INSTRUCTIONS
and
PARTS MANUAL

MODULAR DRIVE SYSTEM'S PROGRAMMABLE SHAPE MODULE

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.

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

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

CE

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.
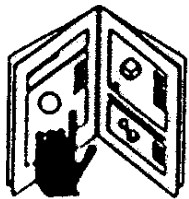
READ INSTRUCTIONS.

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 verity 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.

# MDS PROGRAMMABLE SHAPE MACHINE
INSTRUCTIONS AND PARTS MANUAL
### TABLE OF CONTENTS

SETUP

Always check for proper carriage wheel adjustment before using the machine. Turn the wheel engagement knob **(A)** on the side of the carriage until the wheels are fully moved towards the center of the carriage (engaged). Then rotate the drive clutch knob **(B)** fully counter clockwise to disengage the drive pinion. Slide the carriage onto the end of a track. The wheels should slide into the track V-grooves and the carriage will move smoothly along the track if the wheels are property aligned.
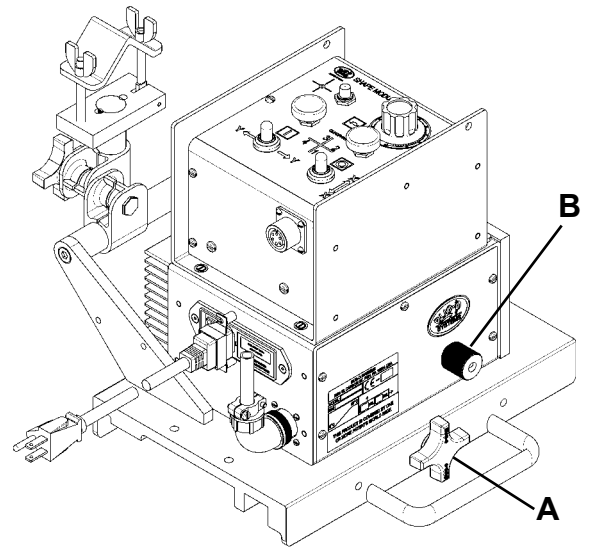
The wheels along one side of the carriage have stainless steel shim washers **(C)** underneath. These wheels are adjustable. Readjust these wheels (if necessary) by rotating the hex bolt **(D)** with a 1/2" wrench.

Grasp the sides of the carriage. The wheels are too loose if it is possible to move the carriage from side to side or up and down. Use a finger to keep one of the adjustable wheels from rotating as the carriage is manually pushed along the track. The wheels are adjusted too tight if firm finger pressure is not enough to prevent wheel rotation. Repeat the process for the other adjustable wheel.
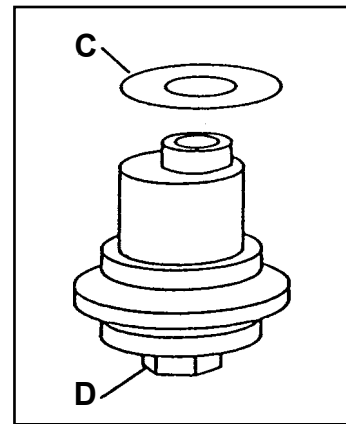
POSITIONING THE MACHINE ON THE TRACK

Position the rail using magnet plates or vacuum cups. Wipe the track grooves free of weld splatter and other debris. This will prevent binding and premature rail and wheel wear. Lubricate the rack using a dry spray, if desired, for extended track life.

Turn the wheel engagement knob **(A)** on the side of the carriage fully counter clockwise to disengage the wheels. Then rotate the Master Drive clutch knob **(B)** fully counter clockwise to disengage the drive pinion. The carriage can now be placed anywhere on the track. Turn the wheel engagement knob **(A)** clockwise to engage the wheels firmly in the V-grooves. Verify all four wheels are in the grooves. Manually move the carriage along the track to verify the motion is smooth and the wheel alignment is correct. Rotate the Master Drive clutch knob **(B)** fully clockwise while gently rocking the machine forward and backward to fully engage the drive pinion. The rocking motion is necessary to help insure proper gear mesh.

MDS PROGRAMMABLE SHAPE MACHINE

This is a 2-axis machine that runs on a track and carries a cutting torch on a motorized cross-arm. It can be used for flame or plasma cutting, or welding, of a variety of shape programmed and stored in memory.

DESCRIPTION

The machine has 20 storage areas in memory for different programmed shapes, numbered 0 to 9. At any time, one of these shape numbers is the current one, and will stay current even when the power is shut off and turned back on, until the shape number is changed by the operator.

All programming is done with the hand-held terminal provided; this may be plugged into the connector on the rear of the machine or unplugged at any time. The terminal is not needed to run the machine once programmed.

Shapes are built up only from the segments provided: circular arcs and straight lines, square or inclined, by selecting type and quadrant for each segment. A shape can have up to 50 segments. Some other operations, like solenoid On/Off, time delay, or repeat another shape a number of times, also count as one segment each if used.

In normal operation, first position the machine at the starting point. Next turn on the preheat gases, and wait until the required preheat is reached. Push the Run button; the machine will turn on the cutting oxygen and start cutting the current shape. At the end of the shape the machine will turn off the cutting oxygen and stop. Manually turn off the preheat gases.

PLASMA CUTTING & WELDING OPERATION

The Programmable Shape Machine can be used successfully for plasma cutting; however it is important to take certain precautions to avoid interference and protect the control circuits. (These comments also apply to TIG welding or any process that uses high frequency to strike an arc). An external relay box is available separately or in the welding kit to provide the contact signal to the plasma source.

OPERATION:

When first plugged in, the position the machine is in becomes the reference Start position.
Now there are three (3) options (the pendant terminal is not needed for the first two):

   1. **MOVE**
      To change the Start position, push the STOP button, move the machine manually to the required position using the toggle switches, and push the RESET button.

