

# 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-0713



**B U G - O   S Y S T E M S**

A DIVISION OF WELD TOOLING CORPORATION



280 TECHNOLOGY DRIVE   CANONSBURG, PENNSYLVANIA   15317-9564 USA  
PHONE: 412-331-1776   <http://www.bugo.com>   FAX: 412-331-0383

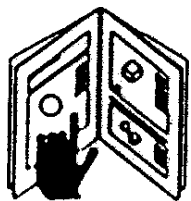
## SAFETY

**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

#### **UNIVERSAL BUG-O-MATIC BUG-5700**

- 5 ..... Technical Data
- 6 ..... Pendant Control Functions
- 7 ..... Universal BUG-O-Matic BUG-5700 / Exploded View / Parts List
- 8 ..... BUG-5710: Drive Box Assembly
- 9 ..... BUG-5720: Cover Assembly, 120 Vac
- 10..... BUG-5715: Base Assembly
- 11 ..... BUG-5725: Cross Drive Assembly
- 12..... BUG-570\_ / BUG-655X Drive Unit / Wiring Diagram
- 13..... BUG-570\_ / BUG-655X Drive Unit / Electrical Component Chart
- 14..... Wiring Harness BUG-5726 Diagram
- 15..... PCB-5700: Drive Unit Interconnect PC Board
- 16..... PCB-5700: Wiring Diagram
- 17..... BUG-5775: Control Pendant / Exploded View
- 18..... BUG-5775: Control Pendant / Parts List
- 19..... Control Pendant, BUG-5775 Wiring Diagram
- 20..... BUG-5751 Pendant Cable Wiring Diagram
- 21..... Rail Options
- 25..... Carriage Options
- 28 .....Accessory / Bug-6553
- 29..... Service Procedure / Installing The Cross Rail (WPD-1150)
- 31..... Warranty

# 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)	

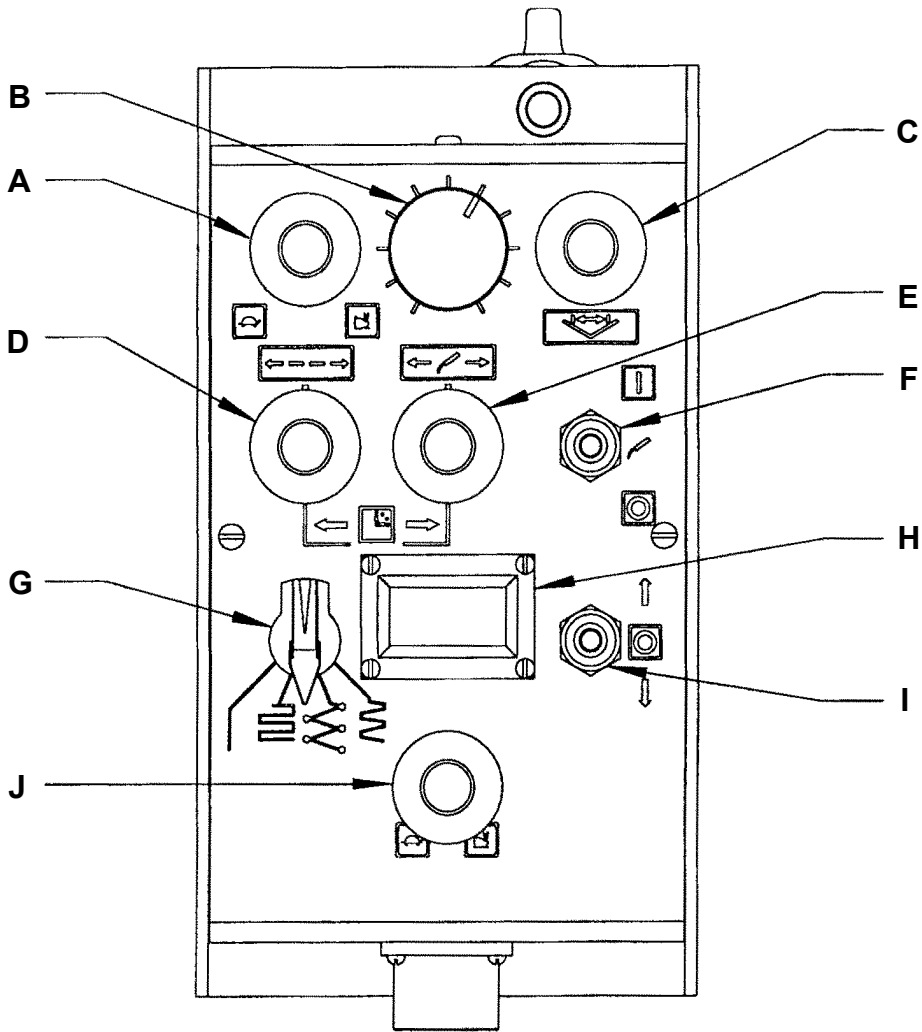
The machine can be mounted on MPD-1065 12" Releasable Carriage, MPD-1055 18" Carriage, FMD-1105 or FMD-1105 Carriage for Hi-Flex rail, or on a BUG-5910 or BUG-5960 Tube Carriage. By simply changing the carriage, the machine will run on any BUG-O rail - Aluminum Rigid, Semi-Flex, Bent Rigid, or Hi-Flex . The chart below shows which types of rail are compatible with each carriage. See pages 21- 27 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
BUG-5910 Tube Carriage	X	X		X
BUG-5960 Tube Carriage	X	X		X
FMD-1100 Hi-Flex Carriage			X	
FMD-1105 Hi-Flex Carriage			X	
MPD-1055 18" Carriage	X			
MPD-1065 12" Releasable 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

