roller Plunger Actuated
BUG-9217-P	1	Cord Grip
BUG-9857	1	Cable Connector, 2-7, M

## OPERATING INSTRUCTIONS

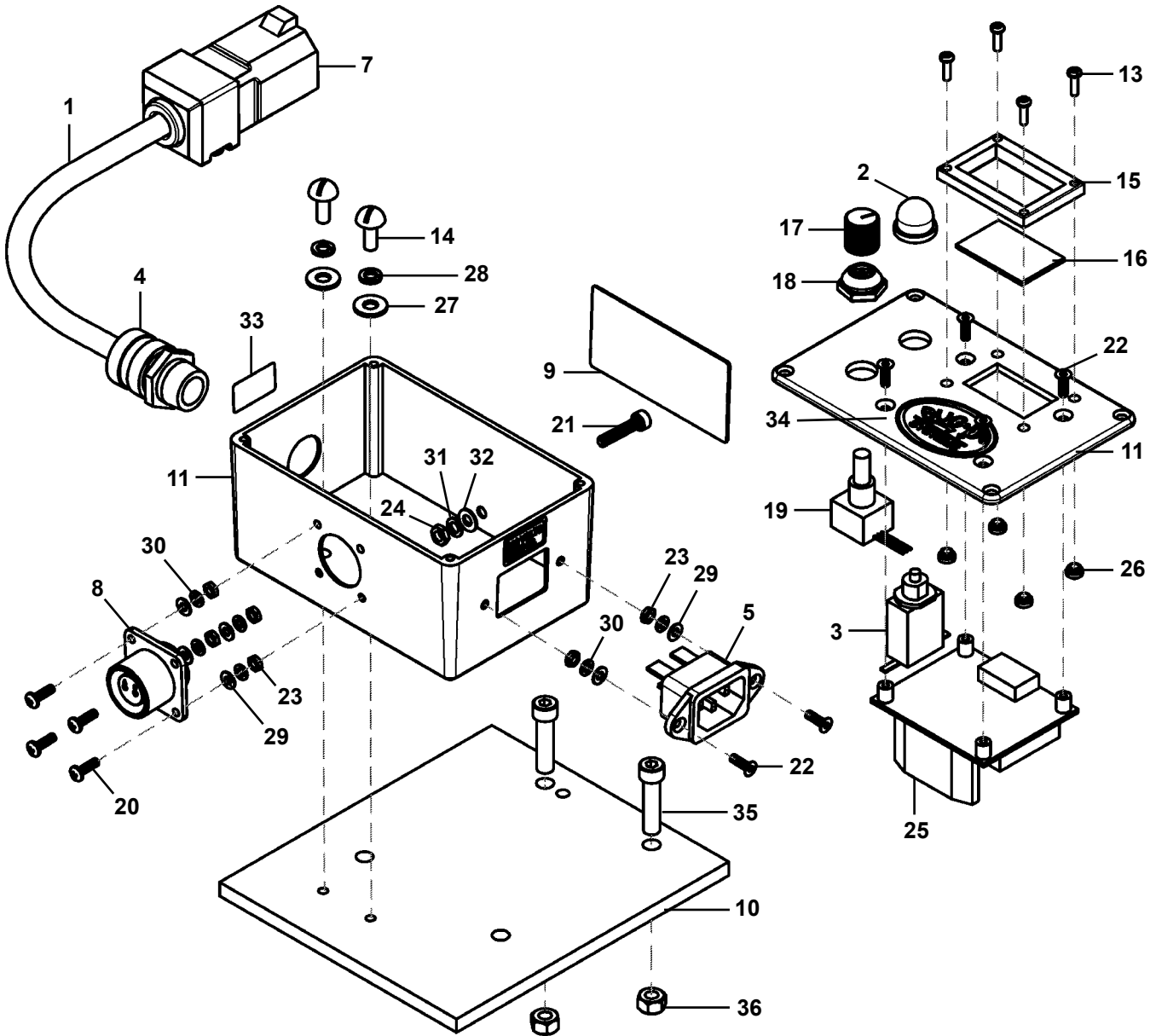
Now that limit switch is mounted, screw the amphenol end of the limit switch cable into the amphenol connector on the Stepper Module. The Stepper Module is mounted to the BUG-O tractor, BUG-O tractor is plugged into the power cable of Stepper Module. Input power is connected to Stepper Module. It is time to test set-up.

