INSTRUCTIONS AND PARTS MANUAL

UNIVERSAL BUG-O-MATIC

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-BUG-O-MATIC-IPM-0424

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

280 TECHNOLOGY DRIVE CANONSBURG, PENNSYLVANIA 15317-9564 USA
PHONE: 412-331-1776 https://www.bugo.com FAX: 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.

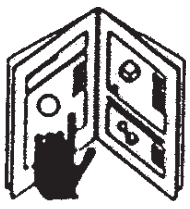
1) The equipment is not waterproof. Using the unit in a wet environment may result in serious injury. Do not touch equipment when wet or standing in a wet location.

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.

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.

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.

PLASMA CUTTING can produce destructive High Voltage at High Frequency.

1) If using plasma, see that the machine as well as the plasma power source is properly grounded.

2) Do not use older model plasma machines meant for manual operation. These can leak high frequency at high voltages, which can cause dangerous shock, as well as destroy control circuits.

3) Read the instruction manual page on plasma cutting carefully, and follow all precautions.

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.

UNIVERSAL BUG-O-MATIC

INSTRUCTIONS AND PARTS MANUAL

TABLE OF CONTENTS

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UNIVERSAL BUG-O-MATIC

TECHNICAL DATA

Power Requirements:	BUG-5700	120 VAC/50-60/1
	BUG-5702	240 VAC/50-60/1
	BUG-5704	42 VAC/50-60/1
Linear Speed:	3-70 ipm (75-1750 mm/min)	
Weave Speed:	4-100 ipm (100-2500 mm/min)	
Dwell Time:	0-3 seconds, left and right	
Weave Width:	0.1 to 2" (2.5-50 mm)	
Steering:	2" (50 mm) left and right of center 4" (100 mm) total	
Load Capacity:	30 lbs (14 kg)	
Net Weight:	22 lbs (10 kg)	

The machine can be mounted on MPD-1065 Releasable Carriage, MPD-1055 18" Carriage, FMD-1022 Carriage for Hi-Flex rail or BUG-5960 for BRR Carriage. By simply changing the carriage, the machine will run on any BUG-O rail - Aluminum Rigid, Semi-Flex, Bent Rigid or Hi-Flex Rail . The chart below shows which types of rail are compatible with each carriage. See pages 24-30 for details.

CARRIAGES	RAILS: Aluminum Rigid Rail ARR-1080 & ARR-1085	Bent Rigid Rail BRR-1180 & BRR-1210	Hi-Flex Rail FMD-1050	Semi-Flex Rail AFR-3000	PSR Ring Rail PSR-2000-XX	Piper Flex Rail PSR-2200
BUG-5960 BRR Carriage	X	X		X		
FMD-1022 Hi-Flex Carriage			X			
MPD-1055 18" Carriage	X					
MPD-1065 Releasable Carriage	X			X		
BUG-6550-QC-PSR-CARR Carriage					X	X

The power Supply transformer is contained inside the unit. Pendant control of all functions is provided, including:

weave speed and amplitude, and centerline steering,

left and right dwell time,

tractor speed and direction,

weld contact on/off.

DETAILED SETUP

1. Secure the Rail to the Workpiece
The Universal Bug-O-Matic is designed for use with most BUG-O rails. Descriptions of the various BUG-O rails and their applications are provided on pages 24-27. Select a rail appropriate to your application. Install rail to workpiece.

2. Secure the Carriage on the Rail
Select a BUG-O carriage that is compatible with the rail being used. Descriptions of the various BUG-O carriages are provided on pages 28-30. Declutch the drive pinion prior to installing carriage. Verify wheel alignment and adjust wheels as needed, then engage the drive pinion.

3. Position and Clamp Welding Gun
Secure welding gun in the clamp located on the end of the gun mounting group. Arrange cables so that they do not interfere with the movement of the machine before securing cables in the cable anchor at the back of the machine.

4. Connect Control Cables
The Universal Bug-O-Matic includes two control cables that must be properly connected for the machine to function.

A. Connect the Control Pendant (BUG-5775) to the Drive Unit (BUG-5710*, for 120 V model).

B. Connect the weld contact outlet, pins A & B, on the Drive Unit (BUG-5710*, for 120 V model) to the wire feeder contact circuit.

5. Plug in Universal Bug-O-Matic
Inspect the power cord before each use. Do not use if damaged. Plug in the machine to a power receptacle of the appropriate voltage.

6. Power ON Universal Bug-O-Matic

CAUTION: Machine may start moving as soon as it is powered on.

Use the toggle switch on the back of the drive unit to turn power on and off to the machine. For operator safety, set weld pattern to “NO WEAVE” and tractor to “OFF” before turning on the machine.

7. Position Welding Gun
Proper setup of the welding gun is critical to a successful weld. In addition to manually positioning the welding gun within the clamp, the welding gun must also be properly set with respect to three mechanical controls: The cross arm, the manual height positioner and the tractor position.

A. Cross Arm: The cross arm offers a weave up to 1" (25 mm) left and right, 2" (50 mm) total. Center the cross arm before placing the welding gun over the work area. This will ensure maximum oscillation amplitude. See “Centering the Cross Arm” on page 9.

B. Manual Height Positioner: The manual height positioner has 4" (100 mm) of vertical travel available. For best results, position the slide assembly in the middle of its travel range before setting the welding gun. Use the knob to raise or lower to the desired height.

C. Tractor position: Use the tractor Forward/Off/Reverse switch to position the Universal Bug-O-Matic at the start of the weld. The operator can increase or decrease the tractor travel speed at any time using the speed controller.

*BUG-5712 for 240 V model or BUG-5714 for 42 V model

DETAILED SETUP, CONT'D.

8. Set Weld Parameters

Use the control pendant to set the seven weld parameters.

A. Weave Speed. Controls the travel speed of the cross arm.

B. Weave Amplitude. Controls the width of oscillation, up to 2" (50 mm).

C. Left Dwell time. Controls how long the cross arm pauses on the left edge of the weld (0-3 sec).

D. Right Dwell time. Controls how long the cross arm pauses on the right edge of the weld (0-3 sec).

E. Travel Speed. Controls the tractor travel speed (3-70 ipm).

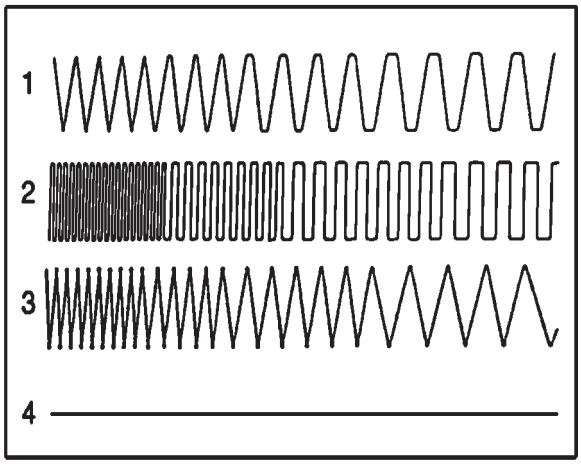
F. Weave Mode. Choose one of four modes.

1) RUN - In this mode, the drive motor is always on and the tractor travels continuously -- during both weave and dwell. Weave speed and dwell time both affect the weave pattern.

2) STEP - The tractor travels only during dwell and stops during the weaver cross stroke. Changing weave speed does not effect the weld pattern-dwell time does.

3) TRACTOR STOP ON DWELL - The tractor travels during the weave stroke; the tractor and the weaver stop during dwell.

4) NO WEAVE - In this mode oscillation is stopped. Only the tractor is powered. This mode is used for stringer passes.



9. Verify Setup

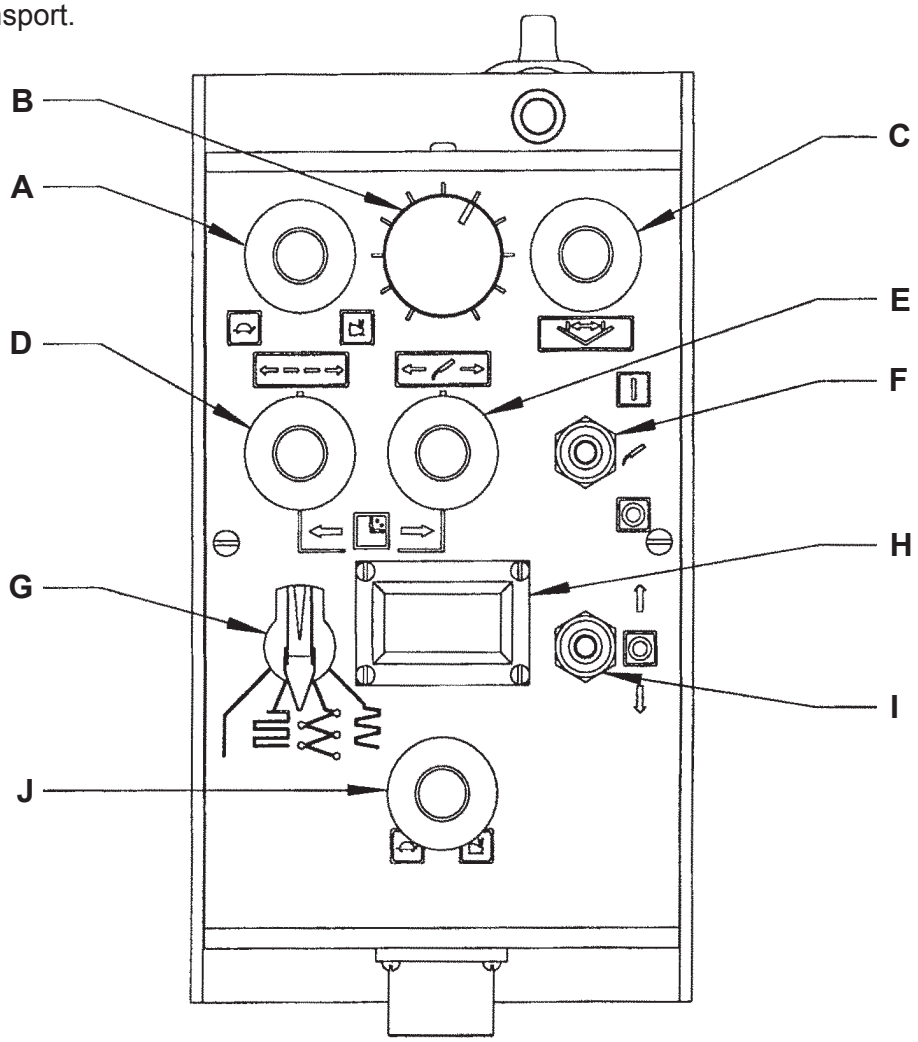
Before proceeding to weld, take a moment to verify that the machine is setup correctly. With the tractor on, but the arc off, run the machine and verify that it is moving as intended. Check cross arm movement and speed, and tractor travel speed. Verify that the cross arm moves over the full width of the weld.

POWER SOURCE

Use only constant voltage (CV) type power sources with this welding device. If using a multiple process power source, be sure that it is set for constant voltage (CV) output as per the instructions in the power source manual. Set the power source polarity switch properly or connect the electrodes and work leads for the correct electrode polarity.

PENDANT CONTROL

The Universal Bug-O-Matic features a remote control pendant which allows the operator to run the machine from up to 10 feet (3 m) away. The pendant can be clamped to the machine handle for easy storage or transport.



BUG-5775 Pendant Control

A. Weave Speed
B. Steering, 2" (50 mm) left or right from center
C. Amplitude, 0-2" (50 mm)
D. Dwell Left, 0-3 sec.
E. Dwell Right, 0-3 sec.
F. Weld Contact Switch
G. Mode Selector Switch
H. Digital Display, Tractor Speed
I. Forward / Off/ Reverse, Tractor Travel
J. Tractor Speed

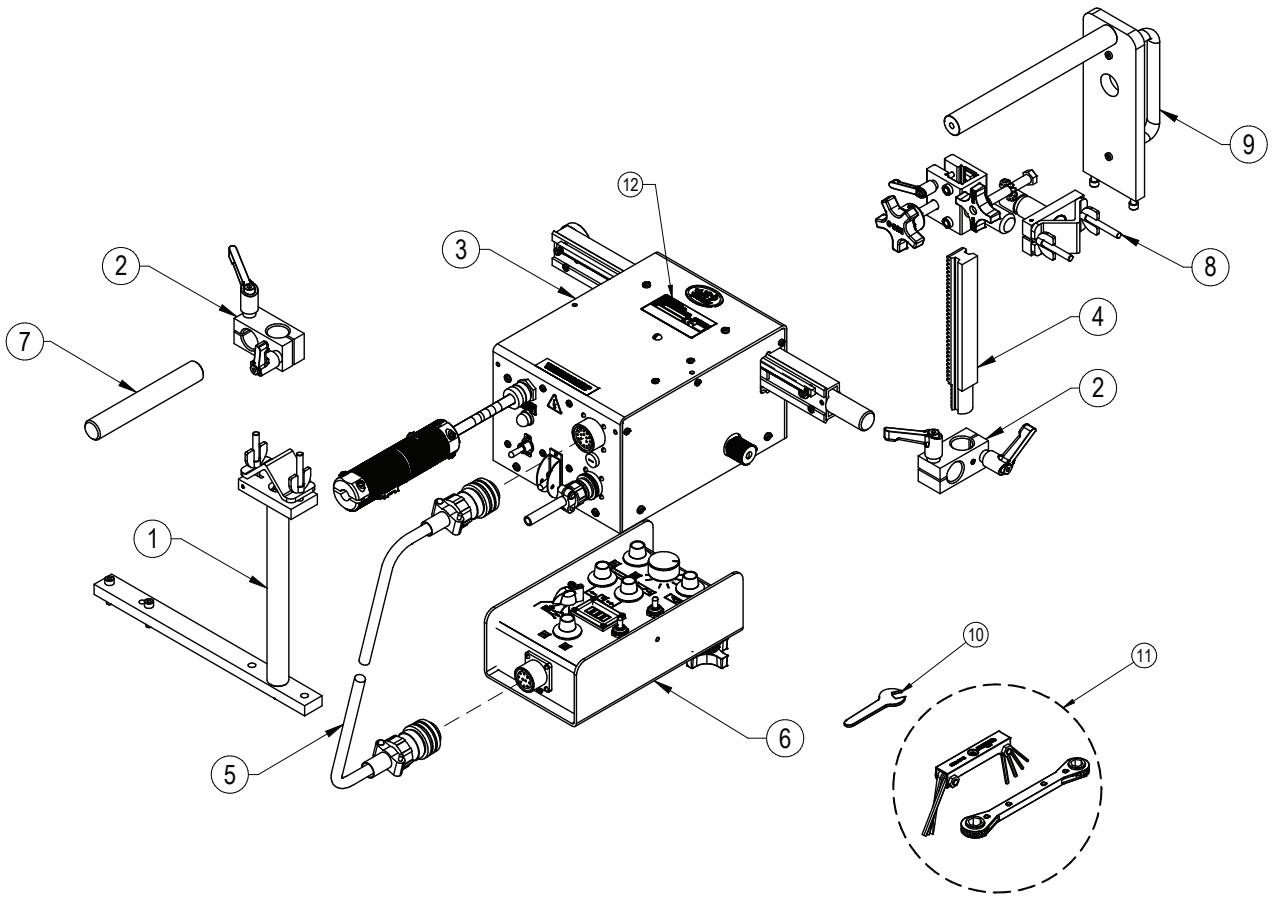
CENTERING THE CROSS ARM

Verify that the cross arm is centered before clamping the welding gun in place.

