

INSTRUCTIONS AND PARTS MANUAL

CIR-O

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-CIRO-IPM-0319

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

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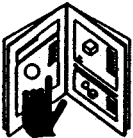
SAFETY

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



ELECTRIC SHOCK can kill.

1. The equipment is not waterproof. Using the unit in a wet environment may result in serious injury. Do not touch the equipment when wet or standing in a wet location.
2. Never open the equipment without first unplugging the power cord or serious injury may result.
3. 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.
4. 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 Electrical 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. Do not leave the equipment unattended. Remove from the work site and store in a safe location when not in use.



FALLING EQUIPMENT can cause serious personal injury and equipment damage.

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



MOVING PARTS can cause serious injury.

1. Never try to stop the pinion from moving except by removing power or by using the STOP control.
2. Do not remove any protective panels, covers or guards and operate equipment.

CAUTION

DO NOT LEAVE EQUIPMENT UNATTENDED WHEN NOT IN USE!

Remove from work site and store in a safe location.

CIR-O

PRECISION CIRCLE BURNER, BEVELER AND WELDER

INSTRUCTION AND PARTS MANUAL

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**THIS PRODUCT IS COVERED BY ONE OR
MORE PATENTS WORLD WIDE.**

TECHNICAL DATA

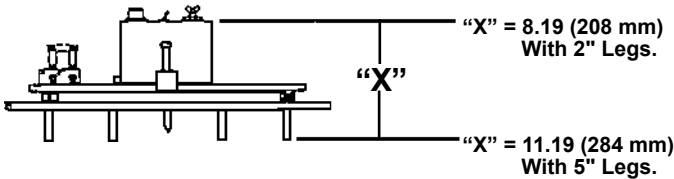
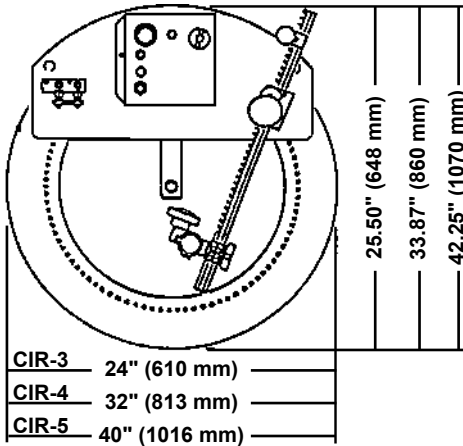
Power Requirement:	<u>120 VAC/50-60/1</u>	<u>240 VAC/50-60/1</u>	<u>42 VAC/50-60/1</u>
	CIR-3303	CIR-3323	CIR-3313
	CIR-4404	CIR-4424	CIR-3313
	CIR-5505	CIR-5525	CIR-5515

Cutting Range:	Inside Diameter	Outside Diameter
CIR-3301,3323,3313	3"-14" (75-356 mm)	26"-56" (660-1422 mm)
CIR-4404,4424,4414	3"-22" (75-559 mm)	34"-64" (864-1626 mm)
CIR-5505,5525,5515	3"-30" (75-760 mm)	42"-72" (1060-1830 mm)