Turn timer adjustment to display 3 seconds (3.0), this is an arbitrary value for this testing. Without turning your lathe or turning rolls on, manually trigger the limit switch, make sure to completely release the limit switch (see "NOTE" below). The BUG-O should move until the relay completes the timed cycle, then stops. Now, trigger the limit switch a second time, the BUG-O should move the same distance and stop. Timer adjustment can now be set to desired time.



NOTE: If the limit switch is not completely released, the timer will not reset. If not completely released activating the limit switch will not result in the BUG-O moving. Make certain that the limit switch mount will allow the limit switch to completely reset. Revise the mounting or adjust the limit so that the limit switch resets.

# BUG-987X STEPPER MODULE / EXPLODED VIEW



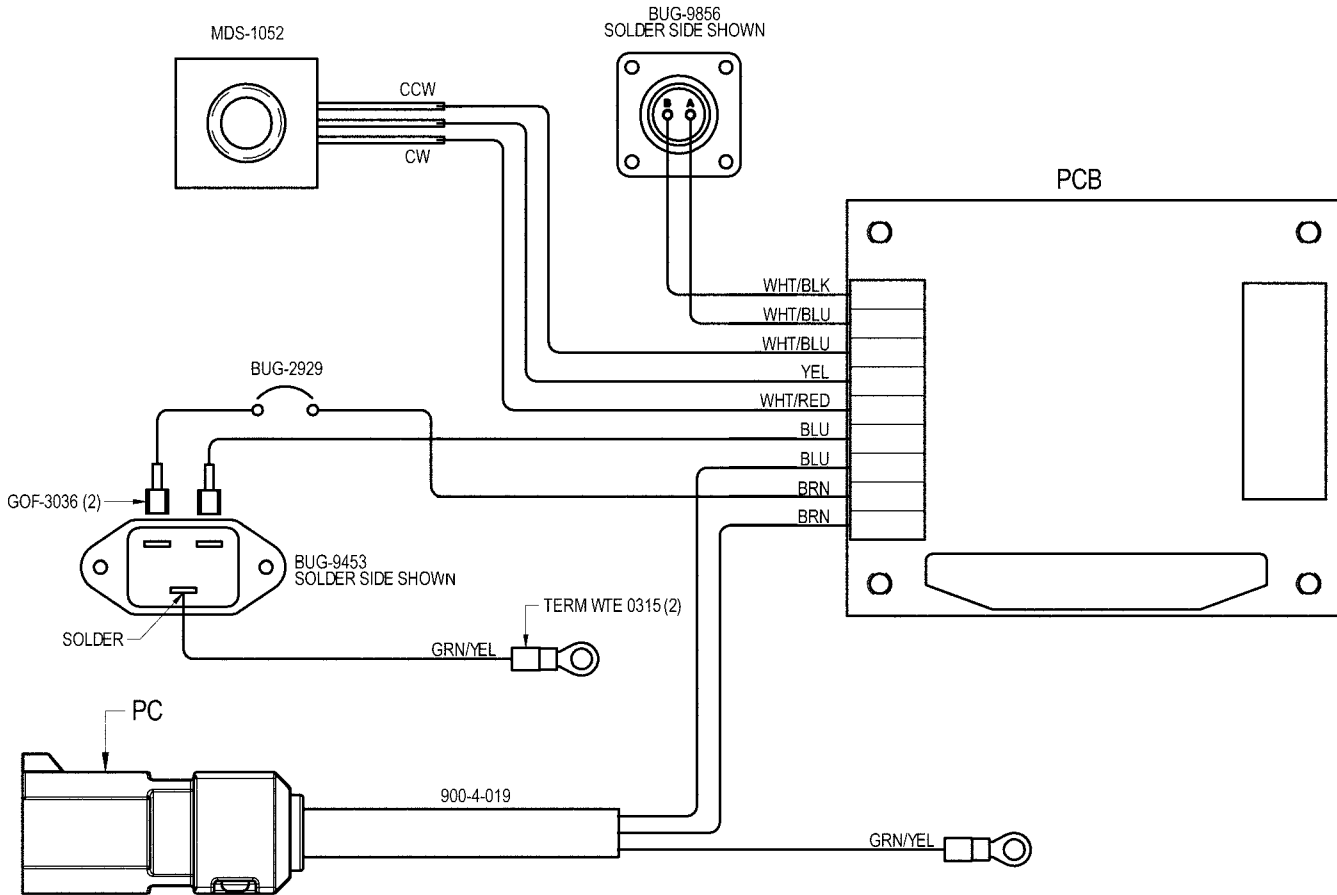


## BUG-987X STEPPER MODULE / PARTS LIST

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	18"	900-4-019	16/3 SJTOW 300V, Pvc
2	1	BUG-2924	Reset Seal, Transparent
3	1	BUG-2929	Circuit Breaker 4 A
4	1	BUG-9216	Cord Grip
5	1	BUG-9453	V-Lock Power Inlet
6*	1	See pg. 10	V-Lock Power Cord
7	1	See pg. 10	Receptacle
8	1	BUG-9856	Panel Connector, 2-T, F
9	1	BUG-1338	Nameplate
10	1	BUG-9866	Stepper Base Plate
11	1	BUG-9871	Stepper Mod Enclosure
12	1	BUG-9875	Stepper Module Switch Assembly