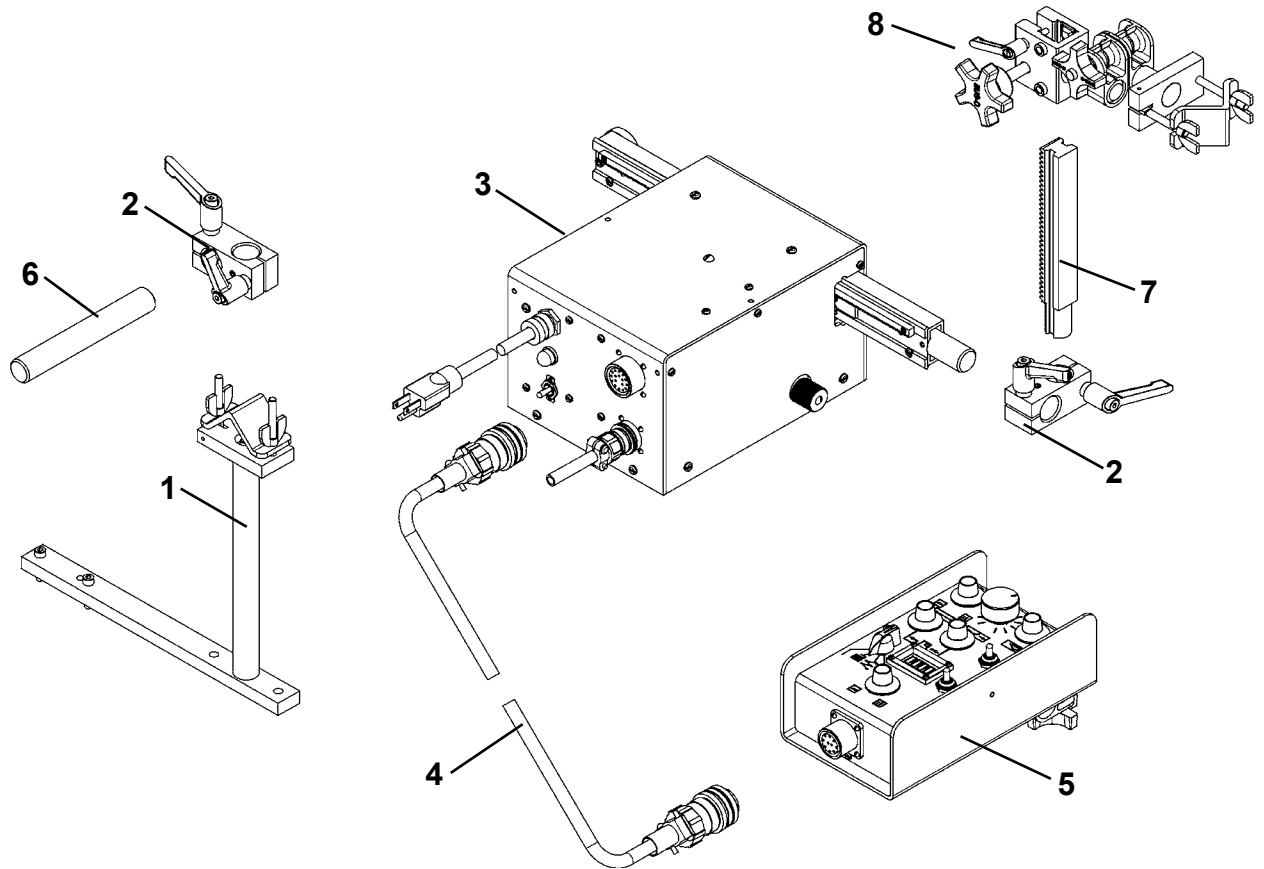
# PENDANT CONTROL FUNCTIONS



## BUG-5775 Pendant Control

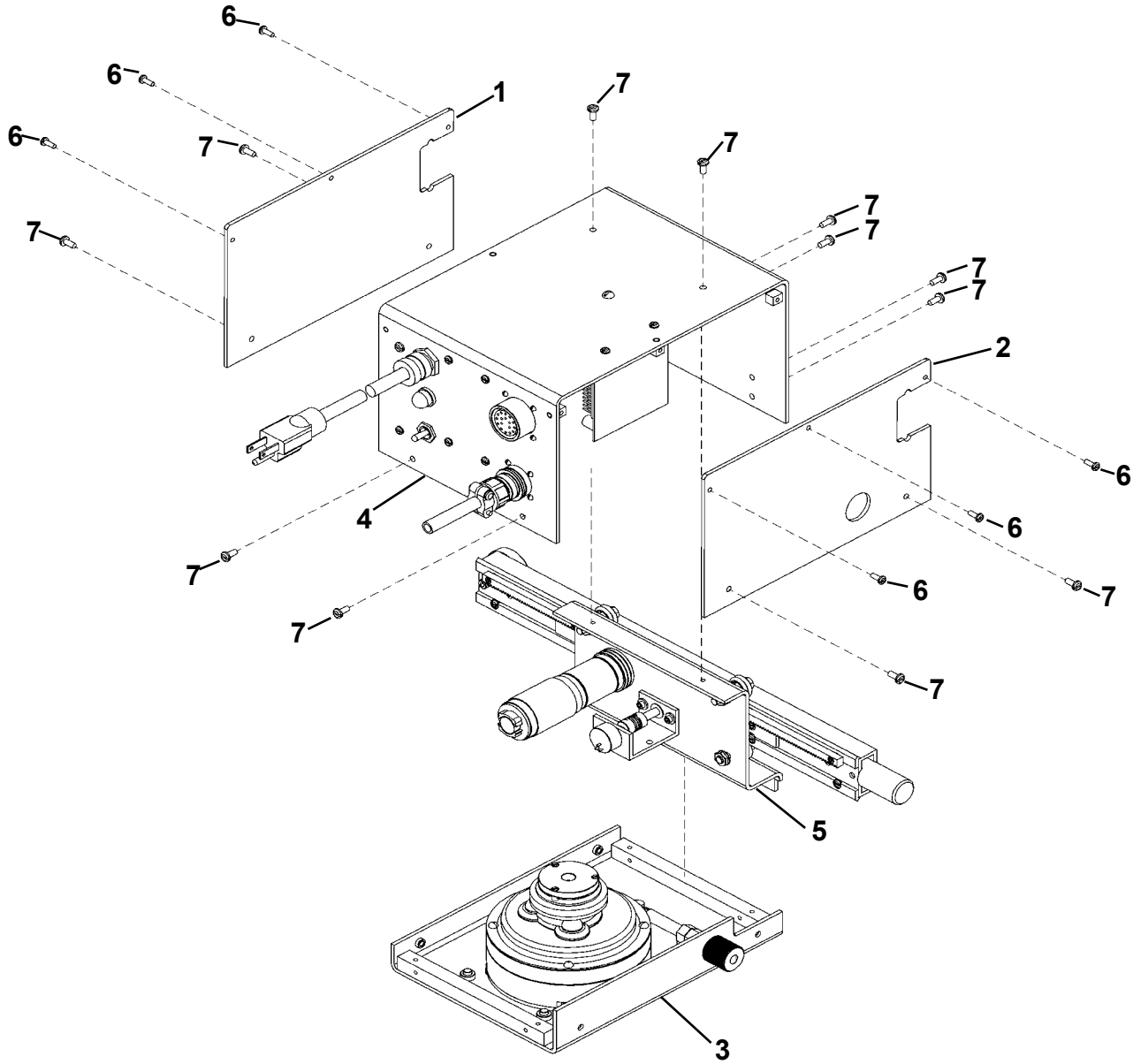
- A. Weave Speed
- B. Steering, 2" (50 mm) left or right from center
- C. Amplitude, 0-2" (50 mm)
- D. Dwell Left, 0-3 sec.
- E. Dwell Right, 0-3 sec.
- F. Weld Contact Switch
- G. Mode Selector Switch
- H. Digital Display, Tractor Speed
- I. Forward / Off/ Reverse, Tractor Travel
- J. Tractor Speed

# UNIVERSAL BUG-O-MATIC BUG-5700 / EXPLODED VIEW / PARTS LIST



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-2975	Cable Mounting Assembly
2	1	BUG-5462	Right Angle Clamp, Qty 2
3	1	BUG-5710	Drive Box 120 V
3	1	BUG-5712	Drive Box 240 V
3	1	BUG-5714	Drive Box 42 V
4	1	BUG-5751	Pendant Cable
5	1	BUG-5775	Pendant Control
6	1	BUG-9180-6	Rod, 6" (152 mm)
7	1	BUG-1853	Machined Rack, 7.5"
8	1	BUG-5455	Gun Mounting Group

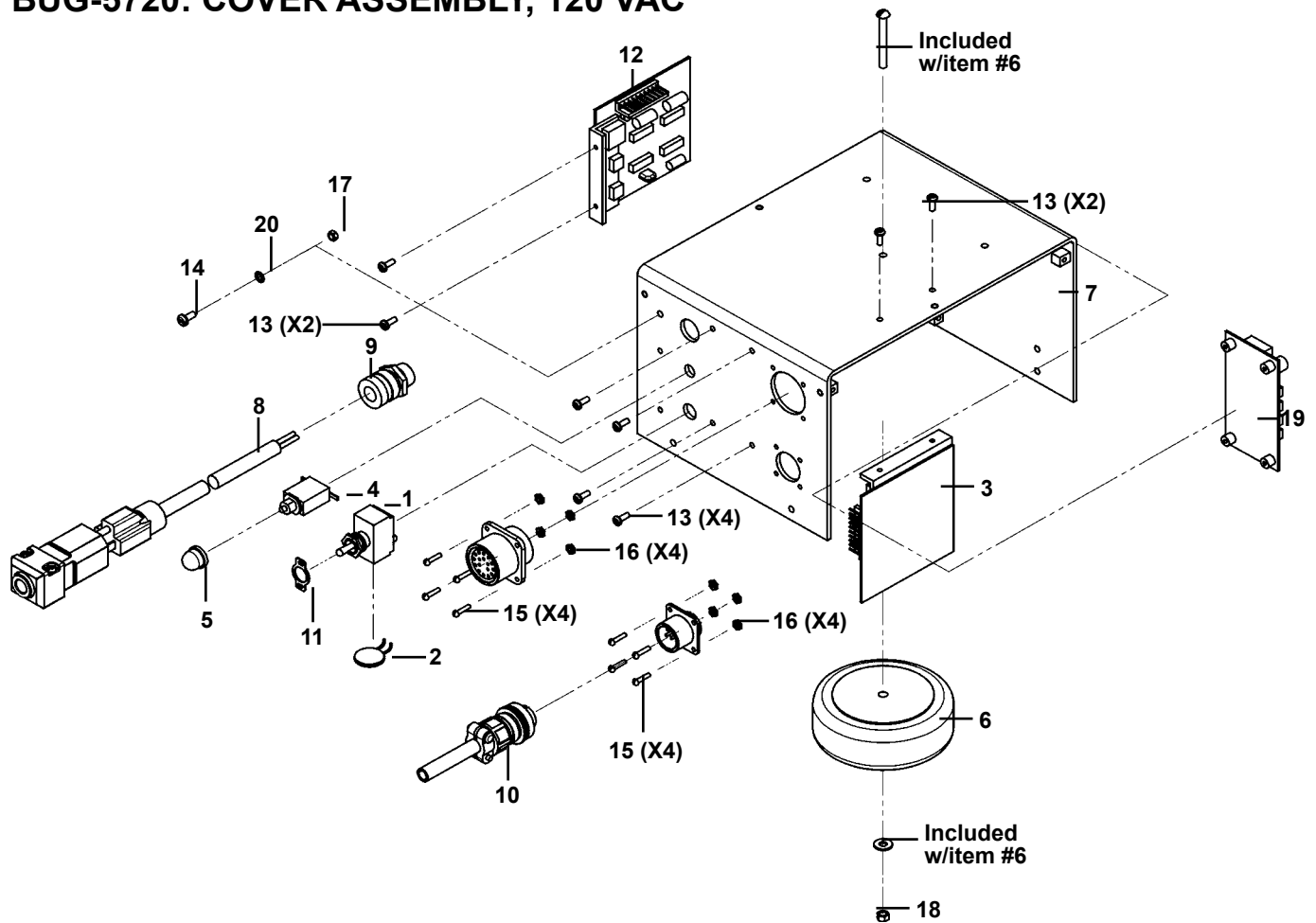
# BUG-5710: DRIVE BOX ASSEMBLY



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
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
4	1	BUG-5722	Cover Assembly 240 V
4	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\*

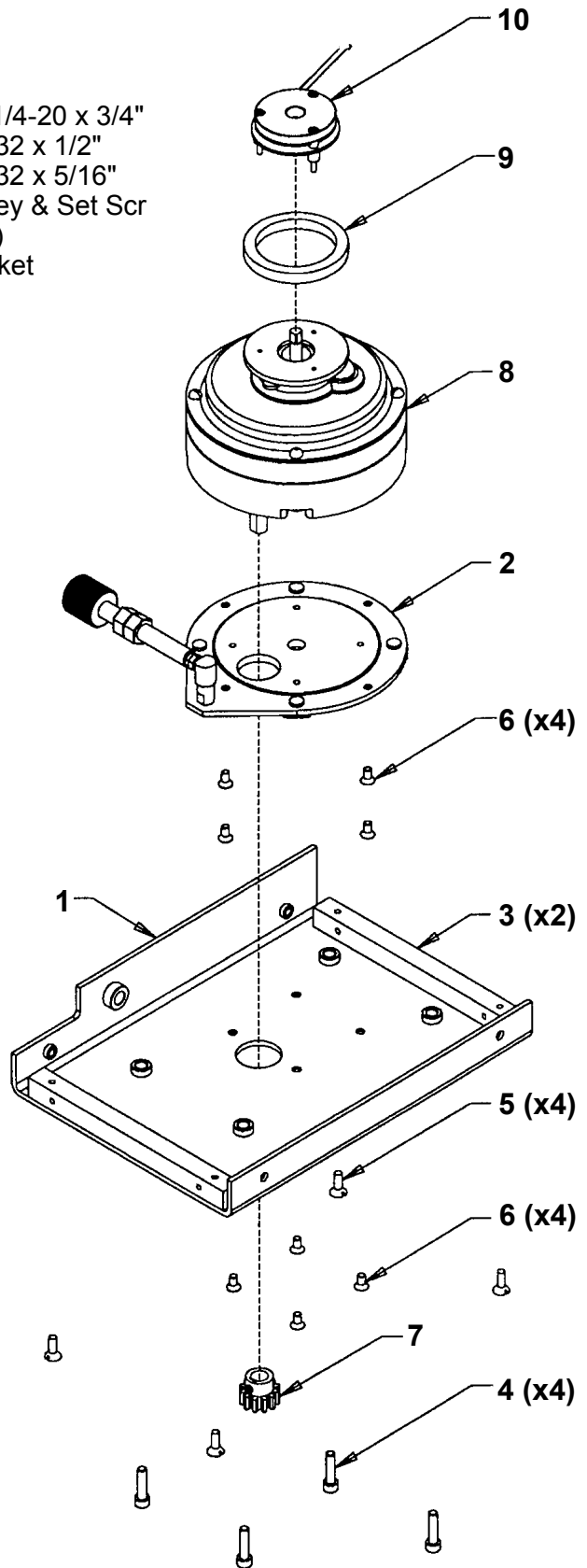


<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	ARM-2279	Toggle Switch
2	1	BUG-1393	Volt trap 120 VAC
3	1	BUG-1770-PW	Motor control board
4	1	BUG-2923	Circuit Breaker 0.7 amps
5	1	BUG-2924	Reset Button Seal
6	1	BUG-5218	Transformer 117 VAC
7	1	BUG-5721	Cover panel anodized
N/S	1	BUG-5726	Wire harness
8	1	BUG-9445	Power Cord
9	1	BUG-9446	Cord Grip
10	1	BUG-9487	Cable connector 2-T
11	1	BUG-9884	On-Off switch plate
12	1	CAS-1770	Speed Control
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