1. Set the weld mode to “NO WEAVE” and turn on the AC power.
2. Turn the Torch Steering knob counterclockwise until it stops.
3. Turn the Torch Steering knob clockwise until it stops. This should be 3 turns.
4. Turn the Torch Steering knob 1 1/2 turns counterclockwise. The cross arm should now be centered.
5. If the cross arm is not centered, refer to the service procedures on pages 32 and 33.

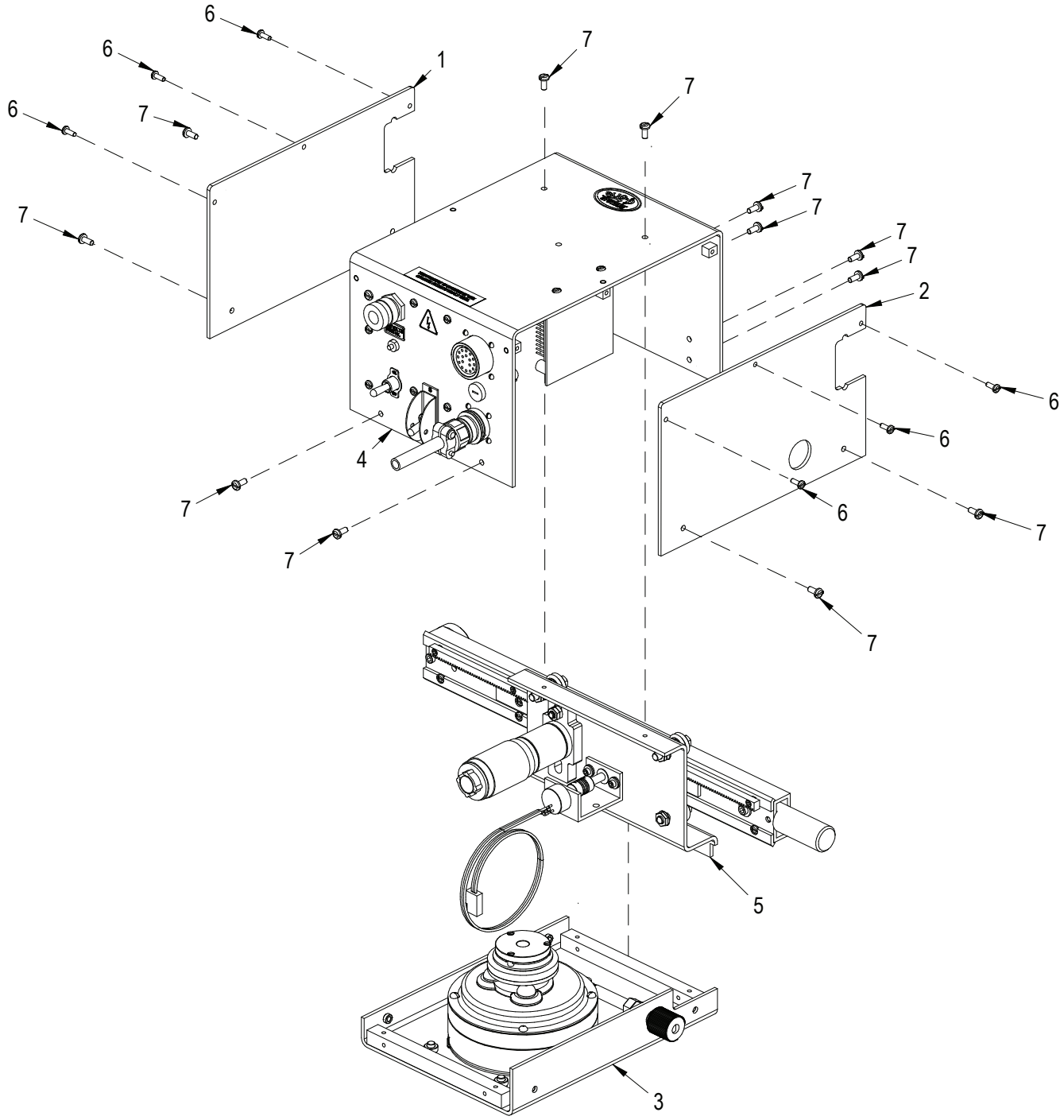
To verify that an adequate range of motion is available, adjust the oscillation amplitude to the desired setting, and change the weld mode. Check that the welding gun moves across the entire weld groove.

BUG-570_ UNIVERSAL BUG-O-MATIC / EXPLODED VIEW /PARTS LIST



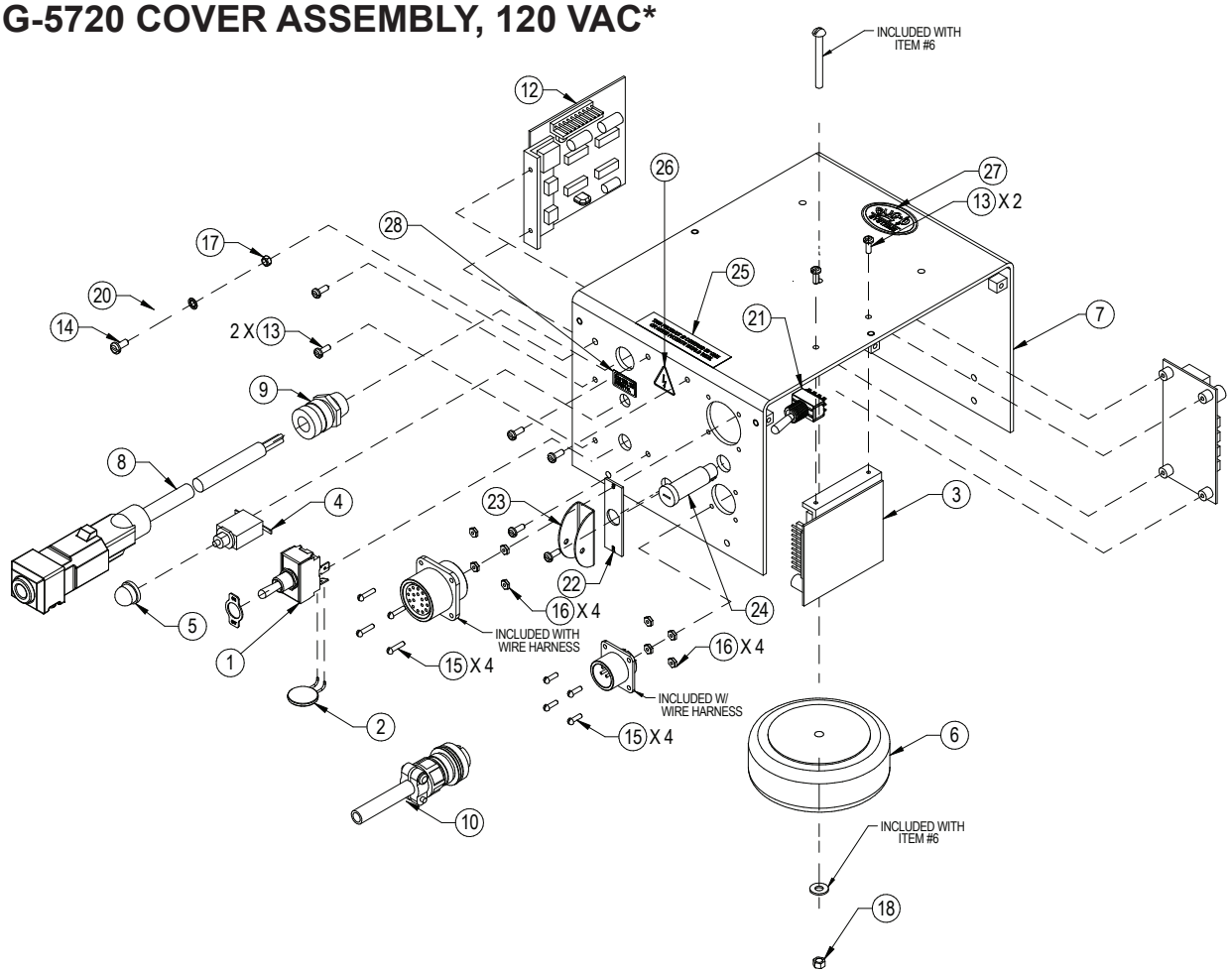
PARTS LIST			
ITEM	PART #	DESCRIPTION	QTY
1	BUG-2975	CABLE MOUNTING ASSY	1
2	BUG-5462	RIGHT ANGLE CLAMP	2
3	BUG-5712	DRIVE BOX 240V	1
4	BUG-1853	MACHINED RACK 7-1/2"	1
5	BUG-5751	PENDANT CABLE 17P TO 10P	1
6	BUG-5775	PENDANT CONTROL	1
7	BUG-9180-6	ROD 6"	1
8	BUG-5455	GUN MOUNTING GROUP	1
9	BUG-5965	HANDLE ASSEMBLY	1
10	BUG-9447	WRENCH	1
11	BUG-9444	TOOL KIT	1
12	100-0427	CE NAME PLATE, BLK	1

BUG-5710 DRIVE BOX ASSEMBLY



ITEM	QTY	PART NO.	DESCRIPTION
1	1	BUG-5707	Left Side Panel
2	1	BUG-5708	Right Side Panel
3	1	BUG-5715	Base Assembly
4	1	BUG-5720	Cover Assembly 120 V
	1	BUG-5722	Cover Assembly 240 V
	1	BUG-5724	Cover Assembly 42 V
5	1	BUG-5725	Cross Drive Assembly
6	6	FAS-0114	Pan Hd Scr 6-32" x 3/8"
7	12	FAS-0124	Pan Hd Scr 8-32" x 3/8"

BUG-5720 COVER ASSEMBLY, 120 VAC*

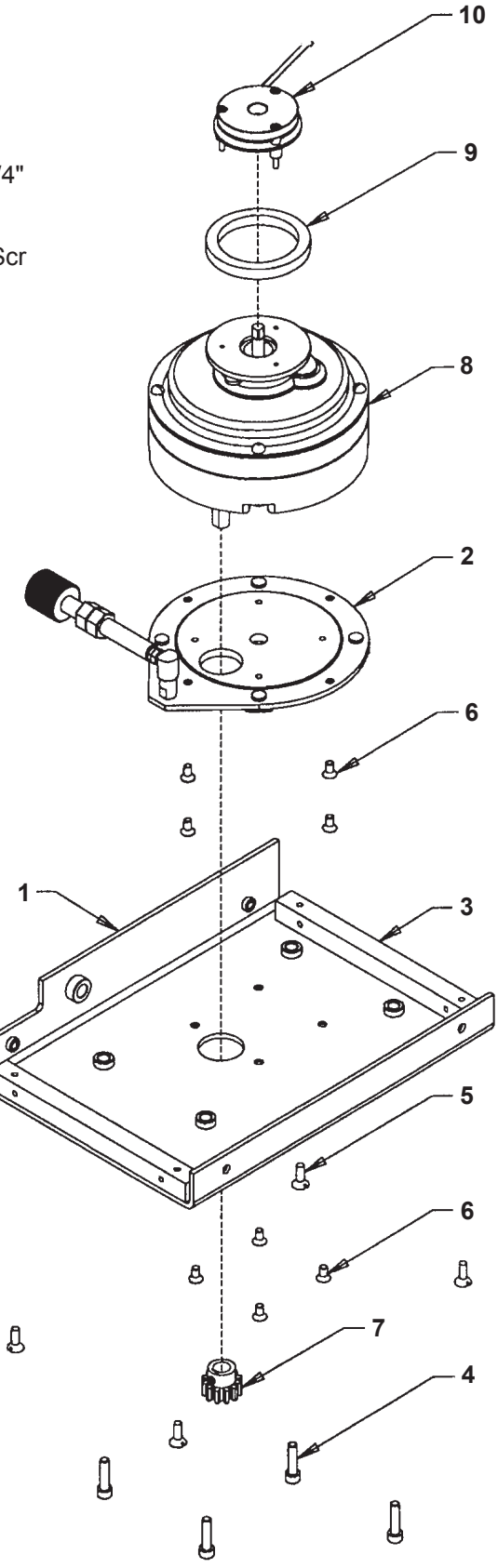


ITEM	QTY	PART NO.	DESCRIPTION
1	1	ARM-2279	Toggle Switch
2	1	BUG-1393	Volt trap 120 VAC
3	1	BUG-1770-UB	Motor control board
4	1	BUG-2923	Circuit Breaker 0.7 amps
5	1	BUG-2924	Reset Button Seal
6	1	BUG-5218	Transformer 117 VAC
7	1	BUG-5721	Cover panel anodized
N/S	1	BUG-5726	Wire harness
8	1	BUG-9445	Power Cord
9	1	BUG-9446	Cord Grip
10	1	BUG-9487	Cable connector 2-T, F
11	1	BUG-9884	On-Off switch plate
12	1	CAS-1770-001	Motor Speed Control Board
13	8	FAS-0114	Pan Hd Scr 6-32 x 3/8"
14	1	FAS-0124	Pan Hd Scr 8-32 x 3/8"
15	8	FAS-0205	Rnd Hd Scr 4-40 x 1/2"
16	8	FAS-1305	Hex nut 4-40
17	1	FAS-1320	Hex nut 8-32
18	1	FAS-1330	Hex nut 10-24
19	1	PCB-5700	Interconnect board
20	1	WAS-0221	#8 INT Star lock washer
21	1	SWT-0503	Toggle Switch
22	1	BUG-5776	Legend Plate
23	1	PWS-0149	Switch Guard
24	1	FHO-0190	Fuse Holder
25	1	BUG-2414	Patent Label
26	1	100-0429	Electrical Shock Label
27	1	BUG-2005	Label, Bug-O Systems
28	1	BUG-9234	Label, 120V