   2. **RUN**
      Push the START/RUN button to cut a shape.

   3. **PROGRAM (entry or change)**
      The Programming operation is selected by pressing keys A,B,C,D, E.

      A: All segments; data entry for new shape consists of:

      Total number of segments

      Data for each: Type   (arc, x/y line or slope)
                                        Quadrant   1-4
                                        Size   (radius, or x/y dimension)

See Shape programming for details.
For example, a 2 inch diameter circle could be
   4 Segments:
   1. 2, 1, 100   Counterclockwise arc,   quadrant 1,   1.00 inch radius
   2. 2, 2, 100   Counterclockwise arc,   quadrant 2,   1.00 inch radius
   3. 2, 3, 100   Counterclockwise arc,   quadrant 3,   1.00 inch radius
   4. 2, 4, 100   Counterclockwise are,   quadrant 4,   1.00 inch radius

The data should be tabulated on paper from a diagram before entering.

B: Program Segment
Press B on the terminal to re-program a single segment. This is useful if there is an error in data for just one segment, so the whole shape does not have to be reentered.

C: CHANGE Shape Number
Press C on the terminal to change the current shape number, and enter the desired number at the prompt. The program switches to the new number in memory, and to whatever shape is stored there.

D: DISPLAY Shape Data
Press D to display the data for the current shape. The terminal display shows Total Number of segments, and data for each segment one by one each time you press Enter.

E: END of Segment Slowdown.
Press E to set deceleration value for the shape, when the machine approaches the end of each segment. This is useful when the shape has sharp corners, to prevent overshoot. 99 is maximum slowdown, 0 is no slowdown.

IMPORTANT:

1. Once the STOP button is pressed, computer control is halted until the RUN or the RESET button is pressed. Therefore the programming cannot be done with the handheld terminal in this state; the RESET button should be pressed first.

2. After pushing A and programming a new shape, End of segment Slowdown will still have the old value unless reprogrammed. To set new value, push E.

STEP BY STEP INSTRUCTIONS FOR OPERATION

1. Set up the main track that the machine is to run on, parallel to the work-piece. Slide the machine onto the track, front end first.

2. Plug the machine into the power line of correct voltage, and push the RESET button.

3. Push the red STOP button and use the toggle switches to move the machine and cross rail to the starting position. Press the Reset button to make this the starting point.

4. Set the speed knob for correct speed. Speed can be checked by moving the machine manually using the toggle switches.

5. If the required shape has not been programmed, refer to Shape Programming, and enter the program. If the shape has been programmed, turn on the preheat gases, set the torch height and ignite the torch.

6. When the work piece is heated enough, press the black RUN button. The solenoid will turn on the cutting oxygen, the machine will start moving along the programmed shape, and at the end of the shape it will stop and turn off the solenoid. Manually turn of the preheat gases. The machine is now ready for the next cut.

PENDANT CONTROL:

This is the Pendant Control with keypad and display, which plugs into the Pendant Control Connection on the control panel.

ALPHA KEYS: Press Keys A, B, C, D, or E for the function desired, as described in the programming section of this manual.

DIGIT KEYS: Use the digit keys to enter pipe diameters or dimensions.

ENTER: Push the enter button to store the numeric value entered.

BACKSPACE: The backspace key removes the last digit keyed in before pushing the enter button, if a correction is required.
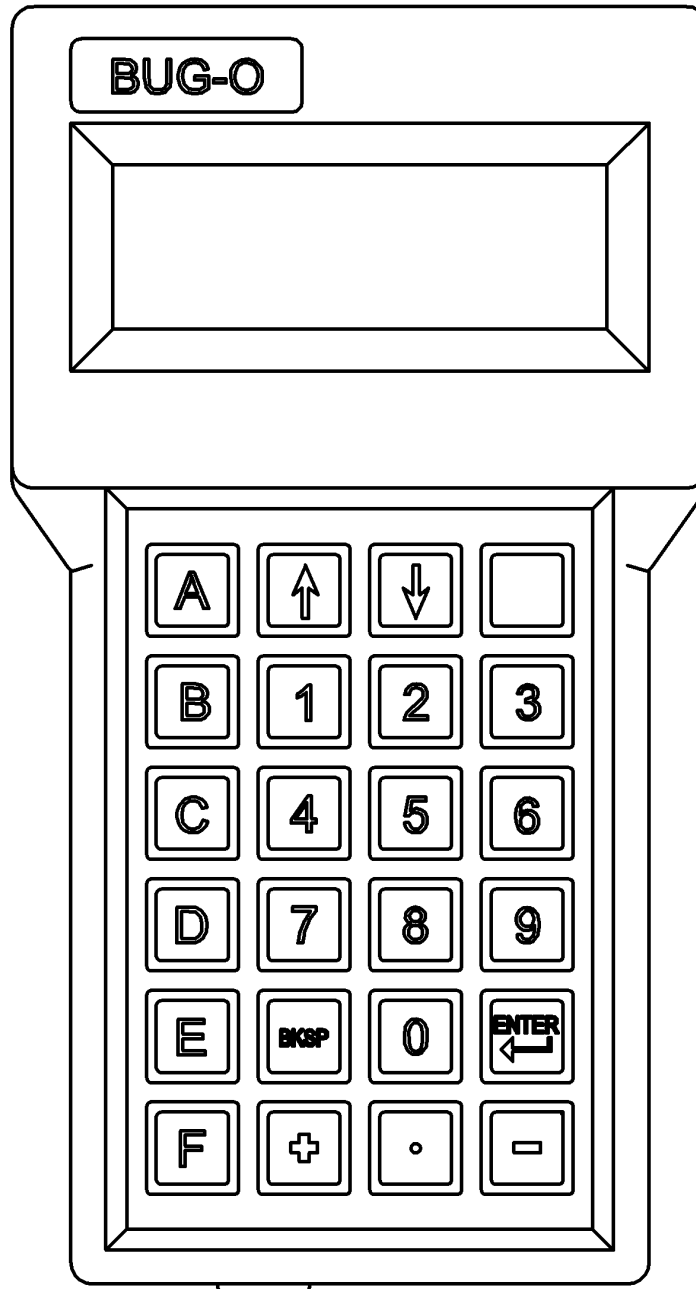
PENDANT CONTROLS

PENDANT CHARACTER MAP: Direct and Shifted Characters.