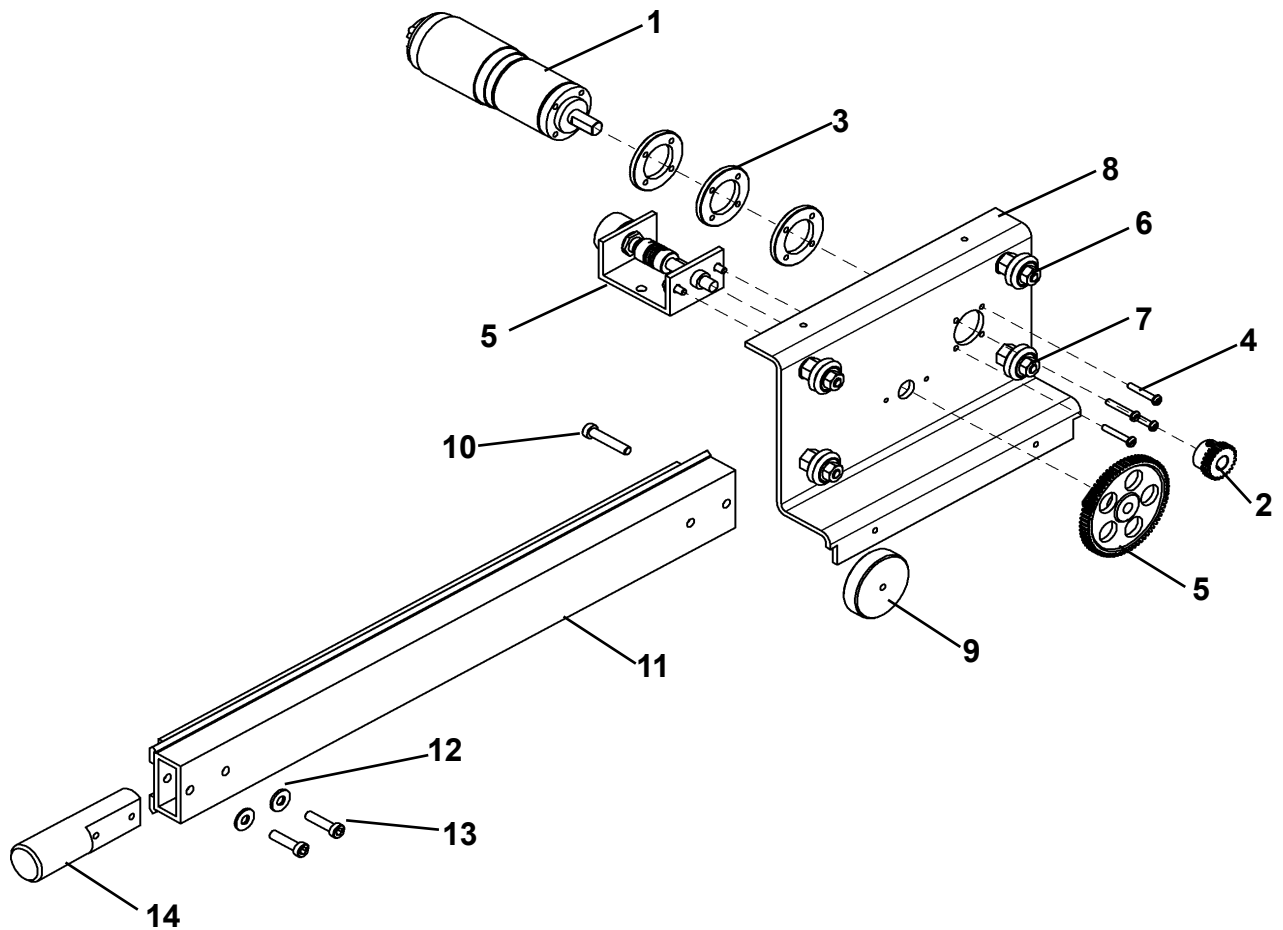
\* For 240V and 42V machines, refer to Electrical Component List on pg 13.

# BUG-5715: BASE ASSEMBLY

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
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

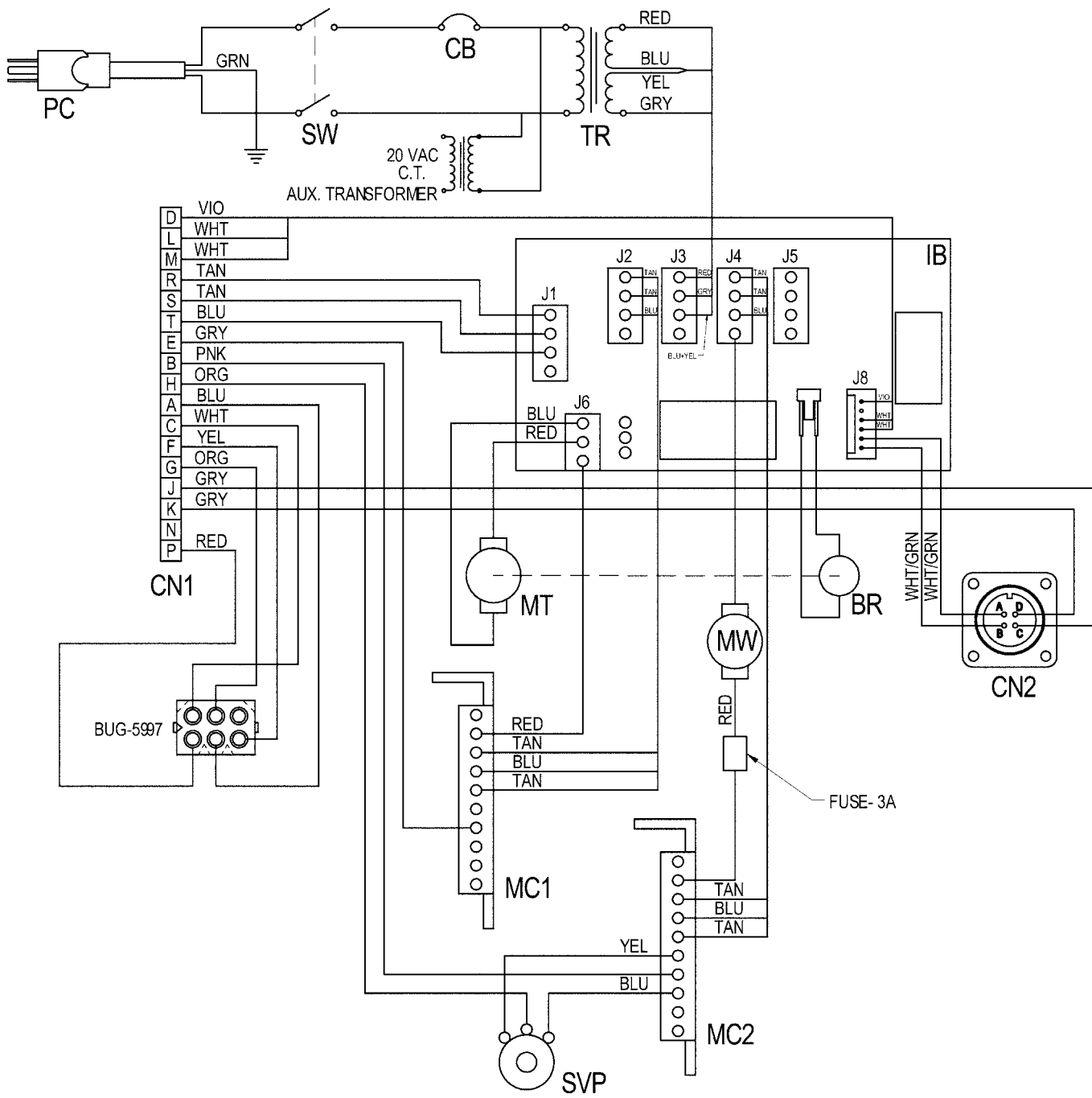


## BUG-5725: CROSS DRIVE ASSEMBLY



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-5590	Gear Motor
2	1	BUG-5591	Pinion
3	3	BUG-5592	Spacer
4	4	BUG-5594	Set Pan Hd Scr 3mm x 18mm
5	1	BUG-5595	Pot Gear Assembly
6	2	BUG-5670	Adj. Leg & Wheel Assembly
7	2	BUG-5675	Fixed Leg & Wheel Assembly
8	1	BUG-5728-A	Cross Drive Support
9	1	WPD-1164	Arm Stop
10	1	FAS-0539	Screw, 10-24 x 1"
11	1	WPD-1150	Cross Arm, 15.50"
12	2	WAS-0230	#10 SAE Flat Washer
13	2	FAS-0537	Screw, 10-24 x 3/4"
14	1	WPD-1177	Post