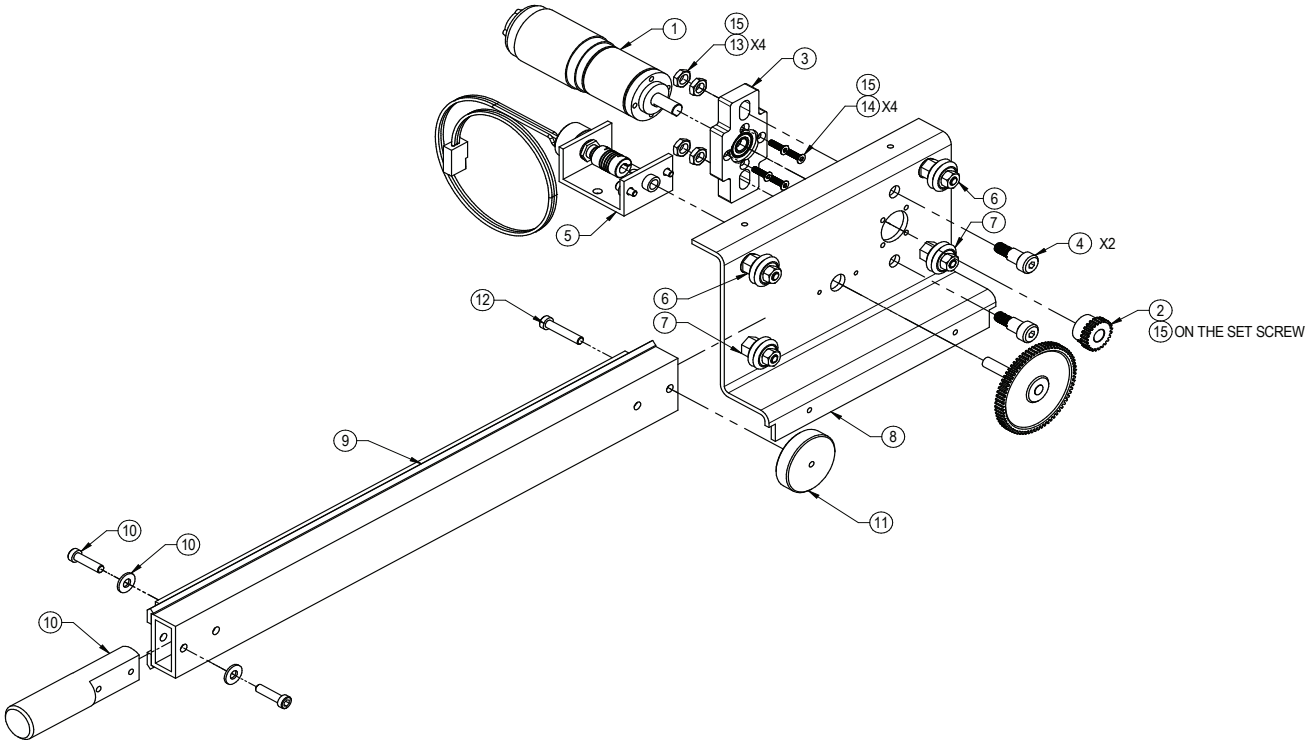
* For 240V and 42V machines, refer to Electrical Component List on pg 18.

BUG-5715 BASE ASSEMBLY

ITEM	QTY	PART NO.	DESCRIPTION
1	1	BUG-5709	Base Plate
2	1	BUG-5716	Clutch Assembly
3	2	BUG-5723	Attachment Bar
4	4	FAS-0557	Soc Hd Cap Scr 1/4-20 x 3/4"
5	4	FAS-0825	Flt Hd Slot Scr 8-32 x 1/2"
6	8	FAS-0923	Flt Hd Soc Scr 8-32 x 5/16"
7	1	GOF-3014	Drive Pinion w/ Key & Set Scr
8	1	MPD-1015	Gear Motor (60:1)
9	1	WPD-1013	Rubber Ring Gasket
10	1	WPD-1045	Brake Assembly

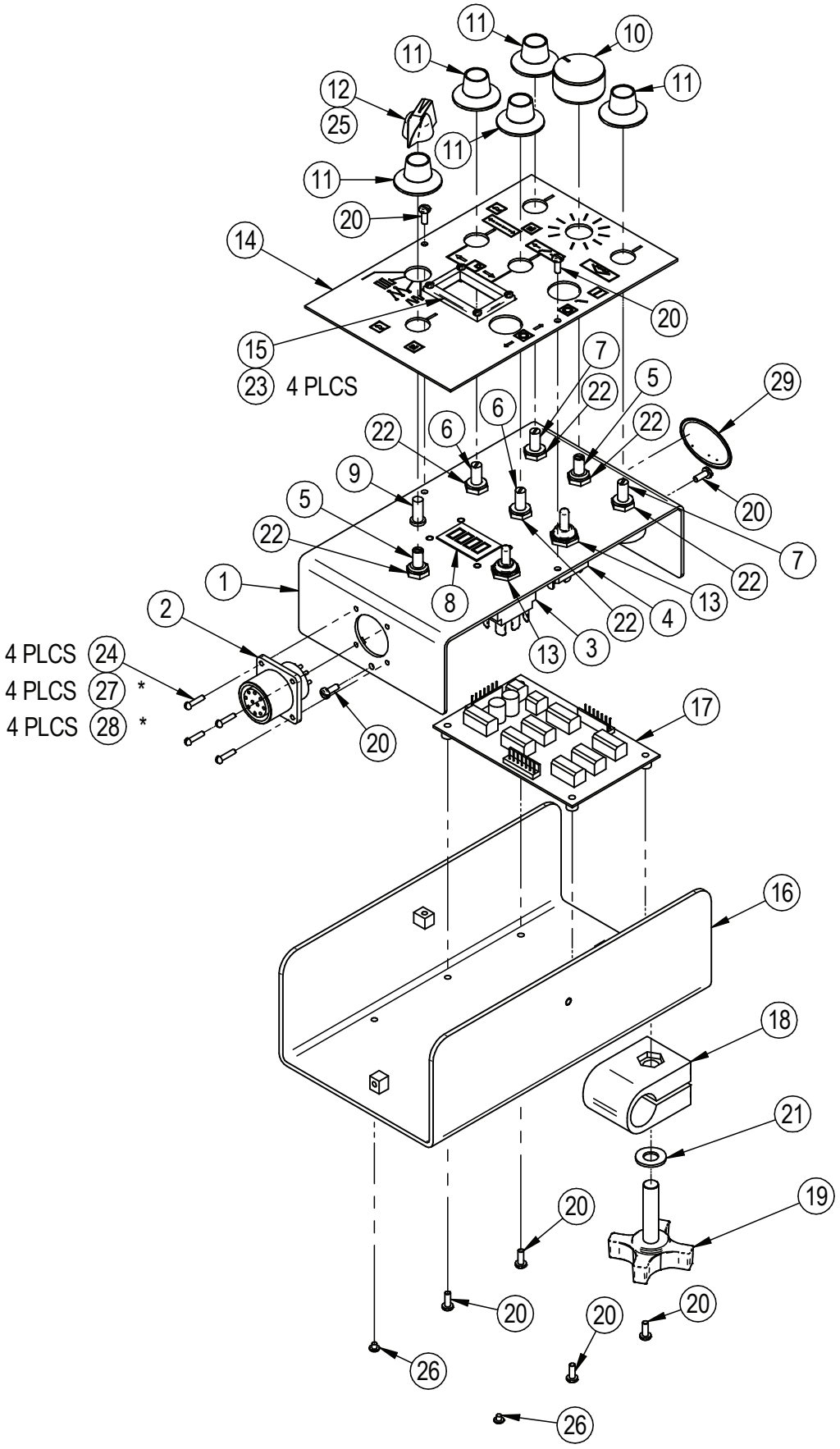


BUG-5725 CROSS DRIVE ASSEMBLY



PARTS LIST			
ITEM	**PART #**	**DESCRIPTION**	**QTY**
1	BUG-5590	GEAR MOTOR	1
2	BUG-5591	PINION	1
3	100-0755	MOTOR MOUNT BLOCK ASSEMBLY	1
4	PWS-1045	SHLDR SCR,M6, 8MM SHLDR DIA.	2
5	BUG-5595	POT/GEAR ASSEMBLY	1
6	BUG-5670	ADJ. LEG & WHEEL ASSY.	2
7	BUG-5675	FIXED LEG & WHEEL ASSY.	2
8	BUG-5728-A	MOUNTING PANEL	1
9	WPD-1150	CROSS ARM 15.50"	1
10	WPD-1178	POST W/FASTENERS	1
11	WPD-1164	ARM STOP	1
12	FAS-0539	SOC HD CAP 10-24 X 1"	1
13	MET-1370-SS	M6 HEX NUT	4
14	MET-0944-SS	FLT HD SOC SCR M3 x 12	4
15	N/A	LOCTITE® 222MS™ THREADLOCKER, OR SIMILAR	AS REQ