Shift Key

A	↑	↓	
B	1	2	3
C	4	5	6
D	7	8	9
E	BKSP	0	ENTER
F	+	·	-

Shift Key

G	H	I	
J	K	L	M
N	O	P	Q
R	S	T	U
V	W	X	Y
Z	@	(SP)	!

U: set Units, inch or metric
R: set Ratio
T: Test drives & encoders, function
V: Version Number

SHIFTED CHARACTER SET E.g. to type U for units, press Shift Key, then "9"

PROGRAMMING

> **NOTE:** All programming is done using the **PENDANT CONTROL**.
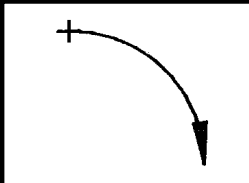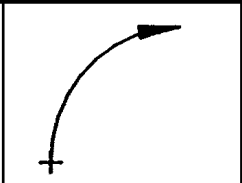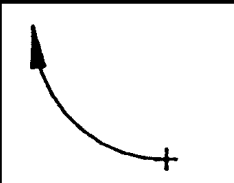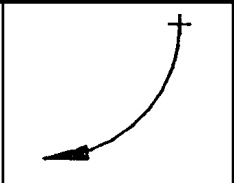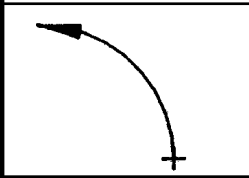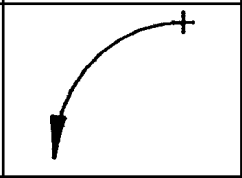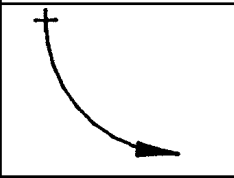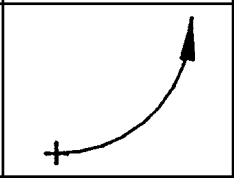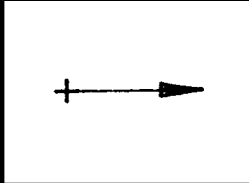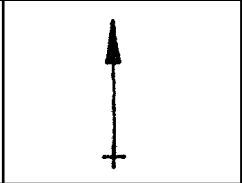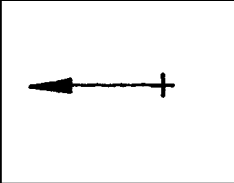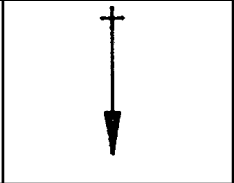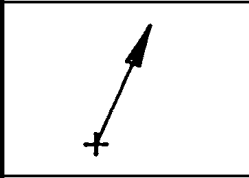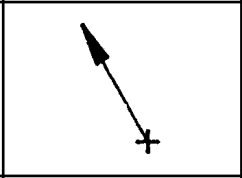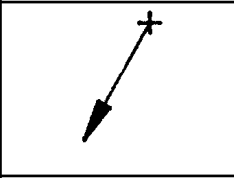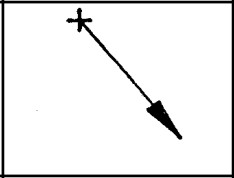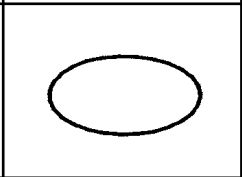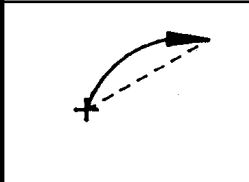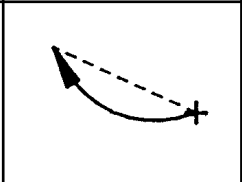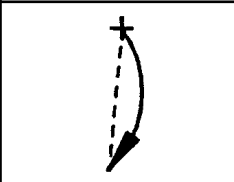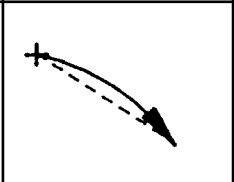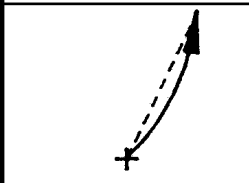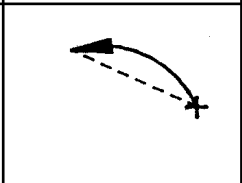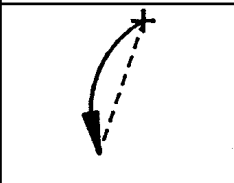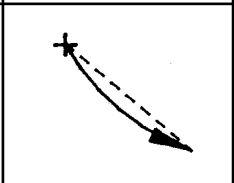
For programming use the following "Alpha Keys".

Push A: To select the type of cut and enter dimensions.

B: To enter the time delay (for plasma cutting).

C: To change Cut Number in memory (numbers 0 – 9).

D: To display the type and dimensions of the cut.

E: To enter end of cut slowdown.