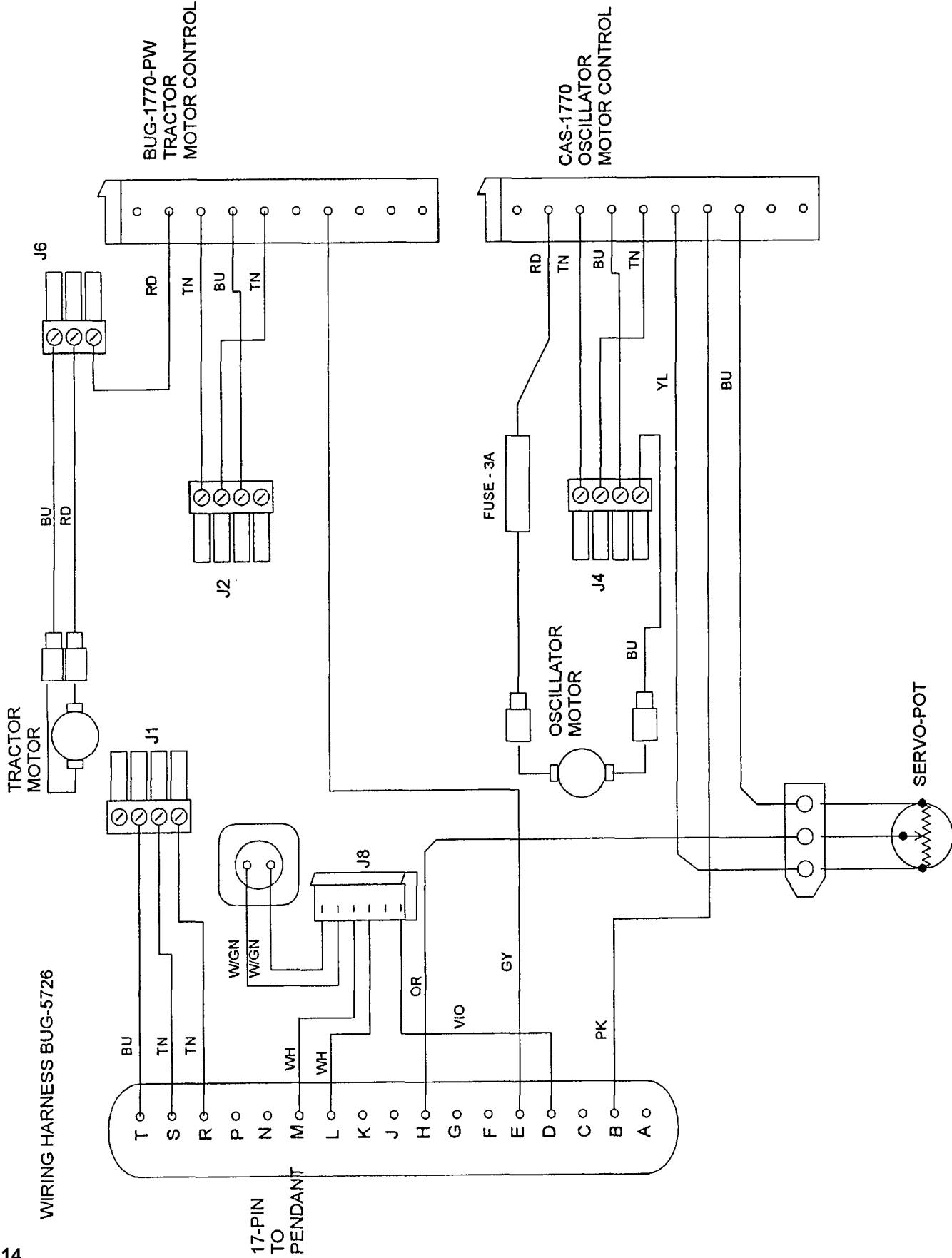
# BUG-570\_ / BUG-655X DRIVE UNIT / WIRING DIAGRAM



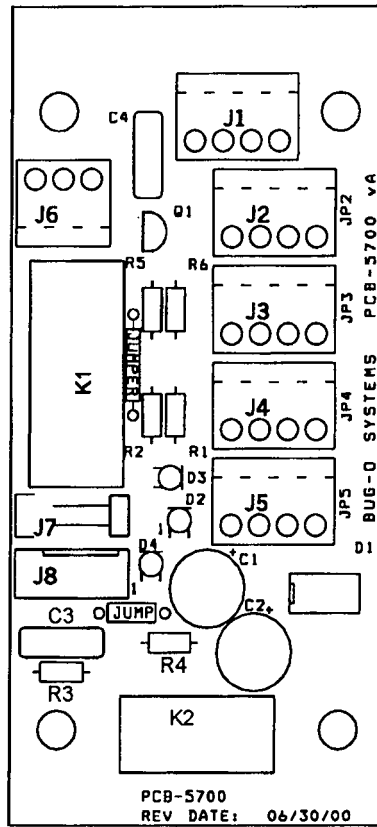
## BUG-570\_ / BUG-655X DRIVE UNIT / ELECTRICAL COMPONENT CHART

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>BUG-5700 120 VAC</b>	<b>BUG-5702 240 VAC</b>	<b>BUG-5704 42 VAC</b>
PC	Power Cord	BUG-9445	GOF-3115	BUG-9442
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	
SVP	Servo-Pot		BUG-5240	

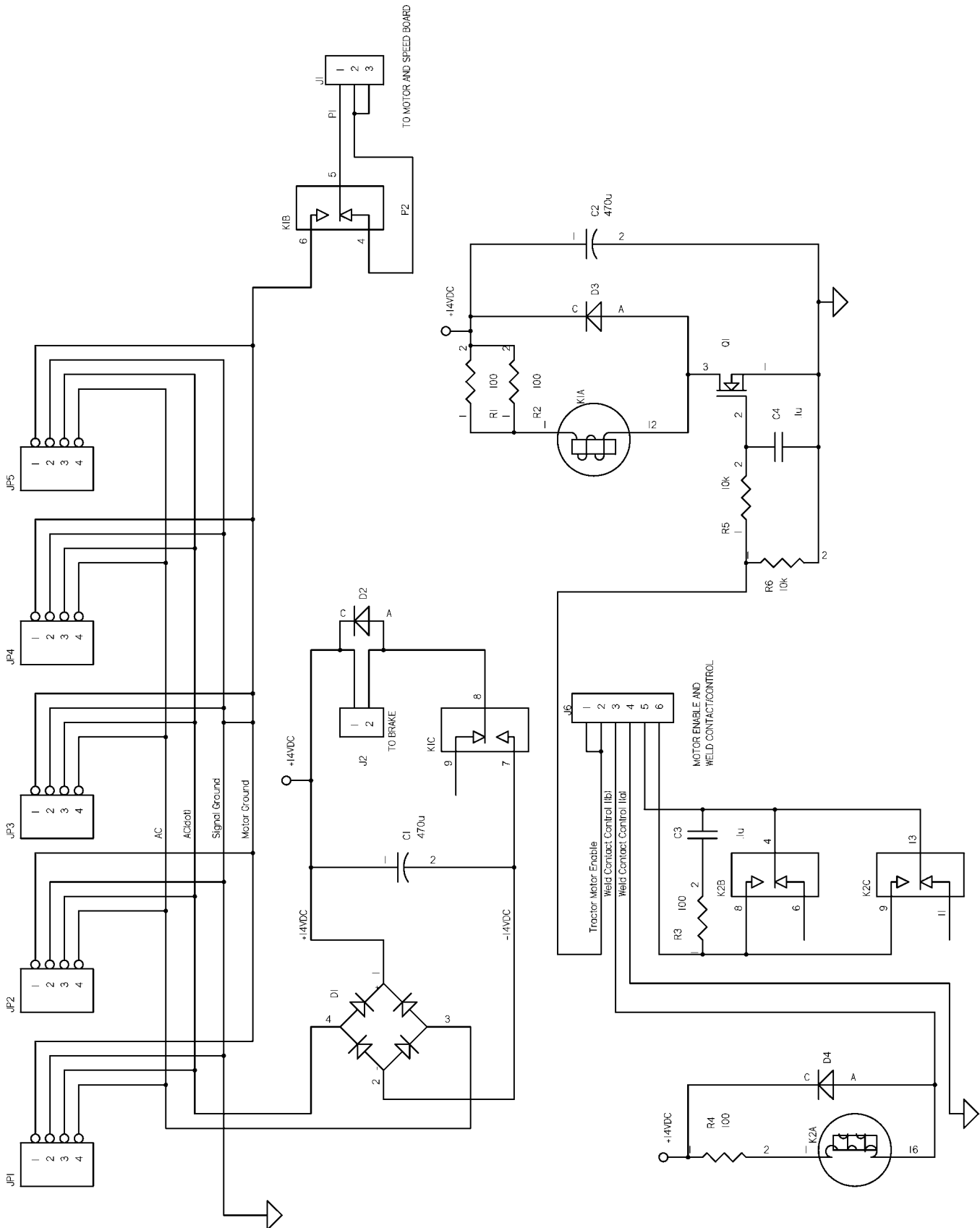
# BUG-5726 WIRING HARNESS / WIRING DIAGRAM