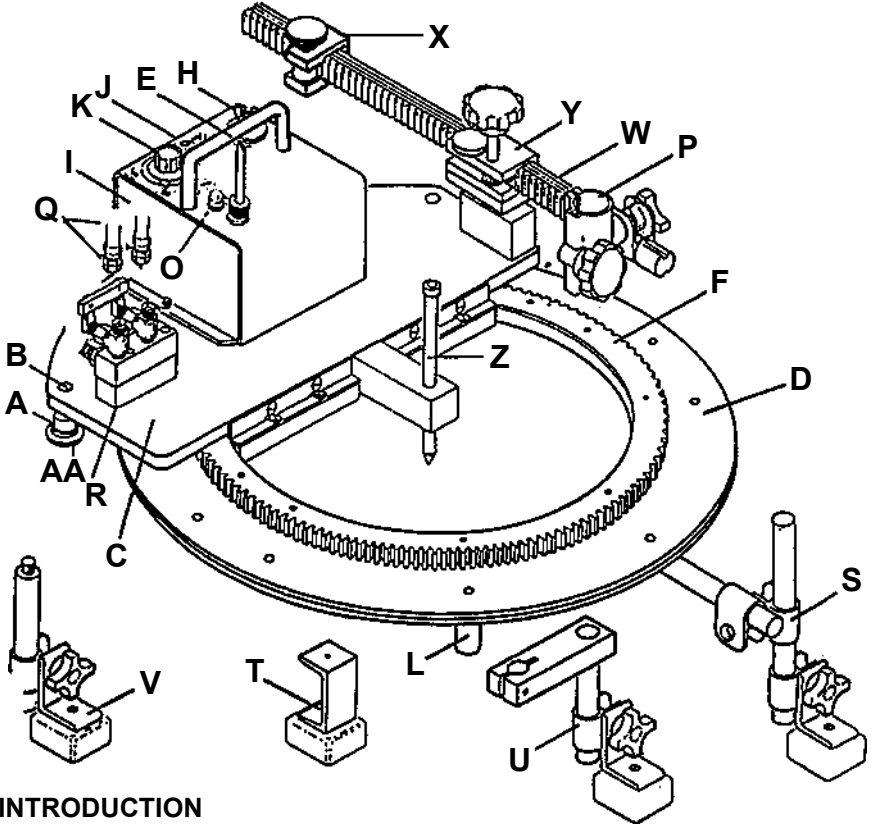
Net Weight:	<u>CIR-3303,3323,3313</u>	<u>CIR-4404,4424,4414</u>	<u>CIR-5505,5525,5515</u>
	48 lbs. (21.8 kg)	65 lbs. (29.5 kg)	90 lbs.(40.9 kg)

Shipping Weight:	66 lbs. (30.0 kg)	90 lbs. (40.8 kg)	128 lbs. (56.0 kg)
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Speed Range: See chart on page 19.



OPERATING INSTRUCTIONS



INTRODUCTION

Your new **CIR-O** is ready for operation when you receive it. A few minutes spent reading the following will help you become familiar with the operation and capabilities of your machine.

The **CIR-O Carriage (C)** should operate freely on the **Ring Track (D)**. The carriage has three adjustable **Wheel Logs (A)**. By loosening the **Flat Socket Head Screws (B)** these logs may be rotated for adjustment. To check **Wheel (AA)** adjustment, hold one wheel and move the carriage. When properly adjusted the wheel should barely slip.

The **Cam Clutch (E)** engages the drive pinion to the **Ring Gear (F)** by changing the position of the **Drive Module (I)**. The **Thumb Nut (H)** locks the **Cam Clutch (E)** in position.

Turning the **Potentiometer Knob (K)** regulates speed. The **Switch (J)** controls forward-off-reverse. Throw the switch in the direction you want the carriage to travel.

The **CIR-O** is furnished with four symmetrically-located **Legs (L)**. A variety of **Magnetic Feet and legs (S), (T), (U), and (V)** are available to increase the versatility of the **CIR-O** machine.

OPERATING INSTRUCTIONS (CONT'D.)

POWER SUPPLY

The DC III drive operates on 120 volt, (42VAC), (240VAC), 50/60 Hz. The **Circuit Breaker (O)** protects the unit against overload or electrical faults,

CAUTION: IF THE CIRCUIT BREAKER OPENS, FIND AND CORRECT THE CAUSE OF FAILURE BEFORE RESETTING.

TORCH

The **Torchholder (P)** will accept any standard American machine torch (barrel diameter 1-3/8" (34 mm) with 1/4"-square (6 mm) 32-pitch rack). The 32-pitch pinion is standard. Specify a 24-pitch pinion if desired. The **Short Hose Assembly (Q)** connects the torch to the **Quick-acting Manifold Assembly (R)**. The supply hoses are to be connected to the open side of the quick-acting manifold assembly.

Proper torch operation is essential to quality cuts. We suggest that you follow the torch manufacturers' instructions carefully, being sure to use a clean tip of the proper size.

MAGNETIC SUPPORTS

Several Types of magnetic supports are available for use with the CIR-O to stabilize the machine as listed below:

- (S) **Outrigger Support Assemblies**; CON-1010 - used in multiples of two or four to stabilize CIR-O on plate, cylinders or heads where two legs must be longer than the other two,
- (T) **Magnet Foot Assemblies**; CIR-9000 - may be used in sets of four or more to position CIR-O on vertical or out-of-position, flat surfaces.
- (U) **Leg and Magnet Foot Assemblies**; CON-1040 (four required) - may be used for flat or irregular surfaces.
- (V) **Offset Leg and Magnet Assemblies**; CIR-9002 (four required) - use with a bevel cutting head or adjustable tip adaptor - to eliminate the "blind" spot under the ring.