PROGRAMMABLE SHAPE MACHINE

SEGMENT TYPES:

QUADRANT:

SEGMENT TYPES	#1	#2	#3	#4
1. Clockwise 90^{0} arc				
2. Counterclockwise 90^{0} arc				
3. X or Y Axis Line				
4. Oblique Line				
5. Functions	**WELD/OXY ON**	**WELD/OXY OFF**	**WAIT FOR START BUTTON**	**TIME DELAY**
6. Functions	**REPEAT ANOTHER SHAPE**		**AUXILIARY MODES**	**PERCENT SPEED**
7. Clockwise Partial Arc				
8. Counterclockwise Partial Arc				

DATA ENTRY REQUIRED FOR PROGRAMMING

To program a complete new shape (press 'A'):

Count the number of segments or operations and enter the total.
For each segment, enter:

TYPE: select from 1 through 8
Quadrant: 1,2,3 or 4; refer to chart
Size: One or more dimensions per segment as described below; 100 per inch
or 10 per mm (depending on machine version); or for time, 100 per sec.
of delay. Eg. 150 = 1.5", or for metric 375 = 37.5 mm

Detailed description of TYPES :

Type 1.
Clockwise, 90^0 arc segments.
Quadrant determined by which quarter of a full circle makes the arc. (See chart) .
Dimensions required: Radius only.

Type 2.
Counterclockwise, 90^0 arc segments.
Quadrant determined by which quarter of a full circle makes the arc. (See chart).
Dimensions required: Radius only.

Type 3.
Line along X or Y axis.
Quadrant determined by direction of movement. (See chart)
(East: 1, North: 2, West: 3, South: 4).
Dimensions required : Length only.

Type 4.
Angled straight line.
Quadrant determined by direction of movement. (See chart)
(NE: 1, NW: 2, SW: 3, SE: 4).
Dimensions required :   (1) X - dimension ; movement along X axis
                         (2) Y - dimension ; movement along Y axis

Type 5.
Functions or other operations.
Quadrant by selecting function. (See chart)

1. Weld/oxygen ON : turn ON weld contact relay or cutting oxygen solenoid.
   Dimensions required : None.

2. Weld/oxygen OFF.
   Dimensions required : None.

3. Pause : Machine stops and waits until Start/Run button is pushed again.
   Dimensions required : None.

4. Delay : Machine stops and holds position for a programmed time period, up to 99.99
   seconds.
   Dimensions required : time in .01 second units. (eg. 2.5 seconds = 250)

DATA ENTRY REQUIRED FOR PROGRAMMING CONTINUED

Detailed description of TYPES continued :

Type 6.
Special functions.
Quadrant by selecting function.

1. **Repeat:** Another complete shape will be repeated the specified number of times. Shape No. of the repeated shape MUST BE LOWER then the Shape No. of the current shape being programmed. Therefore it CANNOT BE USED IN SHAPE No. 0.
   Data required: (1) Shape Number to be repeated
                    (2) Number of times.

2. **Ellipse:** This is provided for making a complete true ellipse, always starting from the left (West extremity) and moving clockwise.
   Dimensions required: (1) diameter along X-axis.
                          (2) diameter along Y-axis.

3. **Auxiliary Modes:** Provides commands to turn ON or OFF the contactor outputs independently, and also switch speeds from set speed to Rapid Traverse and back. Mode numbers are from 1 to 8.

4. **Set Percent Speed:** Used to change speed of the machine in the middle of a shape to a lower speed.

Type 7.
Clockwise arc, must be less than 180^0.
Quadrant determined by direction of end point of arc relative to the start point. (See chart).
Dimensions required:
   (1) X-dimension; offset along X-axis from start to end point.
   (2) Y-dimension; offset along Y-axis from start to end point.
   (3) Radius of arc.

Type 8.
Counterclockwise arc, must be less than 180^0.
Quadrant determined by direction of end point of arc relative to the start point. (See chart).
Dimensions required:
   (1) X-dimension; offset along X-axis from start to end point.
   (2) Y-dimension; offset along Y-axis from start to end point.
   (3) Radius of arc.

AUXILIARY MODES: TYPE 6, QUADRANT 3

These extra controls have been added to independently turn the two internal Relay outputs ON and OFF, and to switch the machine into Rapid Traverse mode or Set Speed.

The machine is shipped with OUTPUT (1) wired to the contactor relay. By default, this Output turns ON when the Start button is pressed to run a shape, and turns OFF at the end. The relay contacts are located on the MDS Drive.

OUTPUT (2) is not wired. The machine can be changed to use Output 2 instead of Output 1 but both outputs cannot be used at the same time. To change from one output to the other:
1. Open the module.
2. Move the connector from the current output jack to the to the desired jack.
3. See Control Module Wiring Group drawing (MDS-1155-WD)
4. Close module.

By default Output (2) is OFF when a shape is started, until specifically turned ON by the Solenoid/ Weld ON command Type 5, Quad 1.

While running, the Type 5 ON and OFF commands can be used to turn both Outputs On and Off together, and both turn Off at the end.

When programming Type 6 Quad 3, a Mode Number is required to be entered. The 8 auxiliary modes, numbered 0 through 7, allow the setting of a mode with any combination of Outputs On or Off, and choice of Set Speed by the speed knob, or maximum speed regardless of setting. The combinations are listed in the table below:

Mode Number	Output 1.	Output 2.	Speed
0.	Off	Off	Set
1.	Off	On	Set
2.	Off	Off	Hi
3.	Off	On	Hi
4.	On	Off	Set
5.	On	On	Set
6.	On	Off	Hi
7.	On	On	Hi

SET % SPEED, FRACTION OF SET SPEED: Type 6, Quadrant 4

Selecting Type 6-4 allows the speed to change to a fraction of the set speed. Display will read "Speed %", and data entry is accepted from 1 to 99. Entering 0 or just return will make the speed 100%, which is the same as set speed.

When the program reaches a Type 6-3 segment while running, the speed will change to the percent entered, and continue at this setting until there is a later Type 6-3 segment which changes it to another % setting or back to 100%.

Note: If Type 6-3 has been set for HI (rapid traverse), then this setting will cut down the HI speed to the same % .

Settings below 10% are not recommended.