# PCB-5700 DRIVE UNIT INTERCONNECT PC BOARD

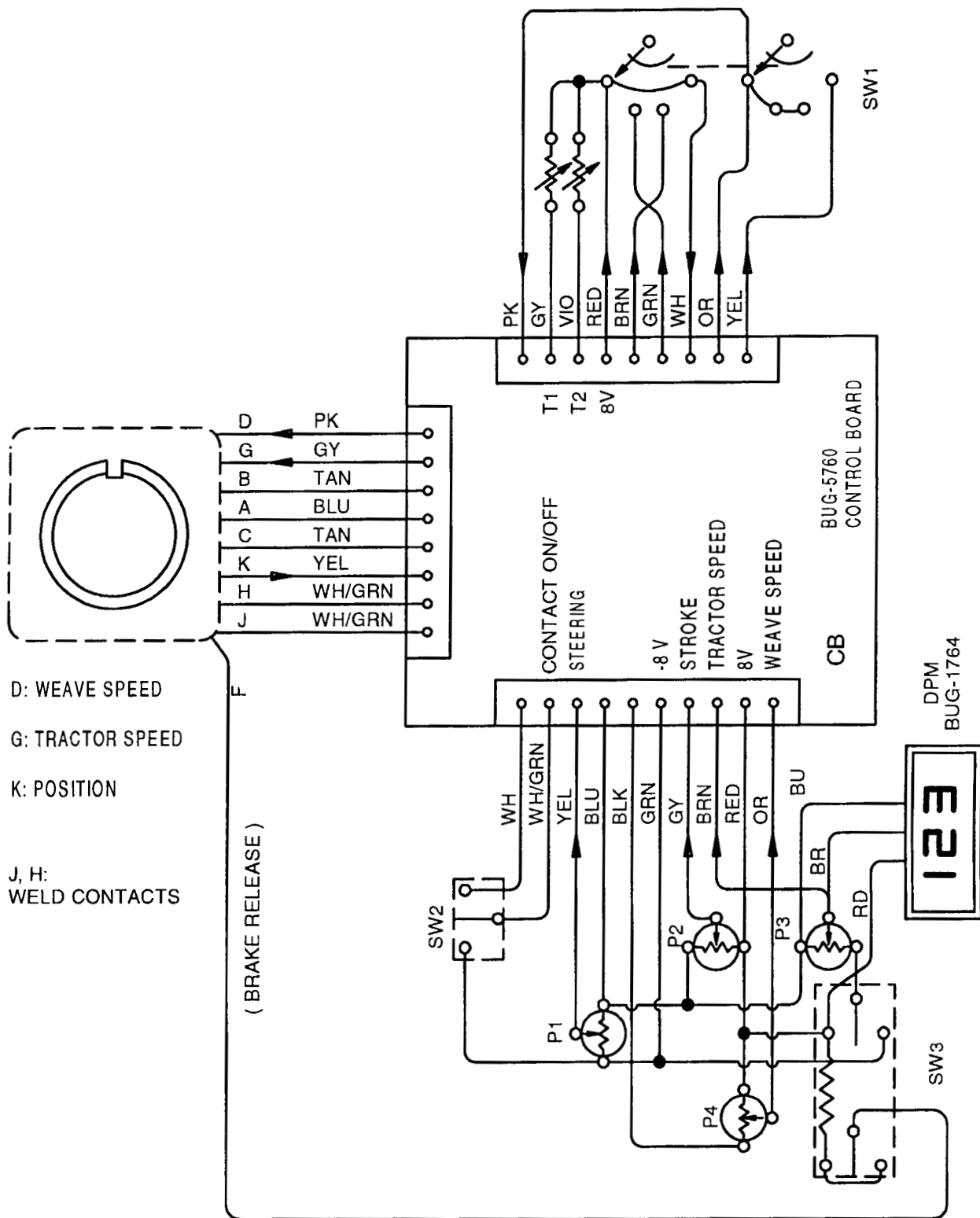


# PCB-5700 / WIRING DIAGRAM

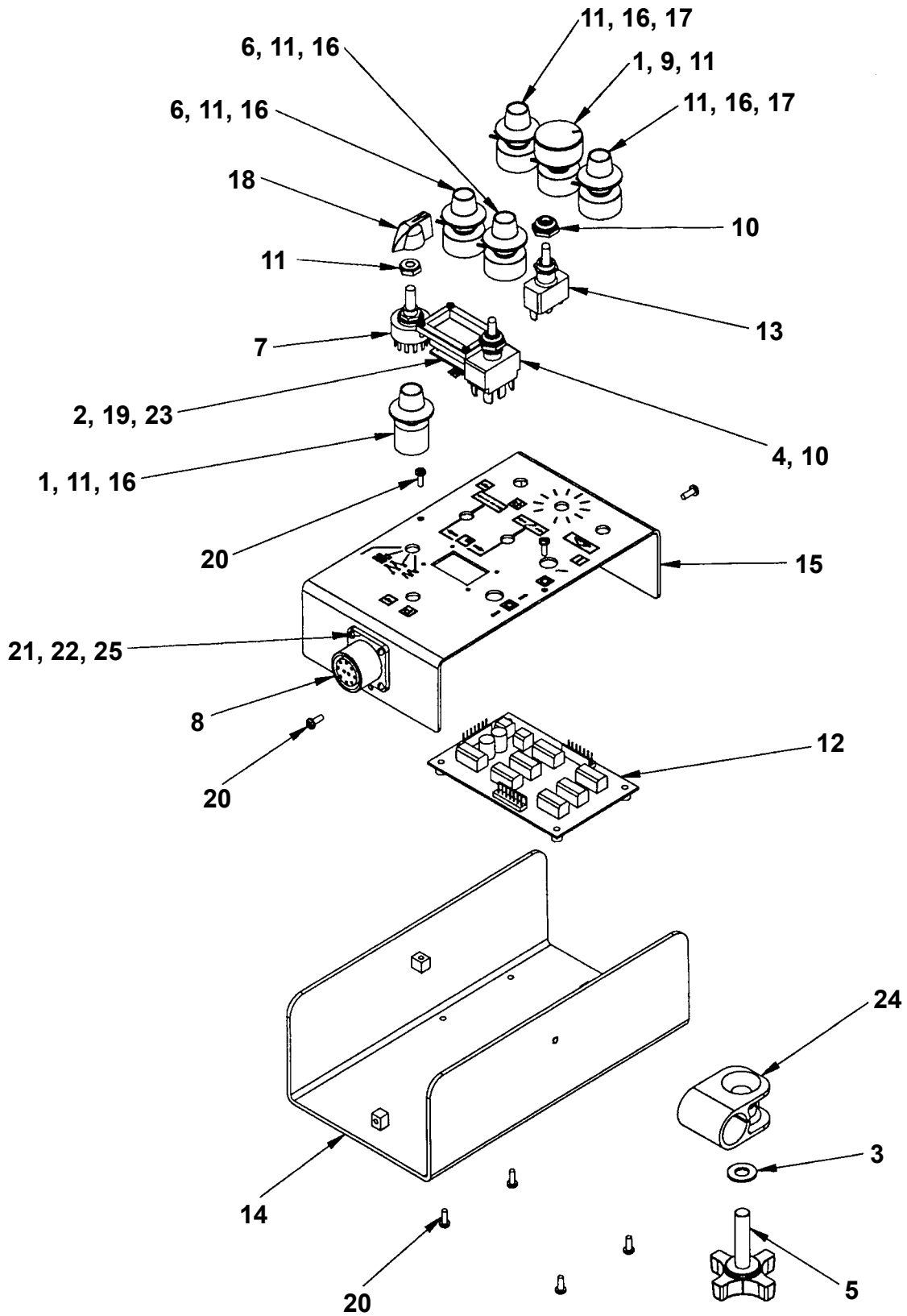




# BUG-5775 CONTROL PENDANT / WIRING DIAGRAM



# BUG-5775 CONTROL PENDANT / EXPLODED VIEW

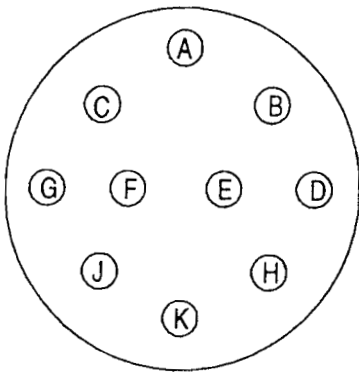


## BUG-5775 CONTROL PENDANT / PARTS LIST

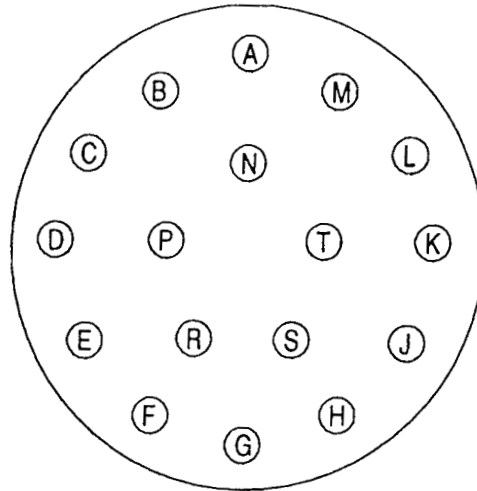
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	BUG-1562	Potentiometer, 10k, 3 Turn
2	1	BUG-1764	Digital Meter
3	1	BUG-2034	Teflon Washer
4	1	BUG-2255	Toggle Switch, DPDT, On-Off-On
5	1	BUG-2436	Knob Screw
6	2	BUG-5054	Potentiometer, 500 K
7	1	BUG-5363	Rotary Switch, 3-P, 4-position
8	1	BUG-5687	Panel Connector, 10-T, F
9	1	BUG-5757	Knob, Large
10	2	BUG-5758	Toggle Switch Seal
11	7	BUG-5759	Pot Shaft Seal
12	1	BUG-5760	Control Board
13	1	BUG-5761	Toggle Switch, SPDT, On-On
14	1	BUG-5772	Rear Panel
15	1	BUG-5773	Front Panel
16	5	BUG-9621	Knob
17	2	BUG-9677	Potentiometer, 10 K
18	1	BUG-9694	Knob (Pointer)
19	4	FAS-0104	Pan Hd. Scr, 4-40 x 3/8 L
20	8	FAS-0114	Pan Hd. Scr, 6-32 x 3/8 L
21	4	FAS-0205	Rnd Hd. Scr, 4-40 x 1/2 L
22	4	FAS-1305	4-40 Hex Nut
23	1	MDS-1011	Display Bezel
24	1	PAN-1033	Rod Clamp
25	4	WAS-0201	Star Washer, #4



# 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 with AHC 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

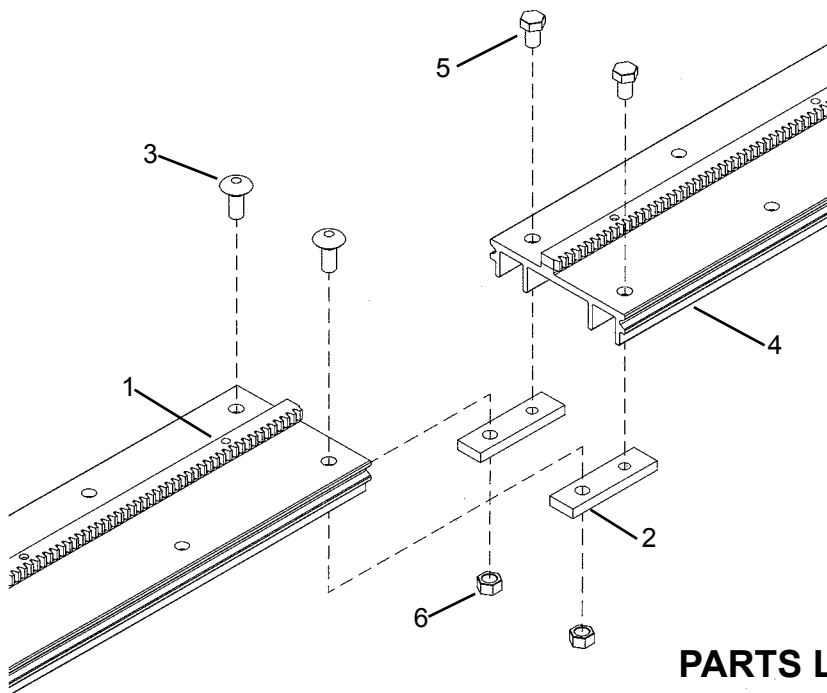
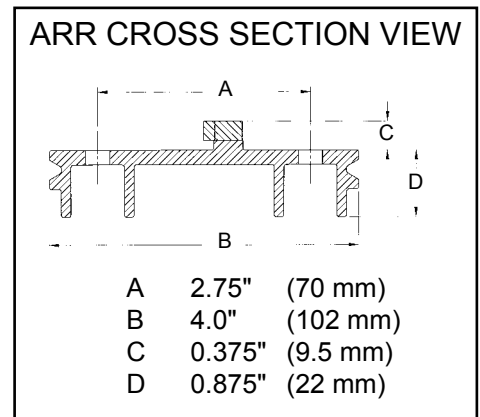
ALUMINUM RIGID RAIL is a rigid channel section made of high quality alloy to machine tool tolerance as in the section view below. A machined gear rack is mounted on the rail, with which the drive pinion of the carriage meshes. The wheels of the carriage travel in opposed grooves at either side of the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