BUG-5775 CONTROL PENDANT / EXPLODED VIEW

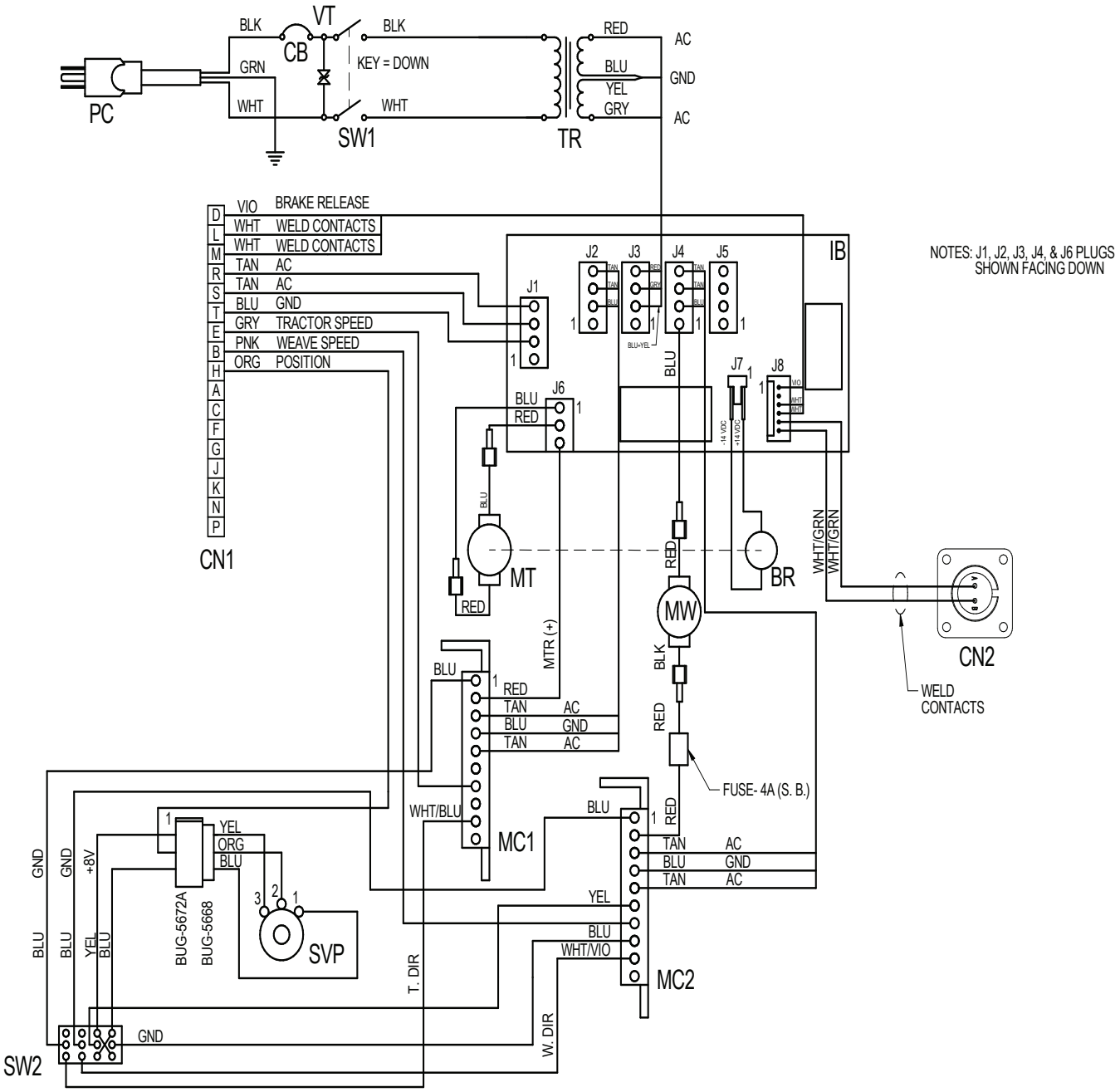


BUG-5775 CONTROL PENDANT / PARTS LIST

ITEM	PART #	DESCRIPTION	QTY
1	BUG-5773	FRONT PANEL	1
2	BUG-5687	PANEL CONNECTOR, 10T, F	1
3	BUG-2255	TOGGLE SWITCH	1
4	BUG-5761	TOGGLE SWITCH	1
5	BUG-1562	MULTI-TURN POTENTIOMETER	2
6	BUG-5054	POTENTIOMETER	2
7	BUG-9677	POTENTIOMETER	2
8	BUG-1764	METER DISPLAY BOARD ASSY	1
9	BUG-5363	ROTARY SWITCH, 3 POLE, 4 POS.	1
10	BUG-5757	KNOB, BLACK,ALUMINUM	1
11	BUG-9621	KNOB, STRAIGHT MOLDED PHENOLIC	5
12	BUG-9694-P	BLACK POINTER KNOB	1
13	BUG-5758	TOGGLE SWITCH SEAL, GRAY	2
14	BUG-5778	UBOM CONTROL PENDANT LEGEND PLATE	1
15	MDS-1011	DISPLAY BEZEL	1
16	BUG-5772	REAR PANEL	1
17	BUG-5760	CONTROL BOARD, UNIV BUGOMATIC	1
18	PAN-1033	ROD CLAMP	1
19	BUG-2436	KNOB SCREW	1
20	FAS-0114	PAN HD SCR 6-32 X 3/8 BLACK	8
21	BUG-2034	TEFLON WASHER 3/4ODX3/8IDX1/16	1
22	BUG-5759	POT SHAFT SEAL 1/4" GRAY	6
23	FAS-0104	4-40 X 3/8 PAN HEAD SLTD, BLK	4
24	FAS-0205	#4-40 X 1/2 ROUND HEAD, ZINC	4
25	FAS-0424	8-32 X 3/8" SOCKET SET SCREW	1
26	MDS-1019	SNAP RIVET, BLACK	2
27*	WAS-0201	#4 INTERNAL STAR LOCKWASHER	4
28*	FAS-1305	HEX NUT 4-40	4
29	BUG-2005	LABEL, BUG-O SYSTEMS	1

(*) - INSTALLED ON INSIDE OF PANEL

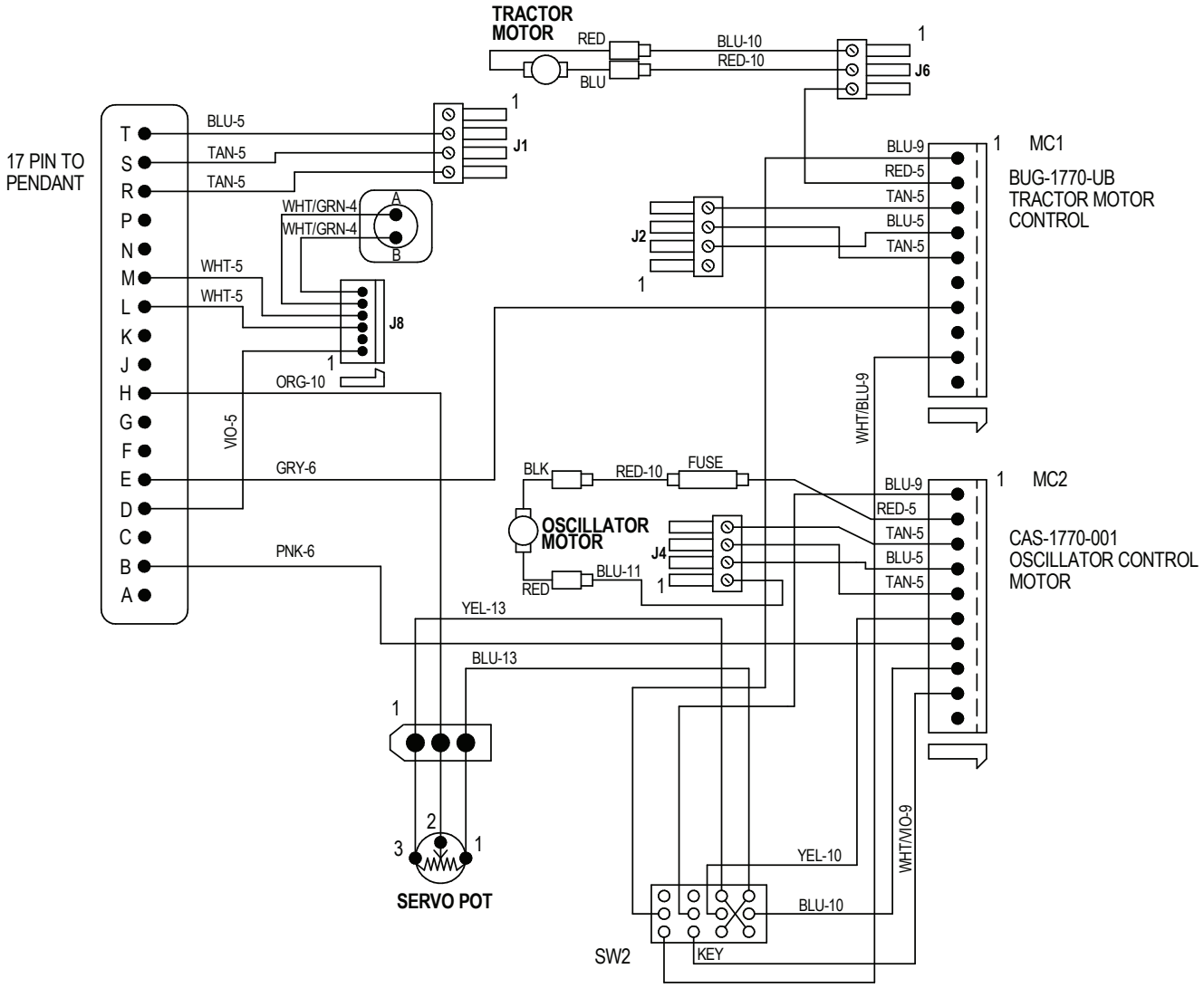
BUG-571X-WD / WIRING DIAGRAM



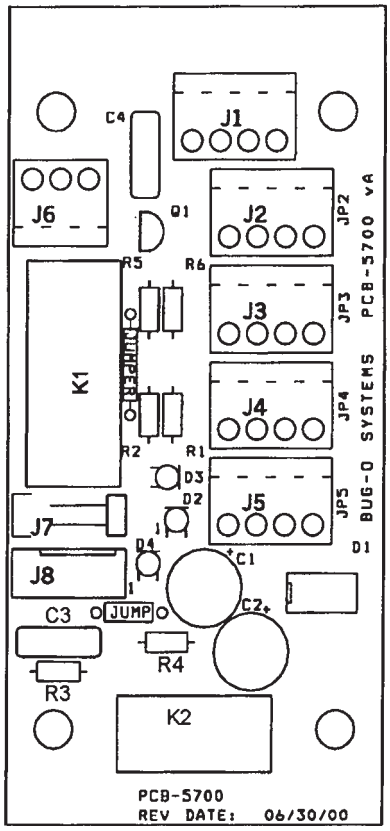
BUG-571X-WD / ELECTRICAL COMPONENT CHART

ITEM	DESCRIPTION	BUG-5710 120 VAC	BUG-5712 240 VAC	BUG-5714 42 VAC
PC	Power Cord	BUG-9445	GOF-3115	BUG-9442
VT	Volt Trap	BUG-1393	BUG-1563	BUG-1393
CB	Circuit Breaker	BUG-2923	BUG-2952	BUG-2933
TR	Transformer	BUG-5218	BUG-5231	BUG-5232
SW	Toggle Switch	ARM-2279		
IB	Interconnect Board	PCB-5700		
CN1	Connector, to Pendant	BUG-5527		
CN2	Connector, to Weld Contact	BUG-9486		
MT	Tractor Motor	MPD-1015		
BR	Brake	WPD-1045		
MW	Weave Motor	BUG-5590		
MC1	Motor Control, Tractor	BUG-1770-UB		
MC2	Motor Control, Weave	CAS-1770-001		
SVP	Servo-Pot	BUG-5240		
SW2	Toggle Switch	SWT-0503		

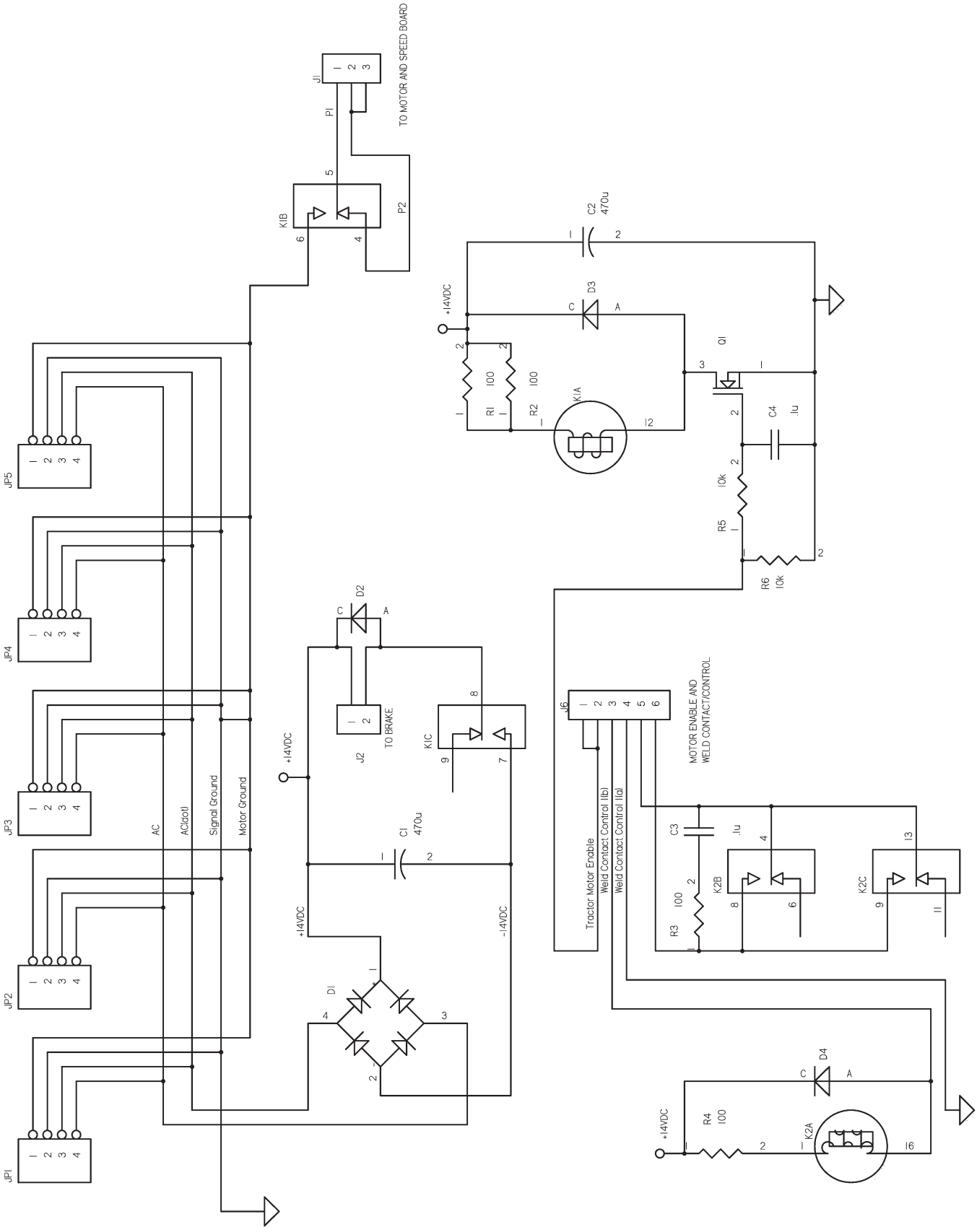
BUG-5726 WIRING HARNESS / WIRING DIAGRAM