13	4	FAS-0104	4-40 x 3/8 Pan Head, Black
14	2	FAS-0235	Rnd Hd Scr 10-24 x 1/2
15	1	MDS-1011	Display Bezel
16	1	MDS-1013	Display Filter
17	1	MDS-1018	Knob Straight Knurl, Black
18	1	MDS-1046	Knob Seal (Black)
19	1	MDS-1052	10K Potentiometer
20	4	MET-0143-SS	Pan Hd Phil Scr M3 x 10
21	1	MET-0559-SS	Soc Hd Cap Scr M4 x 20
22	6	MET-0943	Flt Hd Soc M3 x 10
23	6	MET-1340-SS	M3 Hex Nut
24	1	MET-1350-SS	M4 Hex Nut
25	1	See Chart	Digital Stepper Module
26	4	SCF-1001	4-40 Self-Clinching Nut
27	2	WAS-0230	#10 Sae Flat Washer
28	2	Was-0232	#10 Split Lock Washer
29	6	WAS-5540-SS	M3 Washer
30	6	WAS-5541-SS	M3 Lock Washer
31	1	WAS-5550-SS	M4 Washer
32	1	WAS-5551-SS	M4 Lock Washer
33	2	See Chart	Voltage Label
34	1	BUG-2005	Label, Bug-O
35	2	FAS-0559	Soc Hd Cap 1/4- 20 x 1
36	2	FAS-1351	Hex Nut 1/4- 20

\* = Not Shown

# BUG-987X STEPPER MODULE / WIRING DIAGRAM



**ELECTRICAL COMPONENT CHART**

ITEM*	DESCRIPTION	BUG-9870 120 VAC	BUG-9872 240 VAC	BUG-9874 42 VAC
6	V-Lock Power Cord	BUG-9454	BUG-9454-240	BUG-9454-42
7	Receptacle	BUG-2847	BUG-9594	BUG-2847
25	Digital Stepper Module	PCB-1219	PCB-1219	PCB-1219-42
33	Voltage Label	BUG-9234	BUG-9233	BUG-9492
3	Circuit Breaker		BUG-2929	
5	V-Lock Power Inlet		BUG-9453 BUG-9454	
8	Panel Connector		BUG-9856	
12	Limit Switch in BUG-9875 Stepper Module Switch Assembly		BUG-1417	
19	Potentiometer		MDS-1052	