SHAPE PROGRAMMING

1. Draw the required shape on paper to some convenient scale.

2. Refer to the Segment Chart and divide the shape into straight line and arc segments.

3. Decide on the operation sequence and mark any other operations such as turning torch on or off, or delay.

4. Number all the segments in sequence, including other operations if any, and make a table with required data. Example for a clockwise circle starting from the top: (dimensions described for metric version)

Segment Number	Type	Quadrant	Dimensions
1.	1	1	300 (30 mm)
2.	1	4	300 (30 mm)
3.	1	3	300 (30 mm)
4.	1	2	300 (30 mm)

5. With the machine powered up and pendant plugged in, select which shape number this will be - say we want No. 3.
   Push C : display reads "Shape No._"
   Push 3 for No. 3, press Enter key (backward arrow)
   The program is now in Shape no. 3

6. Push A : display reads "Total segments ?"
   Push 4 for 4 segments and Enter.
   Display reads "1. Type?" waiting for Segment 1 data.

7. Push 1 for type, clockwise arc. (Refer to the table prepared).
   Display reads "Quadrant?"
   Push 1 for quadrant 1.
   Display reads "mm x 10"
   Push 3, 0, 0, Enter, for 300, which is 30.0 mm.
   Segment 1 has now been entered, display reads "2. Type ?", asking for data for segment 2.

8. Repeat above steps to enter data for all segments, in sequence.
   Display will read "Ready" after all segments are entered.

   The shape program is now stored in memory as shape no. 3, and the machine is ready to cut the shape.

DIMENSIONS REQUIRED

R

1

R

2

L

3

X

Y

4

Y

X

6-2

Y

R

X

7

Y

R

X

8
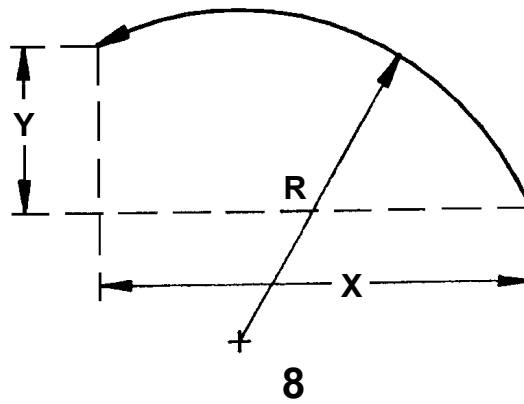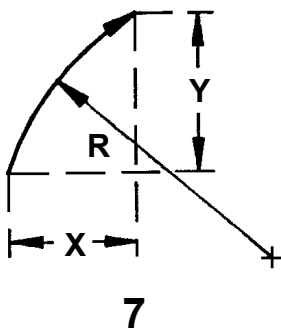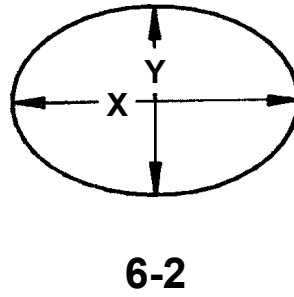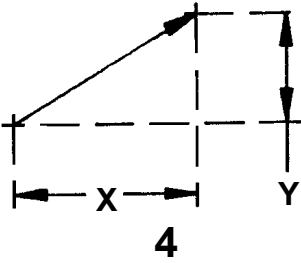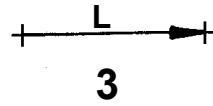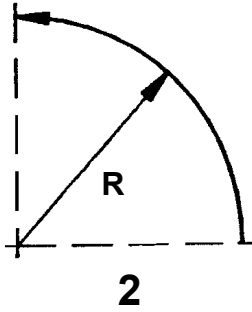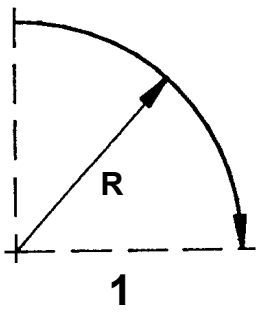
EXAMPLE: OBROUND SHAPE
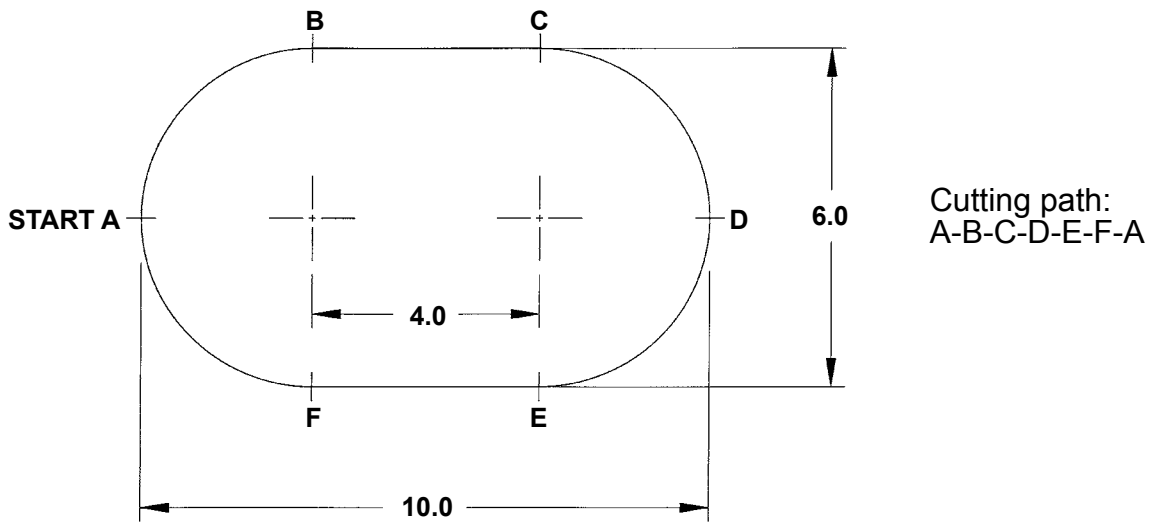
Cutting path:
A-B-C-D-E-F-A

Total number of segments = 6

Segment	Number	Type	Quadrant	Size	Comment
AB	1	1	2	300	CW Arc, 3.00" radius
BC	2	3	1	400	X-axis line, 3.00"
CD	3	1	1	300	CW Arc
DE	4	1	4	300	CW Arc
EF	5	3	3	400	X-axis line
FA	6	1	3	300	CW Arc

AB: Type 1 specifies Clockwise Arc

Quadrant Number is 2

Size 300 specifies Radius = 3.00 inches (Metric: 300=30.0 mm).