SETUP

A center-punch mark and a radius mark are the only layout required. The **Center Pin Assembly (Z)** extends below the CIR-O base and is placed in the center-punch mark. The CIR-O is then eased down to the work on the center pin. This movement locates the entire machine "on center." The **Rack (W)** with **Torchholder (P)** is then positioned over the radius mark.

OPERATION

In order to provide a smooth start, it is recommended that the starting hole be drilled or pierced inside or outside the radius mark. Center the torch tip over the radius mark and secure the **Rack Stop (X)** firmly against the **Post Assembly (Y)**. [The side of the post assembly to which the rack stop is positioned depends upon whether the material inside or outside the cut is scrap]. Begin the cut from the starting hole and, after carriage travel is begun, move the **Torch Rack (W)** slowly against the **Rack Stop (X)**. This action "feathers-in" the cut eliminating a notch.

BUG-5100-F DC III DRIVE UNIT

DRIVE UNIT OPERATION

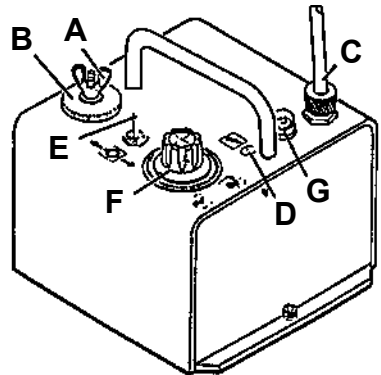
Rotating Cam Knob (B) will move the drive pinion in and out of engagement with the ring gear.

To lock drive into position, tighten the 1/4-28 **Wing Nut (A)**.

To disengage the drive pinion from the ring gear, loosen the 1/4-28 **Wing Nut (A)** and turn **Knob (B)** counterclockwise. Turn **Knob (B)** clockwise to engage the drive pinion with the ring gear, re-tighten the 1/4-28 **Wing Nut (A)** to lock in position.

When **Power Cord (C)** is plugged into the appropriate power source, **Pilot Light (D)** will glow. **Switch (E)** controls the direction of travel, with the center position set at "OFF". **Knob (F)** controls the speed. **Circuit Breaker (G)** protects the unit against overload or electrical faults.

CAUTION: IF THE CIRCUIT BREAKER OPENS, FIND AND CORRECT THE CAUSE OF FAILURE BEFORE RESETTING.



TECHNICAL DATA

DC III DRIVE UNIT

Power Requirement: BUG-5100-F 120 VAC/50-60/1
BUG-5102-F 240 VAC/50-60/1
BUG-5104-F 42 VAC/50-60/1

Dimensions: 7.12" L x 6.75" W x 6.75" H
(180 x 172 x 172 mm)