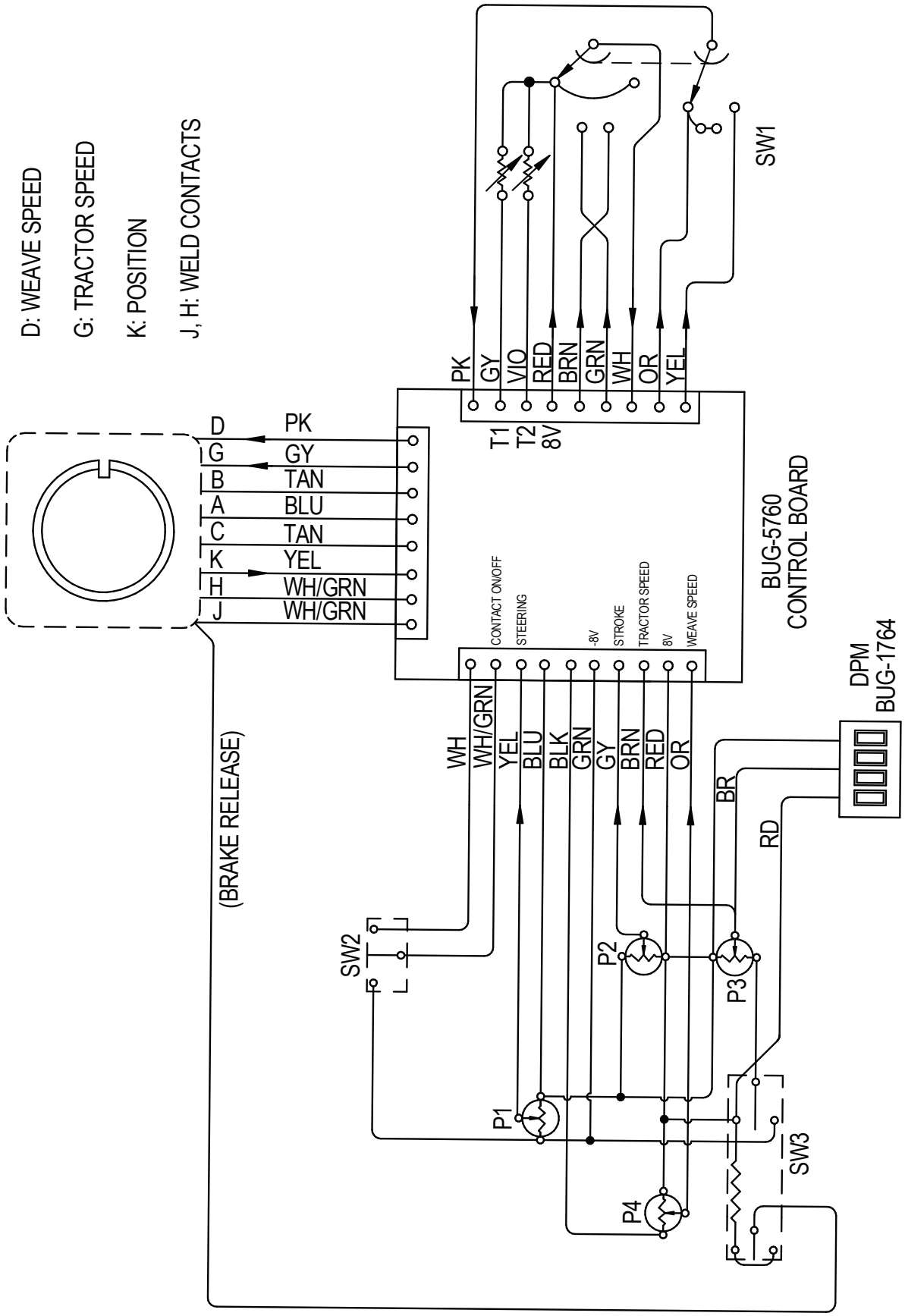
PCB-5700 DRIVE UNIT INTERCONNECT PC BOARD



PCB-5700 / WIRING DIAGRAM

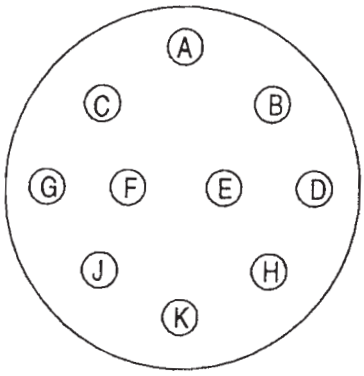


BUG-5775 CONTROL PENDANT / WIRING DIAGRAM

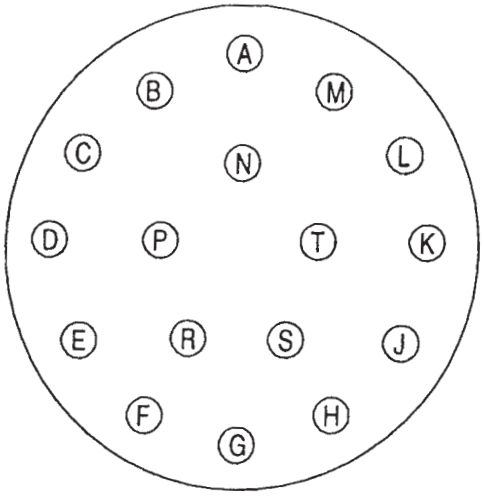


BUG-5751 PENDANT CABLE / WIRING DIAGRAM

BUG-5688
10-PIN CONNECTOR
Pendant End



BUG-5552
17-PIN CONNECTOR
Drive Box End



A	_____	T Common
B	_____	S ∿
C	_____	R ∿
D	_____	B Osc. Speed
E	_____	P (Osc. Dir)
F	_____	D Brake Release
G	_____	E Tractor Speed
H	_____	L Weld Contact
J	_____	M Weld Contact
K	_____	H Gear Pot.

RAIL OPTIONS

With a simple carriage change, the Universal Bug-O-Matic can be made compatible with any BUG-O rail. A brief description of each BUG-O rail type is provided below. Contact your BUG-O representative for more information about these rails and the mounting options available.

ARR-1080 ALUMINUM RIGID RAIL / CROSS SECTION / EXPLODED VIEW / PARTS LIST

ALUMINUM RIGID RAIL is a rigid channel section made of high quality alloy to machine tool tolerance as in the section view below. A machined gear rack is mounted on the rail, with which the drive pinion of the carriage meshes. The wheels of the carriage travel in opposed grooves at either side of the rail, locking the carriage to the rail.

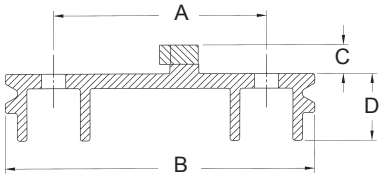
Heavy duty [H.D] aluminum four-legged rigid rail is supplied in two lengths:

ARR-1080 [93-1/2" (2.37 m)] called 8' (2.37 m) rail
ARR-1085 [46-1/2 (1.18 m)] called 4' (1.18 m) rail.

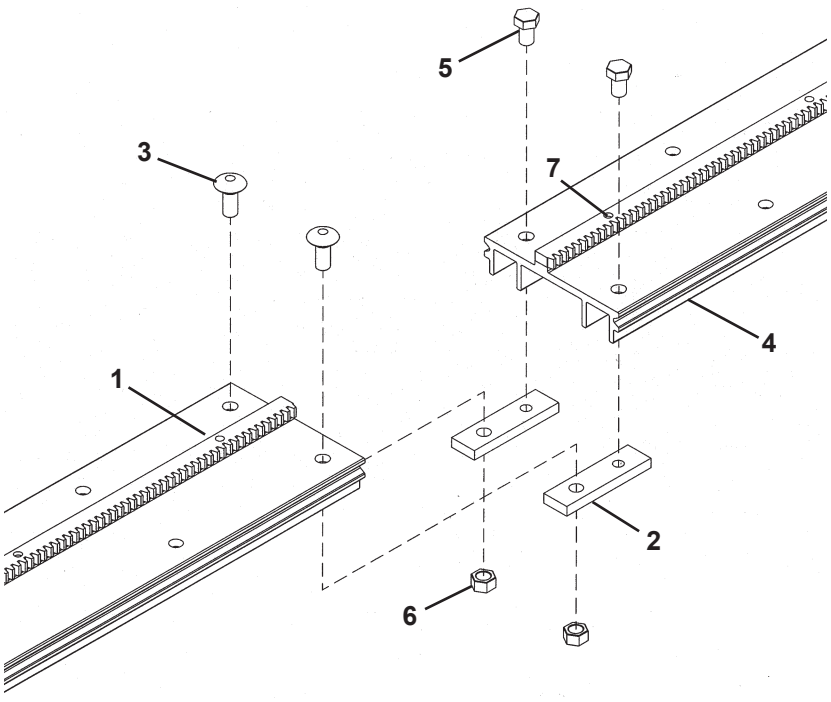
Extra Heavy Duty aluminum four-legged rigid rail is also available:

ARR-1250 [93-1/2" (1.18 m)] called 8' (2.37 m) rail
ARR-1200 [46-1/2" (1.18 m)] called 4" (1.18 m) rail.

ARR CROSS SECTION VIEW



A	2.75"	(70 mm)
B	4.0"	(102 mm)
C	0.375"	(9.5 mm)
D	0.875"	(22 mm)



PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	ARR-1006	Rack	1
2	ARR-1027	Splicer Bar	2
3	ARR-1028	Carriage Bolt	2
4	ARR-1081	Rail Extrusion	1
5	FAS-0375	Screw, Hex Hd Cap 5/16-18	2
6	FAS-1370	Hex Nut 5/16-18	2
7	FAS-1445	Phil Pan Hd Scr 10-32x1/2 Zinc	16

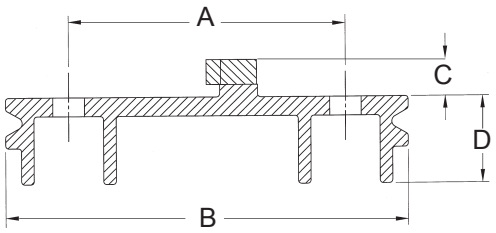
RAIL FOR LONGER SPANS:
When unsupported rail paths longer than nominal 8' (2.37 m) rail are required, multiple sections of standard rail are mounted on plate, I beam, channel or box sections.

BRR-1180 BENT RIGID RAIL / CROSS SECTION / APPLICATION VIEW / PARTS LIST

BENT RIGID RAIL (BRR) is a rigid section of high quality alloy bent for circumferential applications. A machined gear rack is mounted on the rail, with which the pinion of the drive unit meshes, providing positive drive in all directions. The wheels of the carriage travel in opposed grooves at either side of the rail, securing the carriage to the rail.

The rail is ordered as a complete ring (BRR-1210-__) When ordering, specify the work diameter (inside or outside), method of mounting and if a complete ring is required. On larger diameters, rail can be “leapfrogged” around the vessel to reduce the quantity needed. Maximum section length is 80" (2 m).

BRR CROSS SECTION VIEW



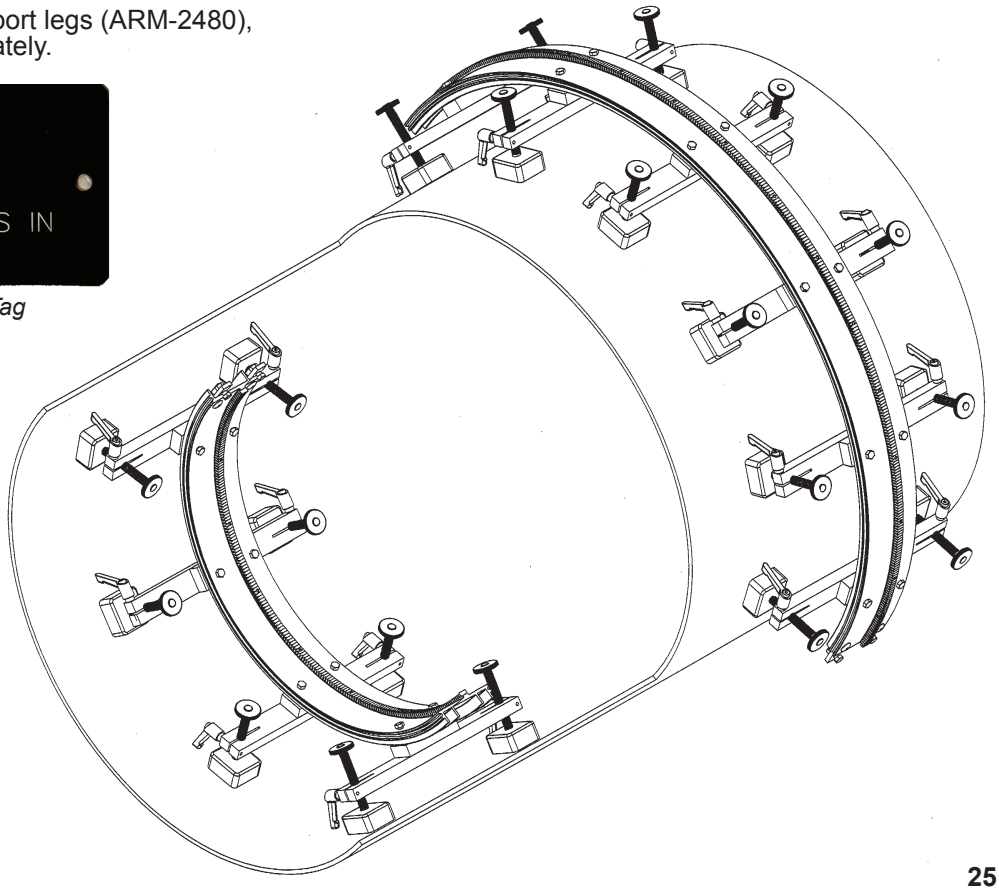
A	2.75"	(70 mm)
B	4.0"	(102 mm)
C	0.375"	(9.5 mm)
D	0.875"	(22 mm)

SPARE PARTS LIST

PART NO.	QTY	DESCRIPTION
ARR-1027	2	Splicer Bar
ARR-1028	2	Carriage Bolt
FAS-0375	2	Screw, Hex Hd Cap 5/16-18
FAS-1370	2	Hex Nut 5/16-18
FAS-1445	16	Phil Pan Hd Scr 10-32 x 1/2 Zinc

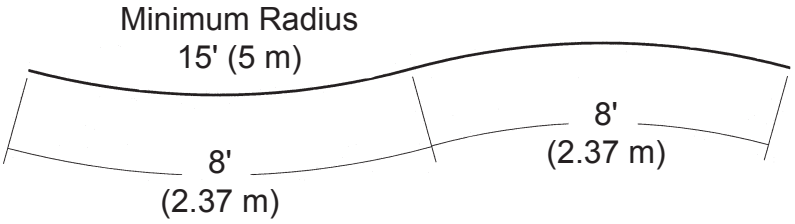
Note: Adjustable magnet support legs (ARM-2480), shown above, are sold separately.