### PARTS LIST

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

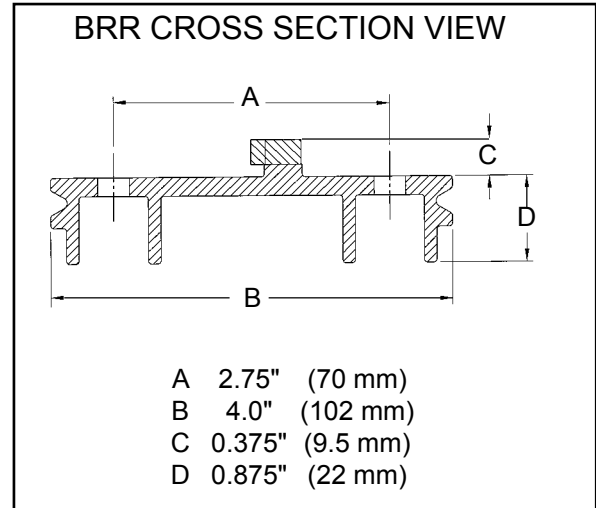
#### RAIL FOR LONGER SPANS:

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.

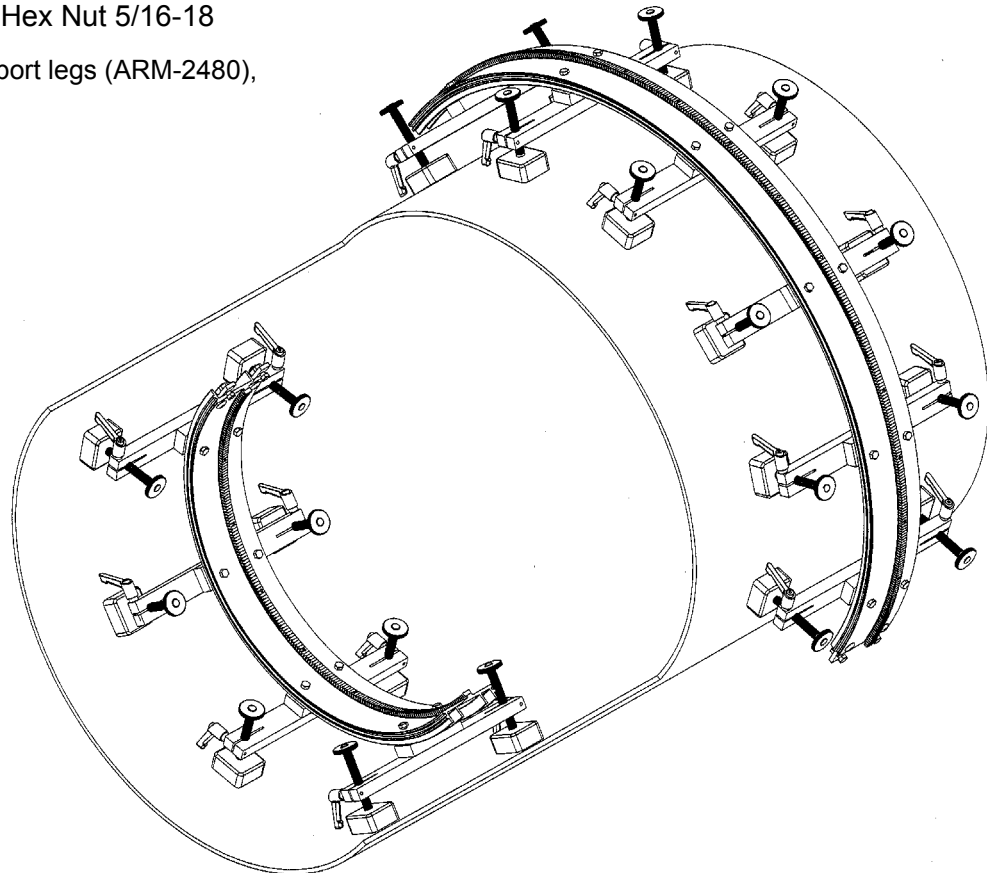
The rail can be ordered as a complete ring (BRR-1210-\_\_) or as individual sections (BRR-1180). When ordering, specify the work diameter (inside or outside), method of mounting and if a complete ring is required. On larger diameters, rail can be "leapfrogged" around the vessel to reduce the quantity needed. Maximum section length is 80" (2 m).



## PARTS LIST

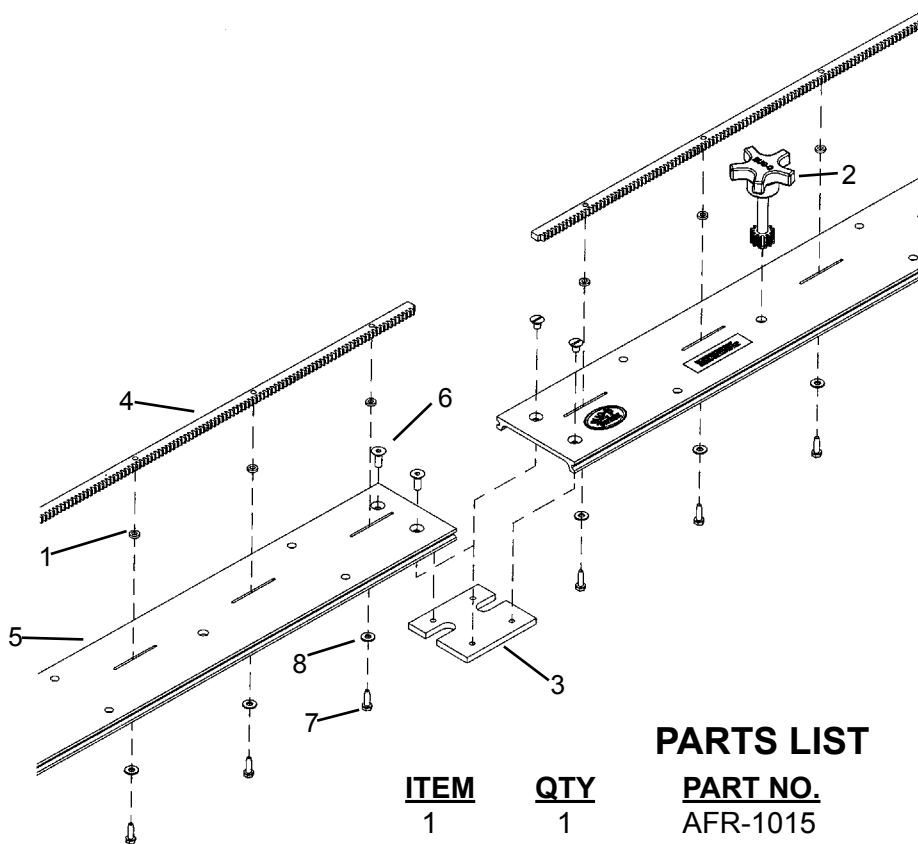
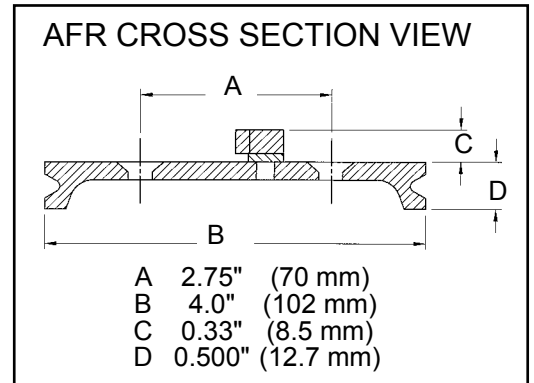
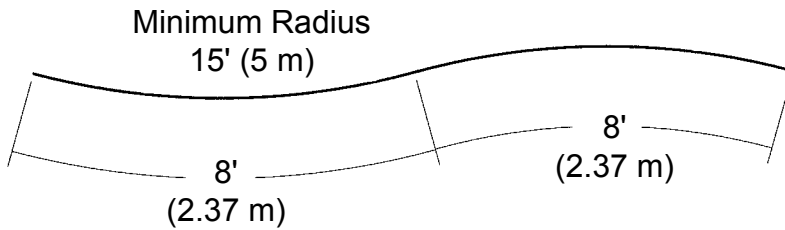
<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	ARR-1002	Rack
2	ARR-1027	Splicer Bar
2	ARR-1028	Carriage Bolt
1	ARR-1044-E	Rail Extrusion
2	FAS-0375	Screw, Hex Hd Cap 5/16-18
2	FAS-1370	Hex Nut 5/16-18