EXAMPLE: REPEAT FUNCTION

Shape No. 2

Total number of segments = 6

Shape No. 1

Total number of segments = 4
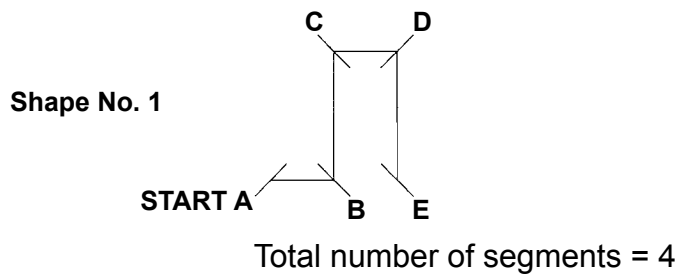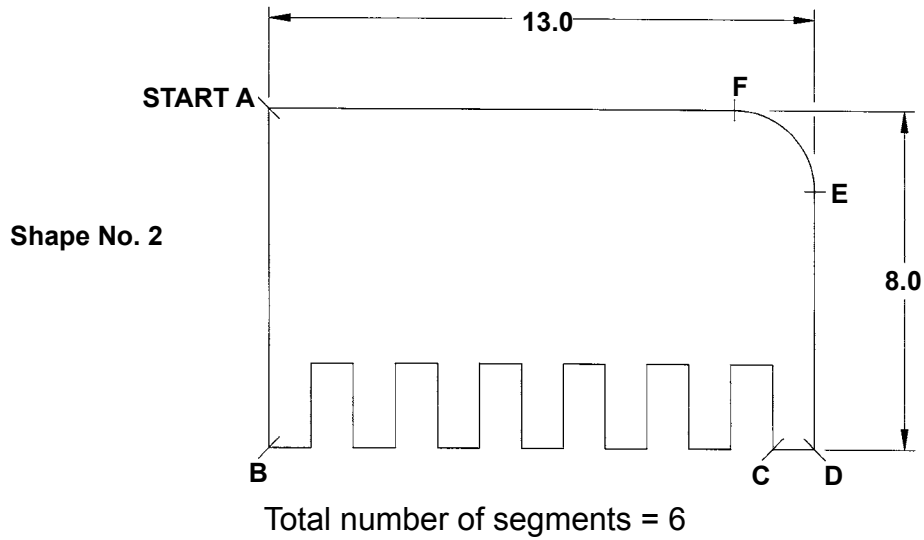
Shape No. 1					
Segment	Number	Type	Quadrant	Size	Comment
AB	1	3	1	100	
BC	2	3	2	200	
CD	3	3	1	100	
DE	4	3	4	200	

Shape No. 2					
Segment	Number	Type	Quadrant	Size	Comment
AB	1	3	4	800	
Shape 1	2	6	1	1	Repeat #1
				6	6 times
CD	3	3	1	100	
DE	4	3	2	600	
EF	5	2	1	200	
FA	6	3	3	1100	

MDS-1165 PANEL CONTROLS

SHAPE MODULE

BUG-O SYSTEMS
MADE IN USA

Reset (SW1)

Speed Control (P)

Start/Run (SW2)

QUADRANT

3   2
4   1

Stop/Pause (SW3)

Manual Jog Y Axis (SW5)

Y ⇐   ⇒ Y

X
↕
X

Manual Jog X Axis (SW4)