BRR Identification Tag

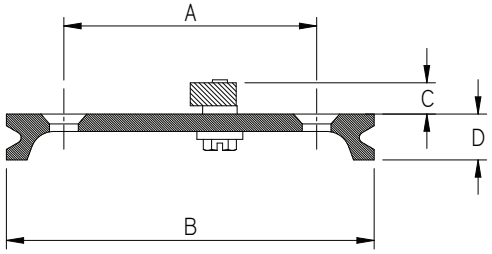


AFR-3000 SEMI-FLEX RAIL / CROSS SECTION / EXPLODED VIEW / PARTS LIST

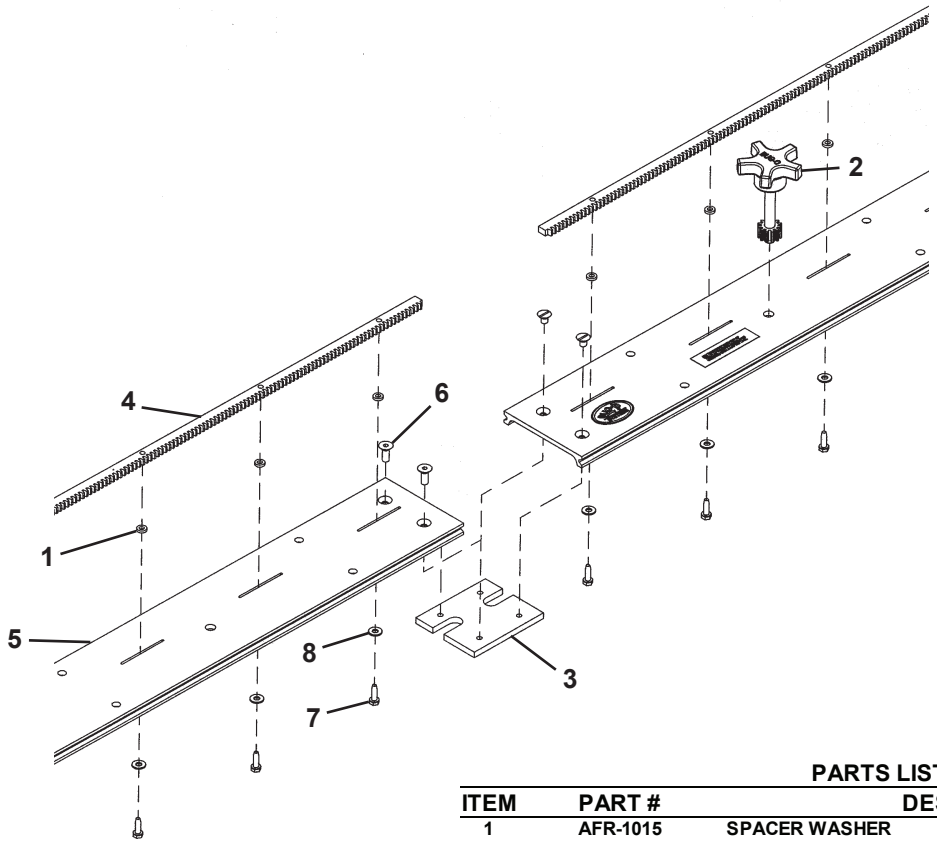
SEMI-FLEX RAIL (AFR) can be bent inside or outside to a minimum radius of 15' (5 m) without permanent deformation. A splice plate is mounted at one end of each flex-rail section for connecting multiple sections of rail. A rack adjusting tool is supplied with every two (2) rails, for moving the rack on the rail. Available in 8' (2.37 m) lengths. Use at least four (4) attachments - vacuum cups or magnets - on each section of Semi-Flex Rail.



AFR CROSS SECTION VIEW



A 2.75" (70 mm)
B 4.0" (102 mm)
C 0.33" (8.5 mm)
D 0.500" (12.7 mm)

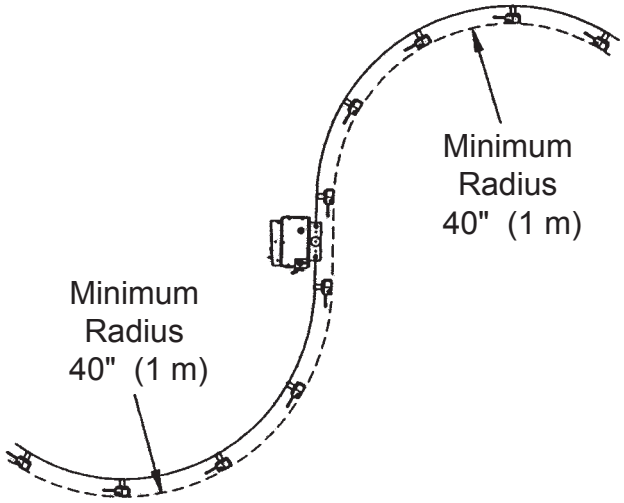


PARTS LIST

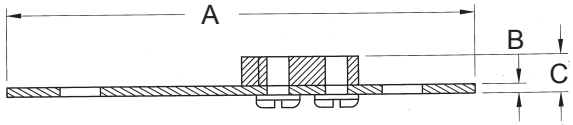
ITEM	PART #	DESCRIPTION	QTY
1	AFR-1015	SPACER WASHER	16
2	AFR-2001	RACK ADJUSTER TOOL	1
3	AFR-3002	SPLICE PLATE	1
4	AFR-3006	RACK	1
5	AFR-3009	EXTRUSION, PUNCHED	1
6	FAS-0955	FLT HD SOC SCR 1/4-20 X 1/2"	4
7	FAS-1446-HD-0.5OD	S.T.SLT.HX.10-32 X 9/16 W/WSH,TYPE F, .500 WSH OD	16

FMD-1050 HI-FLEX RAIL / CROSS SECTION / ASSEMBLED VIEW / PARTS LIST

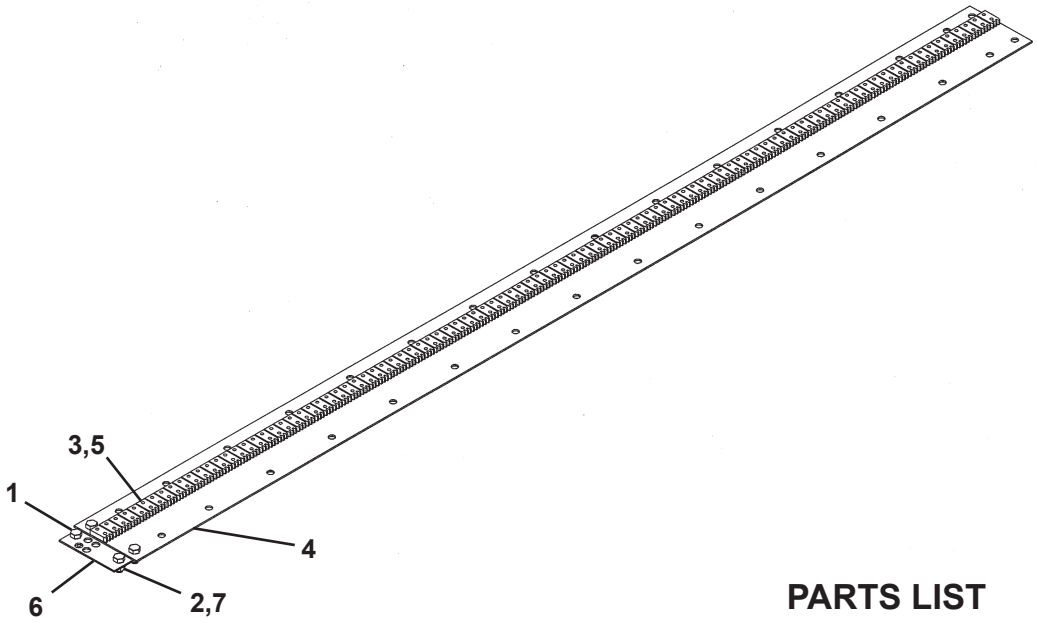
HI-FLEX RAIL is made from heavy duty, wear resistent stainless steel with steel rack. The rail comes in 57.7" (1.47 m) lengths and can be held in place with vacuum cups or magnets. This rail can be used in straight applications or for bends down to 40" (1 m) radius, in or out. Hi-Flex rail can be used on compound curvatures and can be twisted 10° per 24" (600 mm) of length.



FMD CROSS SECTION VIEW



A	3.995"	102 mm
B	0.080"	2 mm
C	0.250"	6.4 mm



PARTS LIST

ITEM	PART NO.	DESCRIPTION
1	FAS-0376	Screw, Hex Hd Cap 5/16-18
2	FAS-1370	Hex Nut 5/16-18
3	FAS-1444	Screw, Phil Pan Hd 10-32
4	FMD-1051	Track
5	FMD-1052	Rack Section, 3 Teeth
6	FMD-1053	Flex-Rail Splice Plate
7	WAS-0250	Washer, SAE 5/16

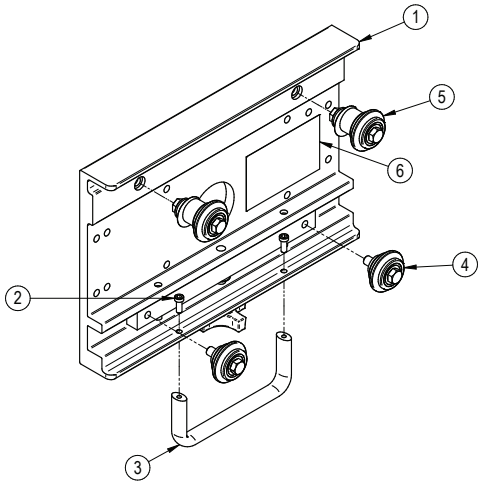
CARRIAGE OPTIONS

The Universal Bug-O-Matic can be used with many BUG-O carriages, allowing it to be used on any BUG-O rail. Each carriage is made of high-strength, lightweight aluminum alloy, with wheels that ride in or along the rail to provide smooth, accurate travel. On each carriage, one set of wheels is adjustable. All wheels contain permanently lubricated, sealed bearings and their steel components are plated to resist corrosion.

MPD-1065 RELEASABLE CARRIAGE / EXPLODED VIEW / PART LIST

The MPD-1065 Releasable 12" Carriage has a carrying capacity of 100 lb (45 kg) and can be placed anywhere on the rail by using the knob located on the side of the carriage, which engages or disengages the wheels from the rail. Use with BUG-O Aluminum Rigid or Semi-Flex Rails.

ITEM	PART #	DESCRIPTION	QTY
1	MPD-1066	CARRIAGE	1
2	FAS-0545	SOC HD CAP 10-32 X 1/2	2
3	MPD-1049	HANDLE, OVAL, BLACK,5"X2.125"	1
4	MPD-1045	FIXED LEG & WHEEL ASSY	2
5	BUG-1984	EXTERNAL ADJ LEG & WHEEL ASSY	2
6	BUG-1979	LABEL: MACHINE EQUIP W/ADJ	1

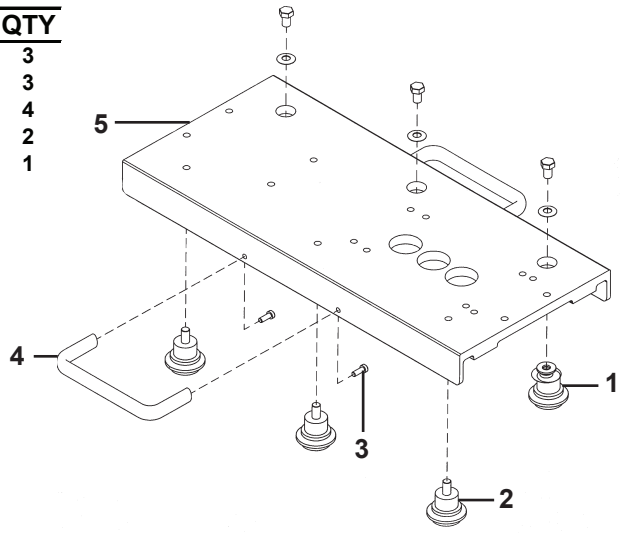


MPD-1055 CARRIAGE 18" / EXPLODED VIEW / PART LIST

The 18" Carriage provides an extended deck for mounting accessories, wire feeder, etc. and has a carrying capacity of 150 lb. (67.5 kg). Use with BUG-O Aluminum Rigid Rail.