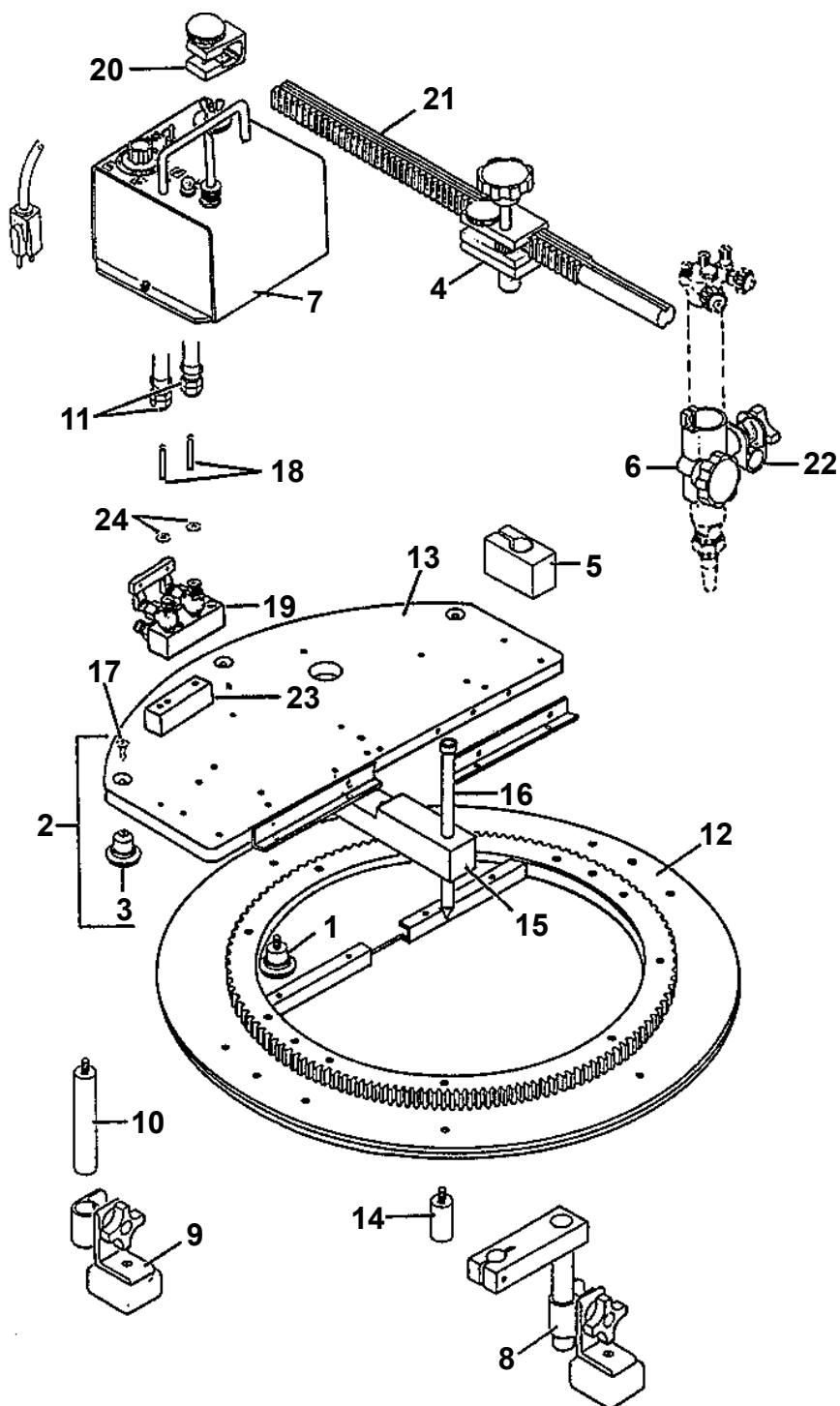
Net Weight: 16 lbs. (7.3 kg)

Shipping Weight: 20 lbs. (9.1 kg)

Speed: 2-50 ipm (50-1270 mm/min)
(Measured at Drive Pinion)

Load Capacity: *30 lbs. (14 kg)
[Measured at Drive Pinion]
***Note:** Speed and load ratings apply at radius of ring gear. Speed is proportional to radius at any other point, and load rating is inversely proportional to radius.