EN1

Pendant Control
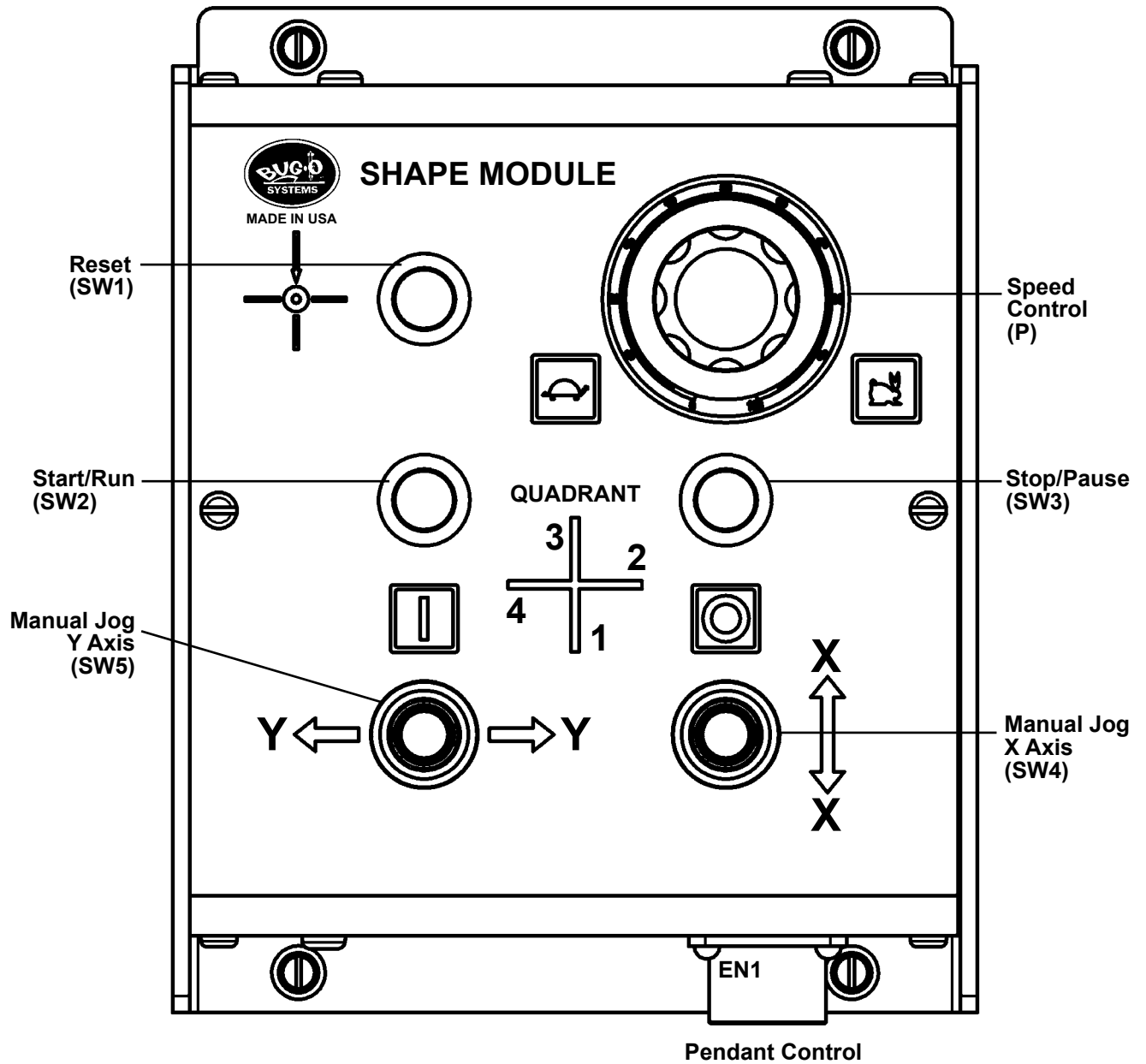
MDS SHAPE MACHINE MAJOR COMPONENTS
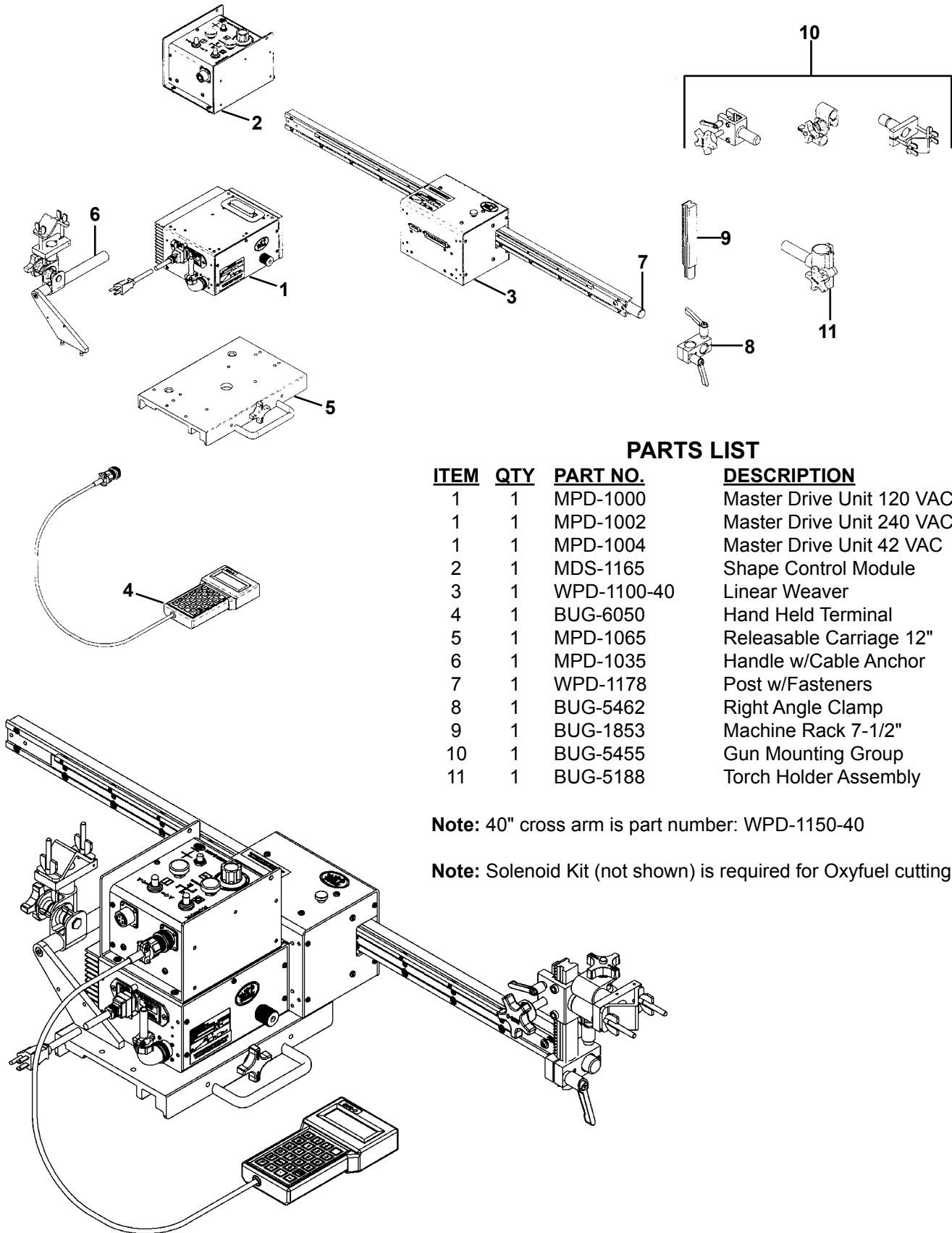
PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	1	MPD-1000	Master Drive Unit 120 VAC
1	1	MPD-1002	Master Drive Unit 240 VAC
1	1	MPD-1004	Master Drive Unit 42 VAC
2	1	MDS-1165	Shape Control Module
3	1	WPD-1100-40	Linear Weaver
4	1	BUG-6050	Hand Held Terminal
5	1	MPD-1065	Releasable Carriage 12"
6	1	MPD-1035	Handle w/Cable Anchor
7	1	WPD-1178	Post w/Fasteners
8	1	BUG-5462	Right Angle Clamp
9	1	BUG-1853	Machine Rack 7-1/2"
10	1	BUG-5455	Gun Mounting Group
11	1	BUG-5188	Torch Holder Assembly