PARTS LIST

ITEM	PART #	DESCRIPTION	QTY
1	BUG-1984	EXTERNAL ADJ. LEG & WHEEL ASSEMBLY	3
2	BUG-2956	FIXED LEG & WHEEL ASSEMBLY	3
3	FAS-0545	SOC HD CAP SCR 10-32 X 1/2"	4
4	MPD-1049	HANDLE, BLACK	2
5	MPD-1055-18	CARRIAGE 18"	1



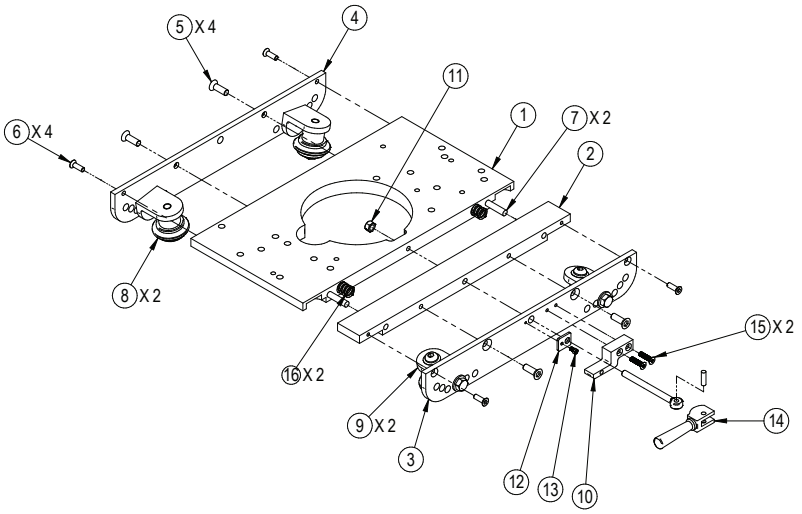
BUG-5960 TUBE CARRIAGE / EXPLODED VIEW / PARTS LIST

The Tube Carriage features a split carriage body for quick and easy placement on the rail. It has a carrying capacity of 100 lb (45 kg). The carriage also offers six (6) wheel positions for circumferential applications over a wide range of diameters. Use with BUG-O Aluminum Rigid, Semi-Flex or Bent Rigid Rails.

PARTS LIST

ITEM	PART #	DESCRIPTION	QTY
1	BUG-5908	LEFT PLATE	1
2	BUG-5906	RIGHT PLATE	1
3	BUG-5964	CARRIAGE SIDE PLATE	1
4	BUG-5907	SKIRT, RIGHT	1
5	FAS-0957	1/4-20 X 3/4 FLAT HD SOCKET	4
6	FAS-0935	FLT HD SOC SCR 10-24 X 1/2	4
7	BUG-5912	DOWEL PIN 18/8 STAINLESS	2
8	BUG-5918	FIXED ANGLE LEG & WHEEL ASSY.	2
9	BUG-5920	ADJ ANGLE LEG & WHEEL ASSY.	2
10	PWS-5965	CAM STOP BLOCK	1
11	FAS-1351	HEX NUT 1/4-20	1
12	PWS-5966	CAM HANDLE WASHER	1
13	MET-0541-SS	SOC HD CAP SCR M3 X 6	1
14	PWS-5967	CAM HANDLE ASSEMBLY	1
15	MET-0958-SS	FLT HD SOC SCR M4 X 18	2
16	BUG-5911	SPRING	2
17*	BUG-1979	LABEL	1

* = NOT SHOWN



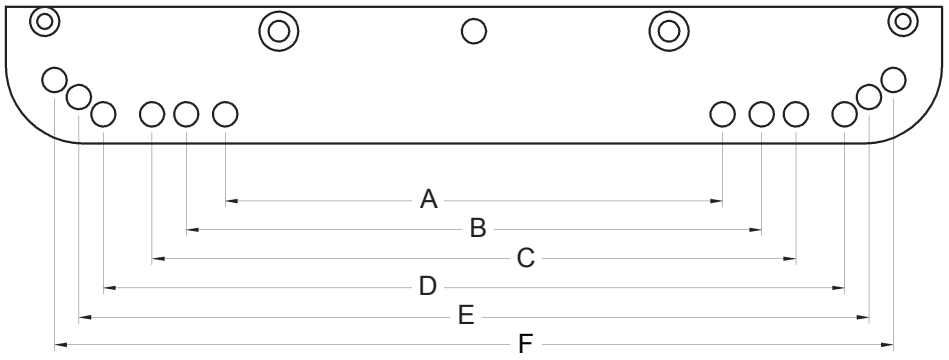
INSTALLING THE BUG-5960 DRIVE CARRIAGE

1. Select the correct pair of holes on each side of the carriage for the rail diameter being used (see chart). If the wheels are not attached to the correct set of holes, remove them and bolt the wheel brackets in selected holes. Tighten the bolts until the brackets are snug, but still free to rotate.
2. Open the cam handle to separate the carriage. On the drive unit, loosen and turn the clutch knob counterclockwise to declutch the drive pinion.
3. Place the carriage on the rail with the wheels in the rail grooves. Close the cam handle and move the carriage back and forth a few inches. The wheels on their mounting brackets will align themselves correctly in the rail grooves.
4. Verify that wheels are properly aligned, then tighten the wheel mounting bolts to lock them in position. Rotate the clutch knob clockwise to engage the drive pinion with the rack.

Carriage Wheel Hole Set	BRR-1210 Rail ID		Pipe OD	
	in	mm	in	mm
A	20 - 25	500 - 635	9 - 21	230 - 530
B	23 - 35	585 - 890	12 - 31	300 - 790
C	30 - 44	760 - 1120	18 - 40	455 - 1015
D	41 - 60	1040 - 1525	29 - 54	735 - 1375
E	75 - 174	1905 - 4420	64 - 170	1625 - 4320
F	flat rail		flat rail	

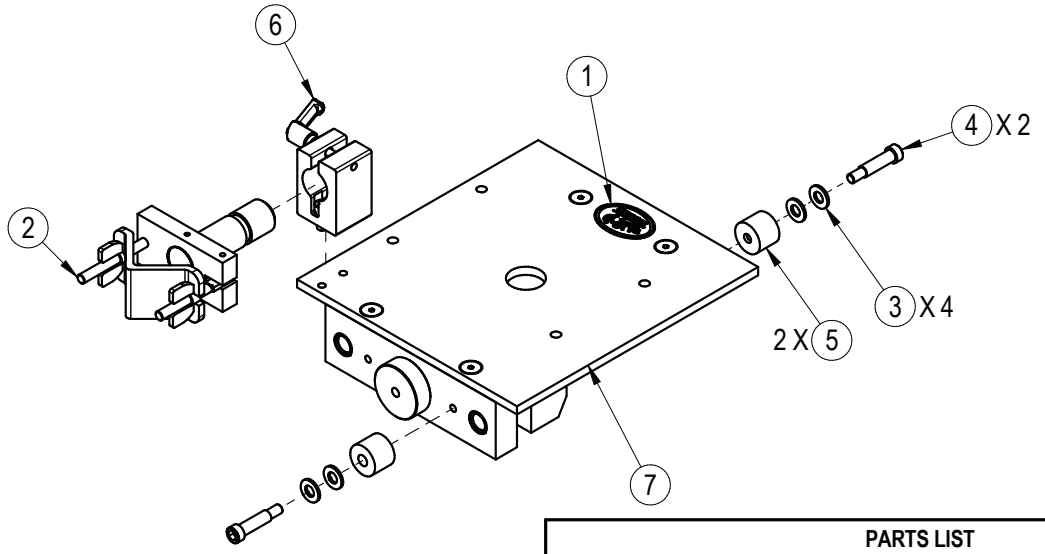
Note: Chart values are for reference only

5. Verify that pinion is properly engaged in the rack. The correct wheel position will provide a minimum of 1/8" engagement (approx. 3 mm) between the drive pinion and the gear rack. **Note**: For some rail or pipe sizes, the pinion height may need to be adjusted.



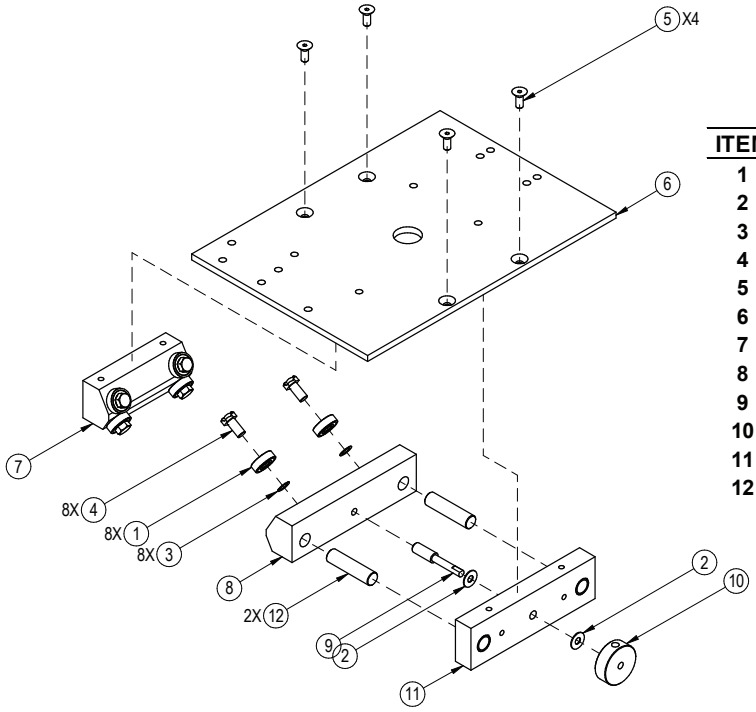
FMD-1100 HI-FLEX CARRIAGE / EXPLODED VIEW / PARTS LIST

The Hi-Flex Carriage can be placed anywhere along the track using the quick release knob on the side of the carriage to engage/disengage the wheels from the track. Use with BUG-O Hi-Flex Rails.



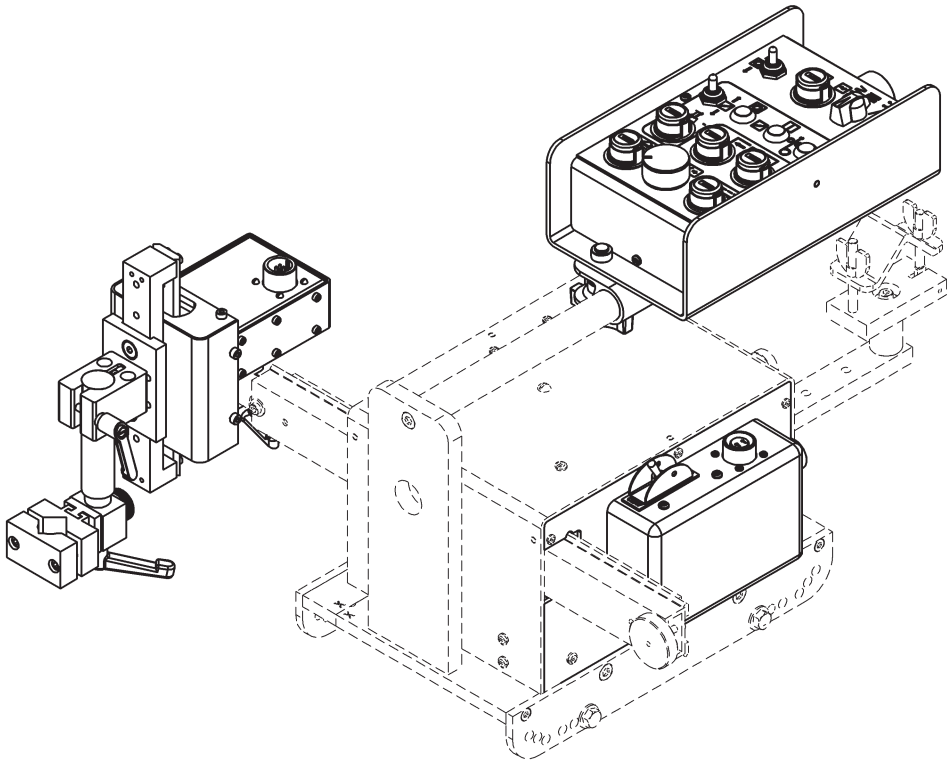
PARTS LIST			
ITEM	PART #	DESCRIPTION	QTY
1	BUG-2005	LABEL, BUG-O SYSTEMS	1
2	BUG-2708	CLAMP	1
3	BUG-2841	WASHER 5/8 OD X 5/16 ID	4
4	FAS-0659	SOC HD SHLD BOLT, 5/16 X 1" SHLD X 1/4-20 X 7/16"	2
5	FMD-1093	STANDOFF .875 DIA X .688 LG	2
6	FMD-1060	FMD CLAMP BLOCK	1
7	FMD-1062	CARRIAGE FOR FLEX RAIL	1

FMD-1022 12" CARRIAGE FOR FLEX RAIL / EXPLODED VIEW / PARTS LIST



PARTS LIST			
ITEM	PART #	DESCRIPTION	QTY
1	BUG-2012	BEARING	8
2	BUG-2848	CAM BEARING	2
3	CON-1029	WASHER 5/16 X .015	8
4	FAS-0386	HEX HD CAP SCR 5/16-24 X 5/8"	8
5	FAS-0956	FLT HD SOC SCR 1/4-20 X 5/8"	4
6	FMD-1026	CARRIAGE COVER	1
7	FMD-1068	FIXED WHEEL MOUNTING BLOCK	1
8	FMD-1069	ADJ. WHEEL MOUNTING BLOCK	1
9	FMD-1071	THREADED SHAFT	1
10	FMD-1072	KNOB	1
11	FMD-1081	BEARING BLOCK	1
12	FMD-1083	DOWEL PIN 1/2" X 2" LG.	2

ACCESSORIES



BUG-6553 RETROFIT CAS HALL EFFECT FOR BUG-5700 TO BUG-5704

AUTOMATED HEIGHT CONTROL

The BUG-6553 Retrofit allows your Universal Bug-O-Matic to have Automated Height Control (AHC) features. The AHC controls the welding tip to work distance and maintains a constant weld current, or uniform weld penetration. AHC senses the actual weld current, compares this value to the setpoint, and raises or lowers the welding gun accordingly. Controls for the AHC are self contained and its drives are independent from those of the drive unit. AHC features a built-in time delay after the arc is struck, and automatically shuts off when current drops too low (generally below 60 amp). The operator can temporarily override AHC using the manual jog switch while welding. AHC resumes as soon as the jog switch is released. To disable the automated height control, move the Auto/Manual switch on the CAS Electronics Box (CAS-1555) to MANUAL.