CIR-O / EXPLODED VIEW

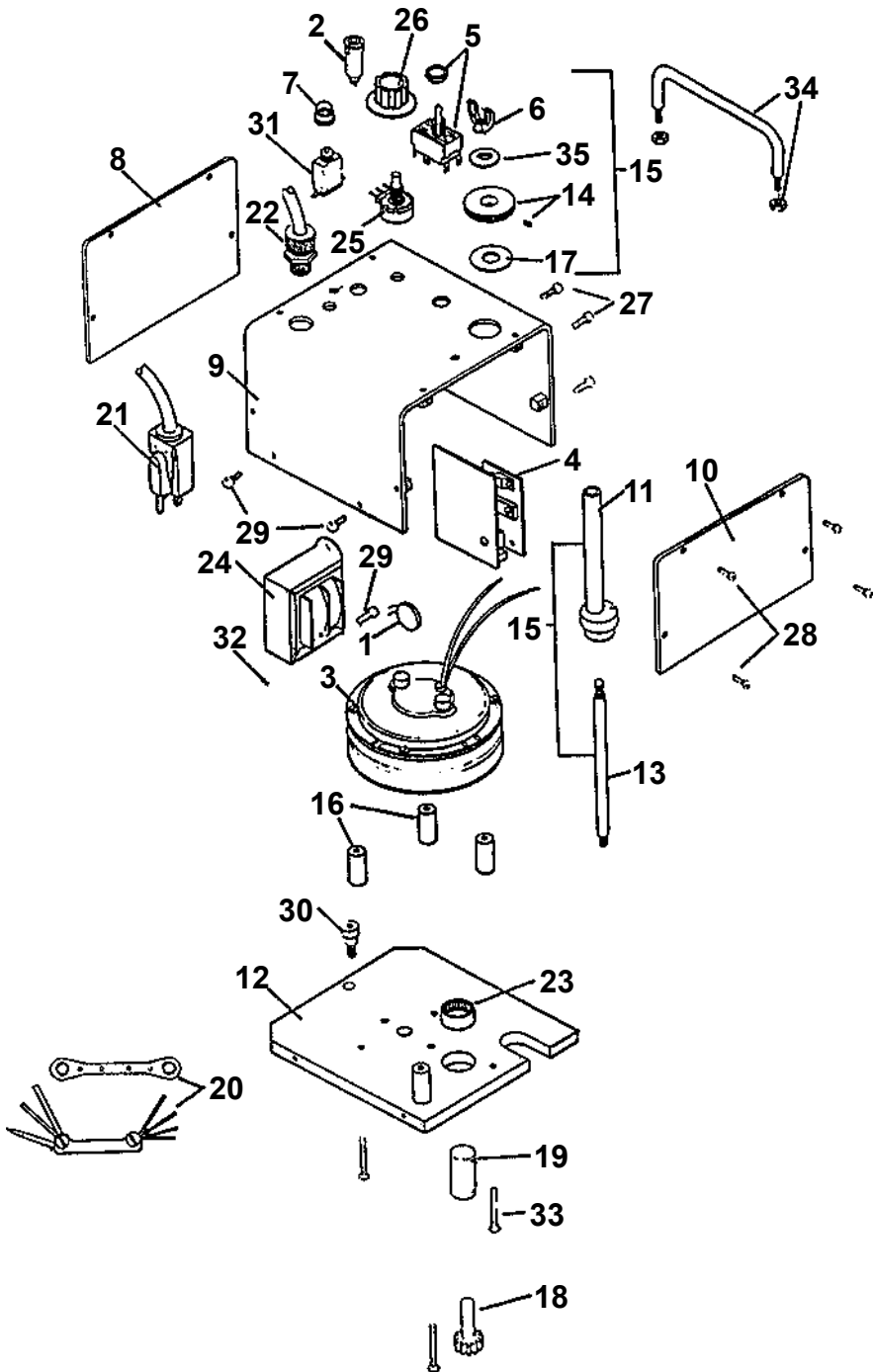


CIR-O / PARTS LIST

PARTS LIST / CIR-O

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	BUG-1996	Fixed Leg & Wheel Assembly
2	3	BUG-1998	Adjustable Leg & Wheel Assembly
3	5	BUG-2010	Wheel w/Bearing
4	1	BUG-2407	Post Assembly (Vertical)
5	1	BUG-2440	Base Post (Block)
6	1	BUG-2915	Torchholder Assembly
7	1	BUG-5100-F	DC III Drive Unit Assembly (150:1) 120 VAC 240 VAC BUG-5102-F 42 VAC- BUG-5104-F
8	4	CIR-9002	Offset Leg & Magnet Foot (Optional)
9	4	CIR-9020	Magnet Foot
10	4	CIR-9021	Leg (Specify Length w/Suffix) Lengths Available: 5" (127 mm) 8" (203 mm) 10" (254 mm)
11	1	CIR-1010-3	Twin Hose Assembly 32" (812 mm) 42" (1066 mm) CIR-1010-4 50" (1270 mm) CIR-1010-5
12	1	CON-(3,4,5)000	Ring & Gear Assembly
13	1	CON-(3,4,5)041	Carriage Plate
14	4	CON-1003	Leg-2" (50 mm)
15	1	CON-1042	Center Pin Support Bar
16	1	CON-1043	Center Pin Assembly 9" (228 mm)
17	3	FAS-0986	Fit Hd Soc Sor 5/16-24 x 5/8
18	2	FAS-2736	Fil Hd Set 10-24 x 2-1/4
19	1	GOF-3025	2-Hose Quick-Acting Manifold
20	1	HOB-1025	Rack Stop
21	1	PAN-1015	Rack 22-5/8" (574 mm)
22	1	PAN-1033	Rod Clamp
23	1	PAN-1043	Spacer
24	2	WAS-0230	#10 Washer