\* See Exploded View for Item Number relations

## TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	TEST	BASE SYSTEM TEST PROCEDURE / REMEDY
<b>Unit will not move.</b>	Mechanical checks:	A1 A2 A3	Make certain that there are no obstructions preventing movement. Make certain that wheels of carriage are properly installed on BUG-O Rail. Make certain that Pinion and Rack are properly engaged and locked in place.
	Electrical checks:	B1 B2 B3 B4 B5	Proper Power is supplied to BUG-O. BUG-O is turned "ON." BUG-O direction switch is set to move and in proper direction. Display on Stepper Module is illuminated. Reset BUG-O Circuit Breaker.
	Stepper Module checks:	C1 C2	Make certain that "FLAG" is actuating limit switch and that limit switch has room to reset. With welder off, turn speed of BUG-O to mid range and set Timer to display 1.0 (1 second) and activate limit switch.
<b>Weld beads are spaced too far apart.</b>	Tractor speed	D1	Slow speed of BUG-O.
	Timer setting	D2	Reduce Timer setting. This bring beads closer together.
<b>Weld bead is not spaced far enough apart.</b>	Tractor speed	E1	Increase speed of BUG-O.
	Timer setting	E2	Increase Timer setting. This will move weld bead further.

# WARRANTY

## Limited 3-Year Warranty

Model \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Date Purchased: \_\_\_\_\_  
Where Purchased: \_\_\_\_\_

For a period ending one (1) year from the date of invoice, Manufacturer warrants that any new machine or part is free from defects in materials and workmanship and Manufacturer agrees to repair or replace at its option, any defective part or machine. HOWEVER, if the invoiced customer registers the Product Warranty by returning the Warranty Registration Card supplied with the product within 90 days of the invoice date, or by registering on-line at [www.bugo.com](http://www.bugo.com), Manufacturer will extend the warranty period an additional two (2) years which will provide three (3) total years from the date of original invoice to customer. This warranty does not apply to machines which, after Manufacturer's inspection are determined by Manufacturer to have been damaged due to neglect, abuse, overloading, accident or improper usage. All shipping and handling charges will be paid by the customer.

The foregoing express warranty is exclusive and Manufacturer makes no representation or warranty (either express or implied) other than as set forth expressly in the preceding sentence. Specifically, Manufacturer makes no express or implied warranty of merchantability or fitness for any particular purpose with respect to any goods. Manufacturer shall not be subject to any other obligations or liabilities whatsoever with respect to machines or parts furnished by Manufacturer.

Manufacturer shall not in any event be liable to Distributor or any customer for any loss of profits, incidental or consequential damages or special damages of any kind. Distributor's or customer's sole and exclusive remedy against Manufacturer for any breach of warranty, negligence, strict liability or any other claim relating to goods delivered pursuant hereto shall be for repair or replacement (at Manufacturer's option) of the machines or parts affected by such breach.

### Distributor's Warranty:

In no event shall Manufacturer be liable to Distributor or to any customer thereof for any warranties, representations or promises, express or implied, extended by Distributor without the advance written consent of Manufacturer, including but not limited to any and all warranties of merchantability or fitness for a particular purpose and all warranties, representations or promises which exceed or are different from the express limited warranty set forth above. Distributor agrees to indemnify and hold Manufacturer harmless from any claim by a customer based upon any express or implied warranty by Distributor which exceeds or differs from Manufacturer's express limited warranty set forth above.

### 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 they 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.***