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



# 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.

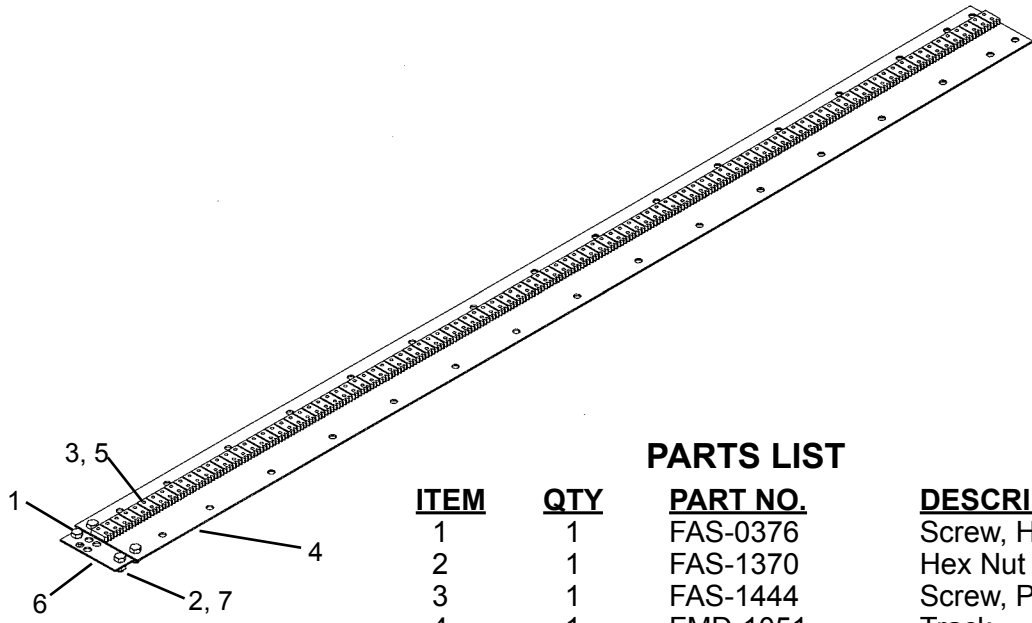
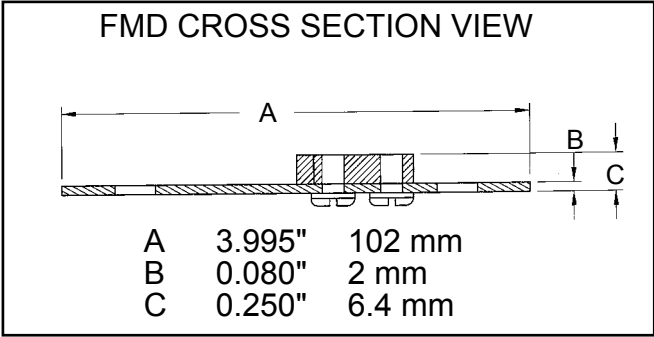
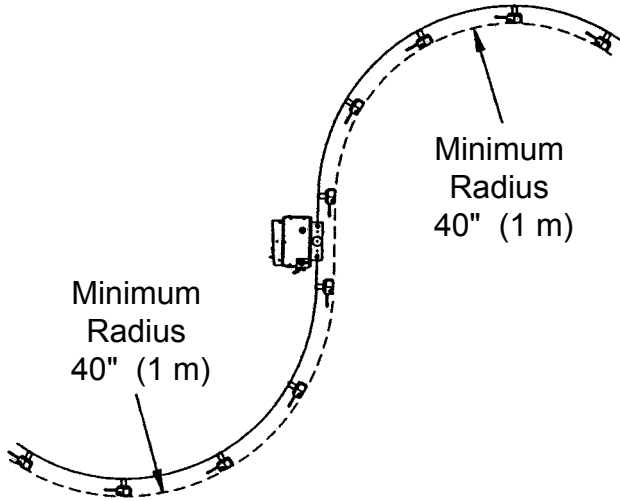


## PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	1	AFR-1015	Spacer Washer
2	1	AFR-2001	Rack Adjuster Tool
3	1	AFR-3002	Splice Plate
4	1	AFR-3006	Rack
5	1	AFR-3009	Extrusion, Punched
6	1	FAS-0955	Screw, Flt Hd Soc 1/4-20
7	1	FAS-1446-HW	S.T. Slit. Hx. 10-32
8	1	WAS-0230	#10 Washer

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

HI-FLEX RAIL is made from heavy duty, wear resistant 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.



## PARTS LIST

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



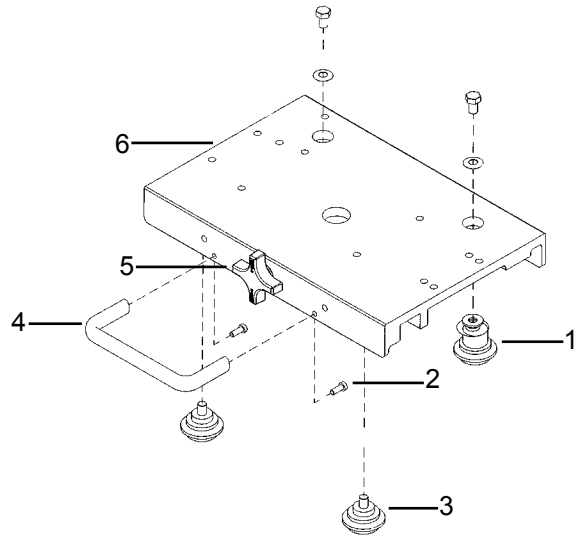
## CARRIAGE OPTIONS

The Universal Bug-O-Matic with AHC 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.

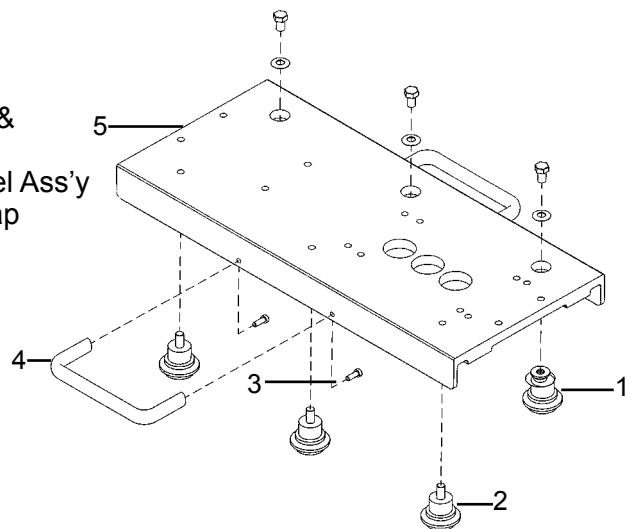
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	BUG-1984	External Adj. Leg & Wheel Assembly
2	2	FAS-0545	Screw, Soc Hd Cap 10-32 x 1/2
3	2	MPD-1045	Fixed Leg & Wheel Assembly
4	1	MPD-1049	Handle, Black
5	1	MPD-1059	Knob Screw (Included w/carriage)
6	1	MPD-1066	Carriage



### 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.

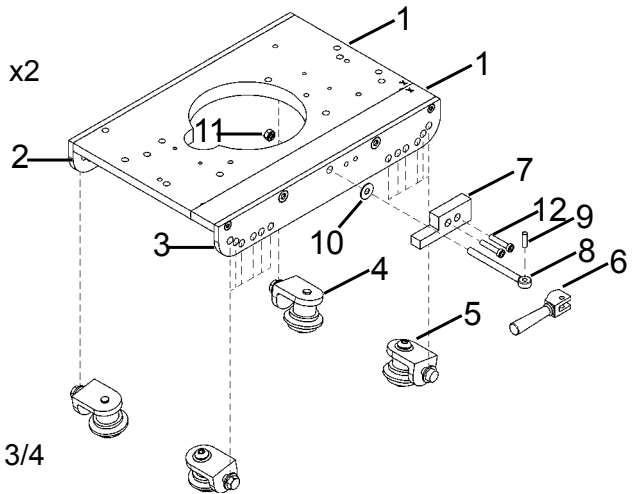
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	3	BUG-1984	External Adj. Leg & Wheel Assembly
2	3	BUG-2956	Fixed Leg & Wheel Ass'y
3	4	FAS-0545	Screw, Soc Hd Cap 10-32 x 1/2
4	2	MPD-1049	Handle, Black
5	1	MPD-1055-PNT	Carriage 18"



## 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.

ITEM	QTY	PART NO	DESCRIPTION
1	1	BUG-5908A	Plate Assembly (Incl. Spring x2 & Dowel Pin x2, not shown)
2	1	BUG-5907	Skirt, Right
3	1	BUG-5964	Skirt, Left
4	2	BUG-5918	Fixed Wheel Assembly
5	2	BUG-5920	Adj. Wheel Assembly
6	1	BUG-5961	Modified Cam Handle
7	1	BUG-5962	Cam Stop Block
8	1	BUG-5963	Swing Eye Bolt
9	1	BUG-5916	Dowel Pin
10	1	ARM-2316	Thrust Race
11	1	FAS-1353	Hex Nut, 1/4-20
12	2	FAS-0537	Screw, Soc Hd Cap 10-24 x 3/4



## 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.

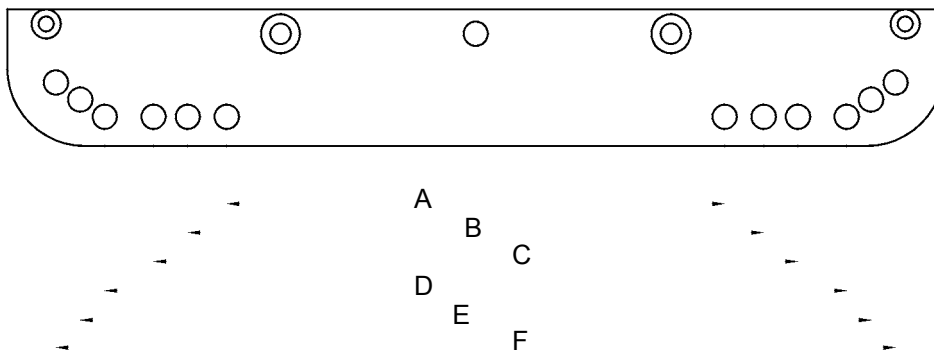
3. Place the carriage on the rail with the wheels in the rail grooves. Close the cam handle and move the carriage back and forth a few inches. The wheels on their mounting brackets will align themselves correctly in the rail grooves.

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
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

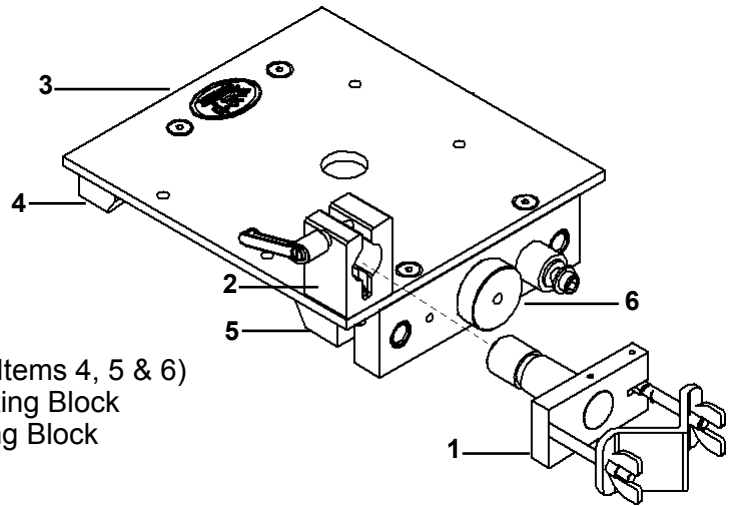
5. Verify that pinion is properly engaged in the rack. The correct wheel position will provide a minimum of 1/8" engagement (approx. 3 mm) between the drive pinion and the gear rack. **Note:** For some rail or pipe sizes, the pinion height may need to be adjusted.