Note: 40" cross arm is part number: WPD-1150-40

Note: Solenoid Kit (not shown) is required for Oxyfuel cutting.

CONNECTING A MDS-117X SOLENOID KIT TO A MPD-100X MASTER DRIVE

To connect the MDS-117X Solenoid Kit to a MPD-100X Master Drive, the power cord from the master drive is removed and the female plug of the MDS-1170 is plugged into its place.

STEP 1: Remove the power cord from the Master Drive.
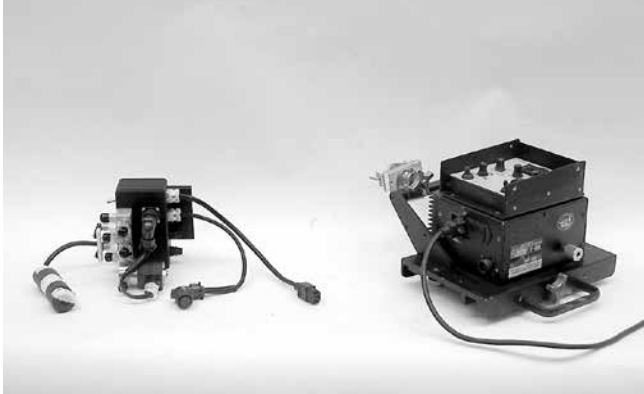
STEP 2: Plug the female plug of the solenoid kit in the master drive.
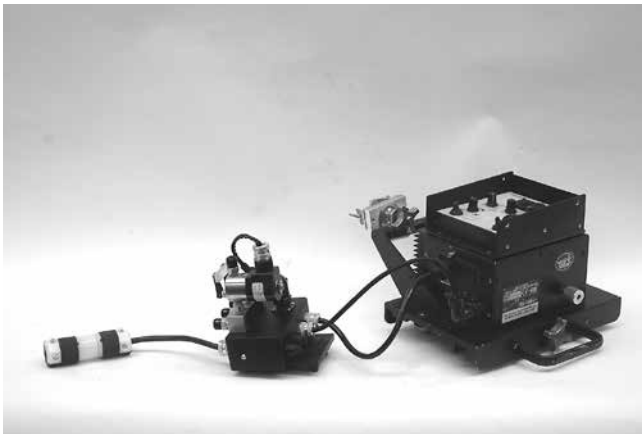
STEP 3: Bolt the solenoid kit to the deck of the master drive carriage using the supplied 1/4-20 bolts.

MDS-1165 CONTROL MODULE WIRING DIAGRAM / COMPONENT LIST

COMPONENT LIST

REF. NO.	QTY	PART NO.	DESCRIPTION
P	1	BUG-9677	Potentiometer Control
CN1	1	BUG-9902	Panel Connector, 6-T, F
F1	1	SEO-4118	Ferrite Data Line Filter
R1	1	PCB-1036	Connector 50-Pin (M)
SW1	1	SWT-1111	Switch, Black
SW2	1	SWT-1113	Switch, Green
SW3	1	SWT-1112	Switch, Red
SW4, SW5	2	SWT-0540	Toggle Switch
	1	MDS-1135	MDS Shape Card
	1	PCB-1041	Interface PCB, Shape Cutter

PENDANT CABLE WIRING DIAGRAM

BUG-6050
HAND HELD TERMINAL
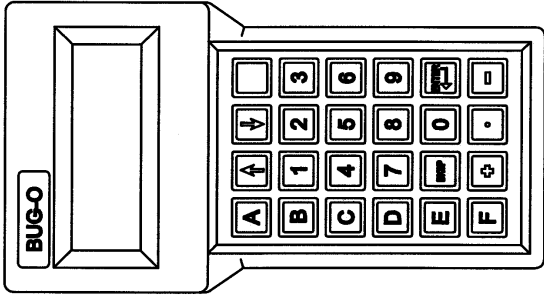
BUG-9906
CABLE CONNECTOR, 6-T, M
FRONT VIEW

BLK
(SHIELD)

RED
BRN

ORG
YEL
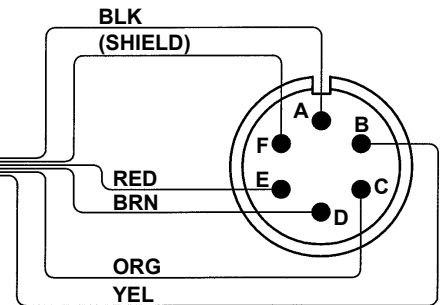
A _ Black: Circuit Com.
B _ Yellow: TX (Transmit)
C _ Orange: RX (Receive) 9600 Baud
D _ Brown: Signal Ground
E _ Red: Power (5V)
F _ Shield Drain Wire, Bare, Touching Foil Shielding

NOTE: Other wires should be trimmed and unable to touch terminal pins.

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, 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 Manufacture'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.