NOTE: AHC is designed to work with the welding gun *above* the work piece. Contact Bug-O Systems for other configurations.

SERVICE PROCEDURE: INSTALLING THE CROSS ARM (WPD-1150)

OPTION 1 - In the Field

NOTE: Read and understand whole procedure before attempting.

Tools required - flash light or well lighted area, marking pen, tape measure or other measuring device.

1. Place machine on blocks to protect the drive pinion (underneath).
2. Turn machine OFF and disconnect from power supply.
3. Remove the Arm Stop (WPD-1164) and the Height Slide Assembly (CAS-1500).
4. Remove the existing Cross Arm (WPD-1150). Manually push/pull the Cross Arm from the machine
5. Looking from the clutch side of the drive unit, locate the reference mark on the mounting plate (“A” in Figure 1) and the reference mark on the face of the brass encoder gear (“B” in Figure 1).

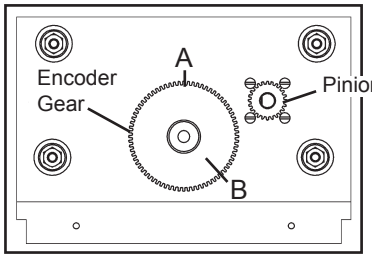


Figure 1: Proper positioning of reference marks A and B before the V-guide is inserted.

6. As shown in Figure 1, position reference “B” at approximately the 5 o’clock position.
7. Make a mark on the cross arm 3 5/8" right of center (“C” in Figure 2). This will serve as a reference line for centering the cross arm.

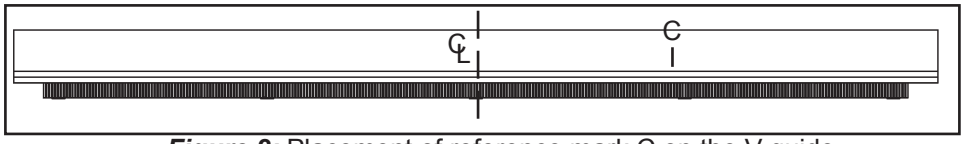


Figure 2: Placement of reference mark C on the V-guide.

8. Inserting from the brass gear side, install the Cross Arm, as shown in figures 3-7.

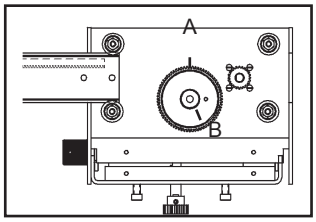


Figure 3: Insert Cross Arm into guide wheels.

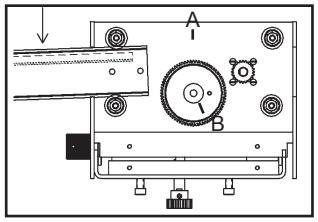


Figure 4: Push down on arm to tilt V-guide up.

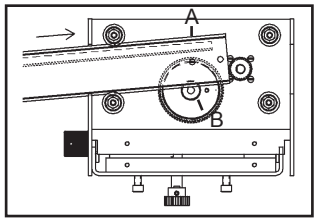


Figure 5: Push cross arm into machine. Avoid brass gear.

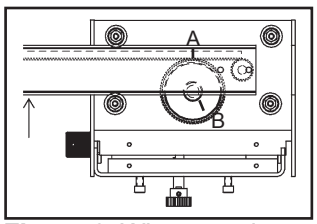


Figure 6: When arm is ready to mesh with pinion, push up on arm.

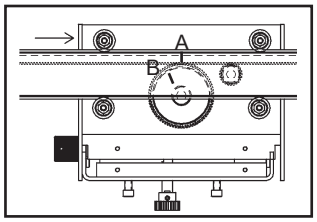


Figure 7: Push cross arm in until it is centered.

Be careful not to bump or mesh brass gear and V-guide rack until V-guide is ready to engage pinion also. Run the Cross Arm until it is centered (align reference mark “C” with face of side plate). Make sure the brass gear teeth and the V-guide teeth do not skip.

9. If necessary, connect the Pendant Control (BUG-5755) to the Drive Unit (BUG-5980) using the Pendant Control Cable (BUG-5551-10).
10. On the control pendant, center steering control (1 1/2 turns from either extreme).
11. Connect the machine to a power supply of the proper voltage and turn machine ON to verify that Cross Arm is centered. The centered V-Guide should stick out of the machine by about 4.25 in (110 mm) on each side.
12. If satisfied with position of Cross Arm, install Arm Stop and Height Slide Assembly; else repeat steps 4-11.

***Note**: Reference mark B will no longer apply if the potentiometer was changed in service or the cross arm was previously centered using the electrical method on page 33.*

SERVICE PROCEDURE: INSTALLING THE CROSS ARM (WPD-1150)
OPTION 2 - The Electrical Way

Tools required: Ohm meter rated to at least 5k Ohm, flat screw driver, 3/32" hex key, tape measure or other measuring device.

1. Place the machine on blocks to protect the pinion (underneath).
2. Remove Right Side Panel (BUG-5708) from the clutch-side of the Drive Box (BUG-5710).
3. If necessary, install the Cross Arm (WPD-1150). Insert from the brass gear side. Make sure the brass gear teeth and the V-guide teeth do not skip.
4. Center the cross arm. The cross arm will stick out of the machine by 4.25 in (110 mm) on side when centered.
5. Loosen only the set screw on the gear side of the coupling between the potentiometer and the brass gear. Refer to figure 8.
6. Unplug wire harness leading from Potentiometer.
7. Using Ohmmeter, measure resistance across Node 1 and Node 3 (refer to figure 9). This should measure approximately 5000 ohms.
8. Rotate potentiometer until resistance across Node 1 and Node 2 is equal to resistance across Node 2 and Node 3. This should be approximately 2500 ohms. The potentiometer is now centered.
9. While being careful not to move the potentiometer, secure the coupling to the gear shaft.
10. Plug wire harness from potentiometer into proper terminal on the speed control board (CAS-1770).
11. Connect to power supply of appropriate voltage, turn machine ON and verify that Cross Arm is centered.
12. Install Right Side Panel.
13. If necessary, install the Arm Stop (WPD-1164) and gun mounting hardware to the ends of the cross arm.

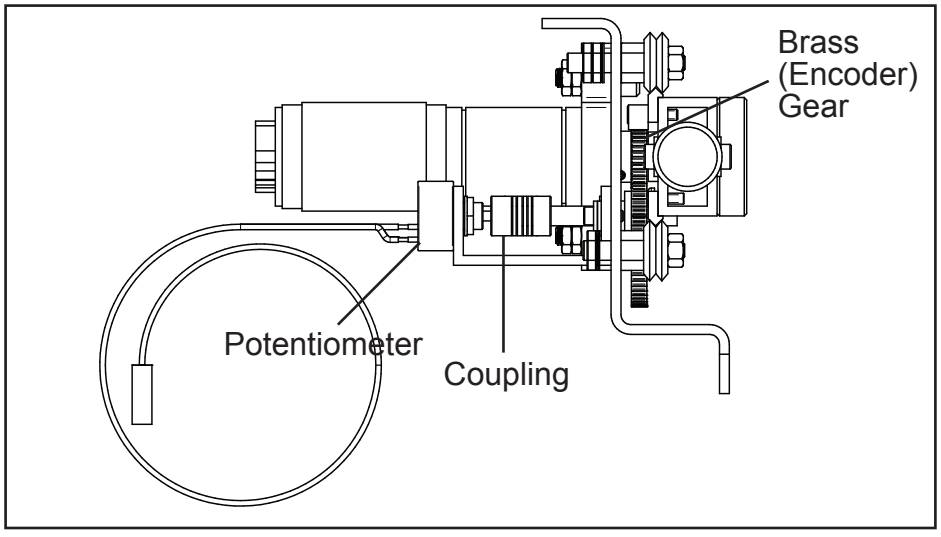


Figure 8: Simplified side view of machine with right cover (BUG-5708) removed.

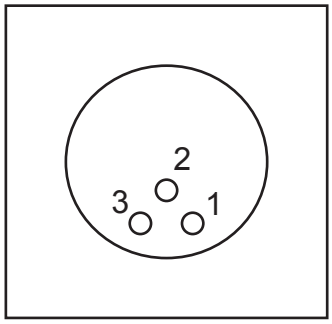


Figure 9: Potentiometer nodes used in Steps 7 & 8.

SPK-5700 120V UNIVERSAL BUG-O-MATIC SPARE PARTS KIT / PARTS LIST

PART NO.	QTY	DESCRIPTION
ARM-2279	1	TOGGLE SWITCH
BUG-1393	1	VOLT TRAP 120VAC
BUG-1770-UB	1	MOTOR CONTROL BOARD
BUG-2923	1	.7 AMP CIRCUIT BREAKER
BUG-5235	1	FLEXIBLE COUPLING
BUG-5240	1	5K BALL BEARING SERVO POT
CAS-1770-001	1	SPEED CONTROL (IRON ROTOR)
GOF-3014	1	DRIVE PINION W/ KEY SET SCREW
SPK-5750	1	PENDANT CONTROL SPARE PARTS

SPK-5750 PENDANT CONTROL SPARE PARTS / PARTS LIST

PART NO.	QTY	DESCRIPTION
BUG-1562	1	MULTI-TURN POTENTIOMETER
BUG-5054	1	POTENTIOMETER
BUG-5363	1	ROTARY SWITCH, 3 POLE, 4 POS.
BUG-5758	2	TOGGLE SWITCH SEAL, GRAY
BUG-5759	3	POT SHAFT SEAL 1/4" GRAY
BUG-5760	1	CONTROL BOARD
BUG-5761	1	TOGGLE SWITCH
BUG-5762	1	TOGGLE SWITCH
BUG-9677	1	POTENTIOMETER

SPK-5702 240V UNIVERSAL BUG-O-MATIC SPARE PARTS KIT / PARTS LIST

PART NO.	QTY	DESCRIPTION
ARM-2279	1	TOGGLE SWITCH
BUG-1563	1	VOLT TRAP 240VAC
BUG-1770-UB	1	MOTOR CONTROL BOARD
BUG-2952	1	.5 AMP CIRCUIT BREAKER
BUG-5235	1	FLEXIBLE COUPLING
BUG-5240	1	5K BALL BEARING SERVO POT
CAS-1770-001	1	SPEED CONTROL (IRON ROTOR)
GOF-3014	1	DRIVE PINION W/ KEY SET SCREW
SPK-5750	1	PENDANT CONTROL SPARE PARTS

SPK-5704 42V UNIVERSAL BUG-O-MATIC SPARE PARTS KIT / PARTS LIST

PART NO.	QTY	DESCRIPTION
ARM-2279	1	TOGGLE SWITCH
BUG-1393	1	VOLT TRAP 120VAC
BUG-1770-UB	1	MOTOR CONTROL BOARD
BUG-2933	1	2 AMP CIRCUIT BREAKER
BUG-5235	1	FLEXIBLE COUPLING
BUG-5240	1	5K BALL BEARING SERVO POT
CAS-1770-001	1	SPEED CONTROL (IRON ROTOR)
GOF-3014	1	DRIVE PINION W/ KEY SET SCREW
SPK-5750	1	PENDANT CONTROL SPARE PARTS

BUG-O SYSTEMS INTERNATIONAL

EU DECLARATION OF CONFORMITY

Manufacturer and technical documentation holder:	**BUG-O SYSTEMS INTERNATIONAL** a Division of Weld Tooling Corporation
Address:	280 Technology Drive Canonsburg, PA 15317-9564
Hereby declare that machinery:	**UNIVERSAL BUG-O-MATIC**, including options and accessories, **UNIVERSAL BUG-O-MATIC WITH AUTOMATED HEIGHT CONTROL (AHC)**, including options and accessories
Sales codes:	**BUG-6550**, **BUG-6552**, **BUG-6554**, **BUG-5700**, **BUG-5702**, **BUG-5704.** (sales codes may also contain prefixes and suffixes)

Is in conformity with Council Directives and amendments:

- 2006/42/EC – Machinery Directive.
- 2014/35/EU – Electromagnetic Compatibility (EMC) Directive
- 2011/65/EU – Restriction of the use of certain hazardous substances (RoHS)

Standards:

- EN 12100:2010 – Safety of Machinery – General principles for design – Risk assessment and risk reduction.
- EN 60204-1:2016 Safety of machinery – Electrical equipment of machines Part 1: General Requirements.
- EN 61000-6-2 Electromagnetic compatibility (EMC) – Part 6-2 Generic standards – Immunity for industrial environments.
- EN 61000-6-4 Electromagnetic compatibility (EMC) – Part 6-4 Generic standards – Emissions for industrial environments.
- EN 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to restriction of hazardous substances.

-The machinery, product, assembly or sub-assembly covered by this Declaration of Conformity must not be put into service until the machinery into which it is to be incorporated (if applicable) is declared in conformity with provisions of the applicable directives(s).

Authorized representative for the compilation of the relevant technical documentation and issuer of EC Declaration of Conformity:

Date of Issue: JUNE 25,2019
Place of issue: 280 Technology Drive, Canonsburg, PA 15317, USA
Typed Name of Authorized Person: MATTHEW W. CABLE - PRESIDENT

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.