## 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.

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-2708	Clamp
2	1	FMD-1060	FMD Clamp Block
3	1	FMD-1062	Carriage (Includes Items 4, 5 & 6)
4	1	FMD-1068	Fixed Wheel Mounting Block
5	1	FMD-1069	Adj. Wheel Mounting Block
6	1	FMD-1072	Knob

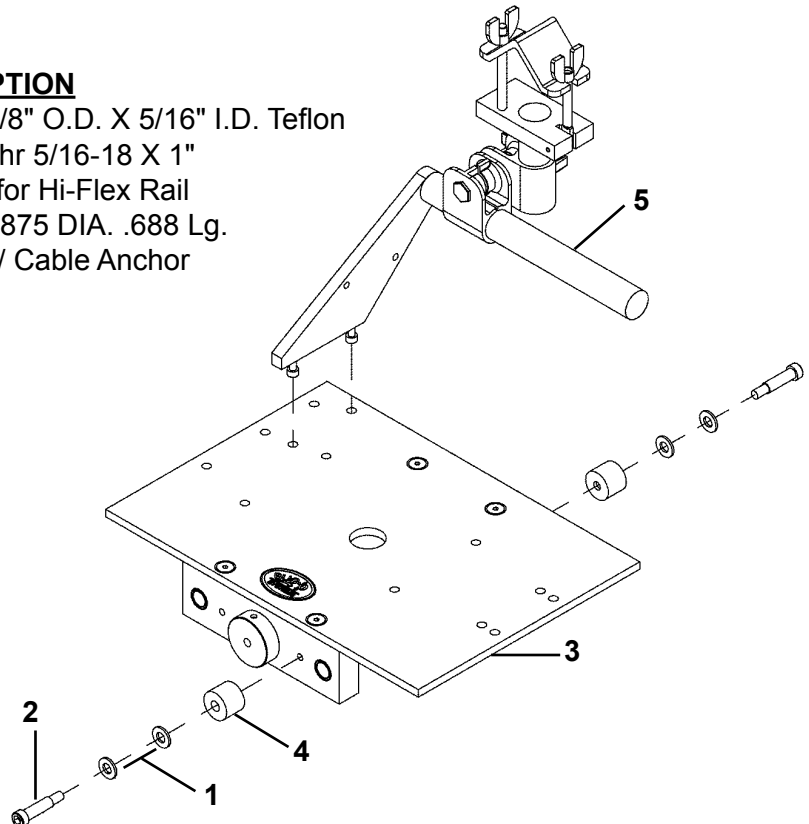


## FMD-1105 HI-FLEX CARRIAGE / EXPLODED VIEW / PARTS LIST

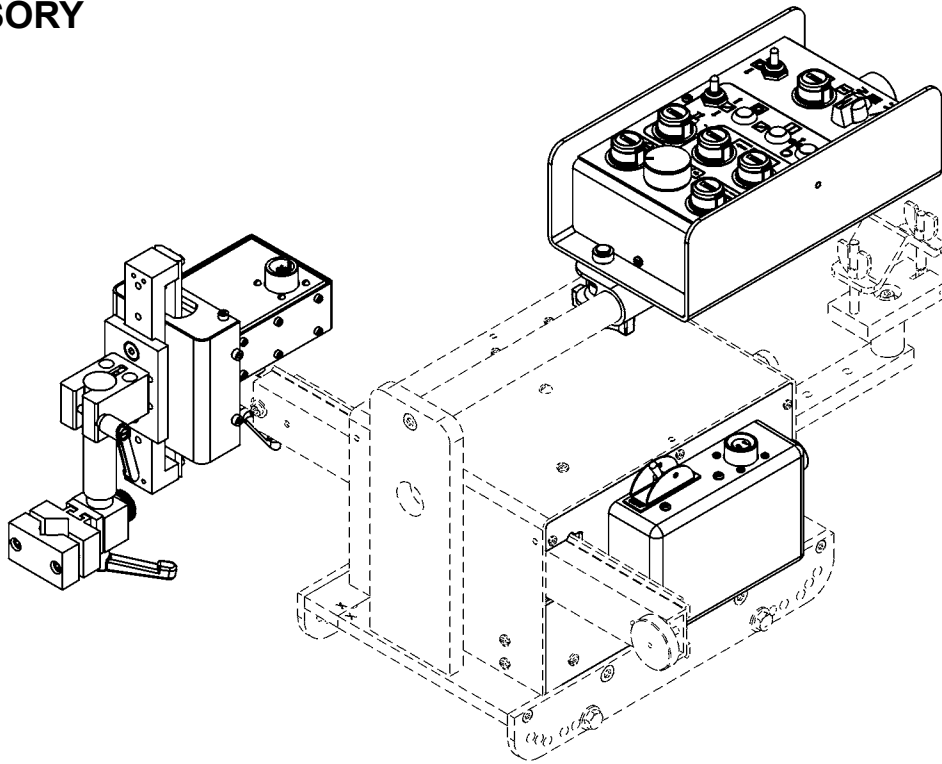
FMD-1105 12" HI FLEX CARRIAGE  
100 lb (45 kg) Carrying Capacity

### PARTS LIST / EXPLODED VIEW

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	4	BUG-2841	Washer 5/8" O.D. X 5/16" I.D. Teflon
2	2	FAS-0659	Soc Hd Shr 5/16-18 X 1"
3	1	FMD-1022	Carriage for Hi-Flex Rail
4	2	FMD-1093	Standoff .875 DIA. .688 Lg.
5	1	MPD-1035	Handle w/ Cable Anchor



## ACCESSORY



### **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.

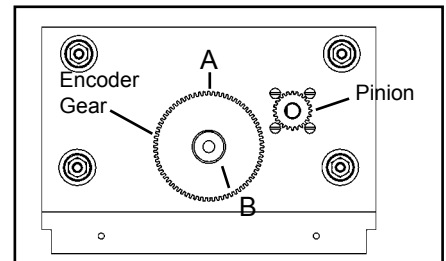
# SERVICE PROCEDURE: INSTALLING THE CROSS ARM (WPD-1150)

## OPTION 1 - In the Field

**NOTE:** Read and understand whole procedure before attempting.

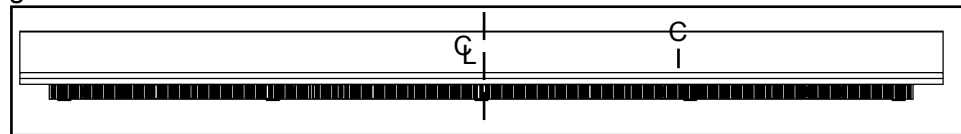
Tools required: Flash light or well lighted area, marking pen, tape measure or other measuring device.

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).



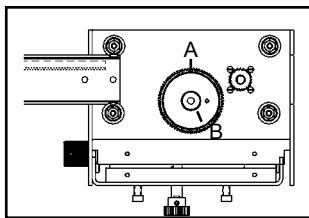
**Figure 1:** Proper positioning of reference marks A and B before the V-guide is inserted.

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.

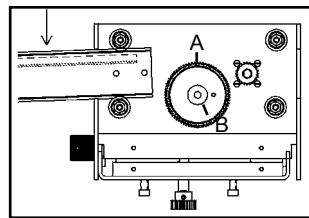


**Figure 2:** Placement of reference mark C on the V-guide.

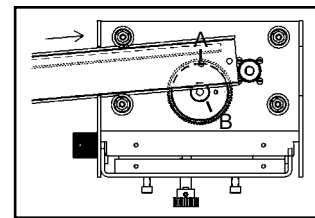
8. Inserting from the brass gear side, install the Cross Arm, as shown in figures 3-7.



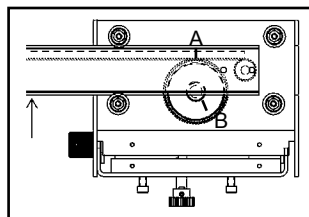
**Figure 3:** Insert Cross Arm into guide wheels.



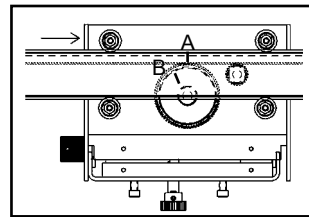
**Figure 4:** Push down on arm to tilt V-guide up.



**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.

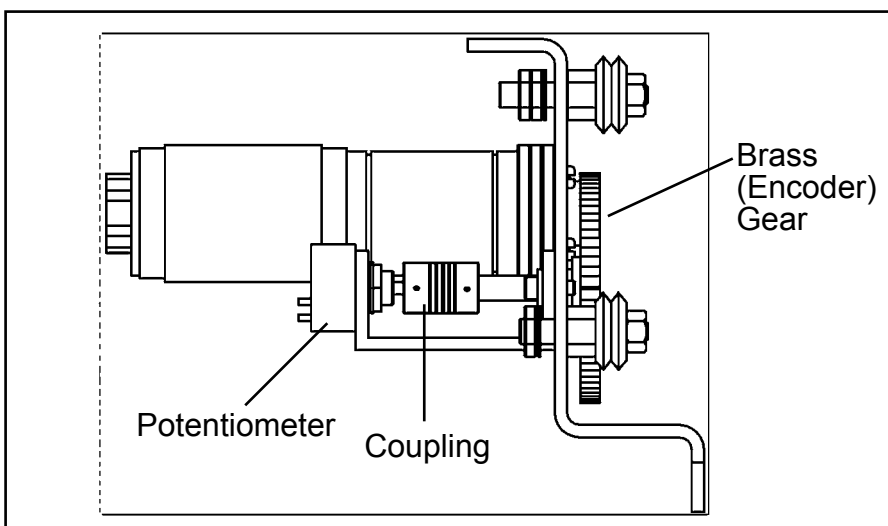
**Note:** Reference mark B will no longer apply if the potentiometer was changed in service or the cross arm was previously centered using the electrical method on page 30.

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

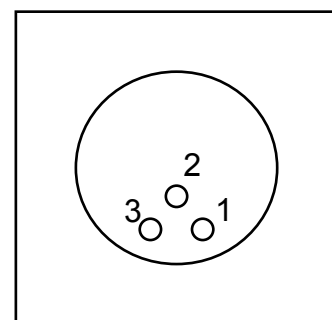
### OPTION 2 - The Electrical Way

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.

# 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.***