BUG-5100-F DC III DRIVE UNIT / EXPLODED VIEW

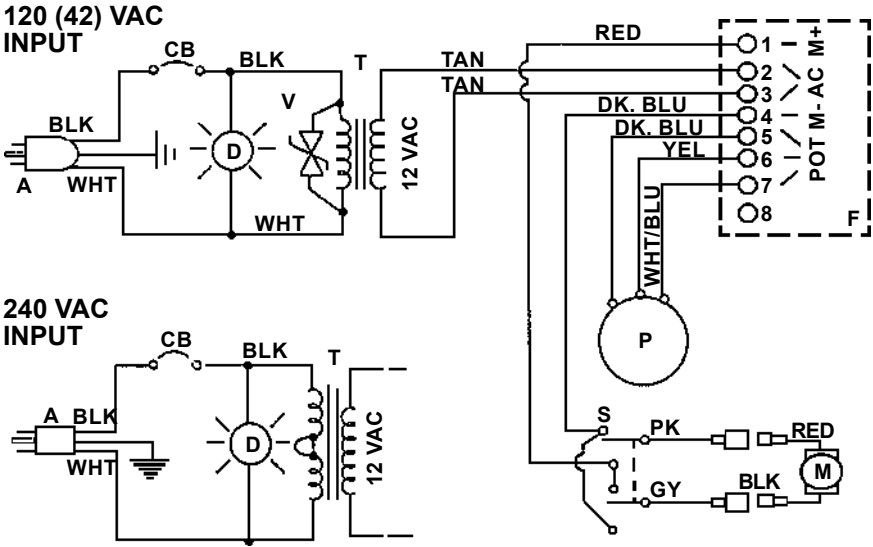


BUG-5100-F DC III DRIVE UNIT / PARTS LIST

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
*1	1	BUG-1393	Volt Trap 120 VAC
*2	1	BUG-1415	Pilot Light 120 VAC
*3	1	BUG-1550	Gear Motor 150:1
4	1	BUG-1725	Precision Speed Control
5	1	BUG-2255	Toggle Switch
6	1	BUG-2767W	Wing Nut 1/4-28
7	1	BUG-2924	Reset Button Seal
8	1	BUG-2988	End Plate
9	1	BUG-5111	Cover
10	1	BUG-5112	End Plate
11	1	BUG-5113	Cam Clutch
12	1	BUG-5114	Swivel Plate
13	1	BUG-5116	Stud
14	1	BUG-5119	Knob
15	1	BUG-5120	Cam Clutch Assembly (includes Items 6,11,13,14,17,35)
16	4	BUG-5121	Stand Off
17	1	BUG-5122	Delrin Washer
18	1	BUG-5128	Drive Pinion w/Long Shaft
19	1	BUG-5131	Sleeve
20	1	BUG-9444	Tool Kit
*21	1	BUG-9445	Power Cord 120 VAC
22	1	BUG-9446	Cord Grip
23	1	BUG-9614	Needle Bearing
*24	1	BUG-9675	Transformer 120 VAC
25	1	BUG-9677	Potentiometer
26	1	BUG-9687	Knob
27	2	FAS-0112	Pan Hd Scr 6-32 x 1/4
28	8	FAS-0114	Pan Hd Scr 6-32 x 3/8
29	7	FAS-0124	Pan Hd Scr 8-32 x 3/8
30	1	FAS-0654	Soc Hd Shidr Scr 5/16 x 3/8 x 1/4-20
*31	1	BUG-2923	Circuit Breaker w/Reset .7A
32	2	FAS-1320	Hex Nut 8-32
33	4	FAS-2824	Fit Hd Slit Scr 8-32 x 1-3/4
34	1	GOF-3019	Handle
35	1	WAS-0240	1/4 Washer

*See Electrical Component Chart for 240 VAC and 42 VAC part numbers.

BUG-5100-F DC III DRIVE UNIT / WIRING DIAGRAM / ELECTRICAL COMPONENT CHART



ELECTRICAL COMPONENT CHART

ITEM	DESCRIPTION	PART NUMBER		
		BUG-5100-F 120 VAC	BUG-5102-F 240 VAC	BUG-5104-F 42 VAC
A	Power Cord	BUG-9445	GOF-3115	BUG-9442
CB	Circuit Breaker	BUG-2923 (.7A)	BUG-2952 (.5A)	BUG-2933 (2A)
D	Pilot Light	BUG-1415	BUG-1428	BUG-1427
V	Volt Trap	BUG-1393	BUG-1563	BUG-1393
T	Transformer	BUG-9675	GOF-3112	BUG-1466
M	Gear Motor		* BUG-1550 (150:1)	
F	Precision Speed Control		BUG-1725	
S	Toggle Switch		BUG-2255	
P	Potentiometer Control		BUG-9686	

* BUG-1600 (50:1)

BUG-1595 (100:1)

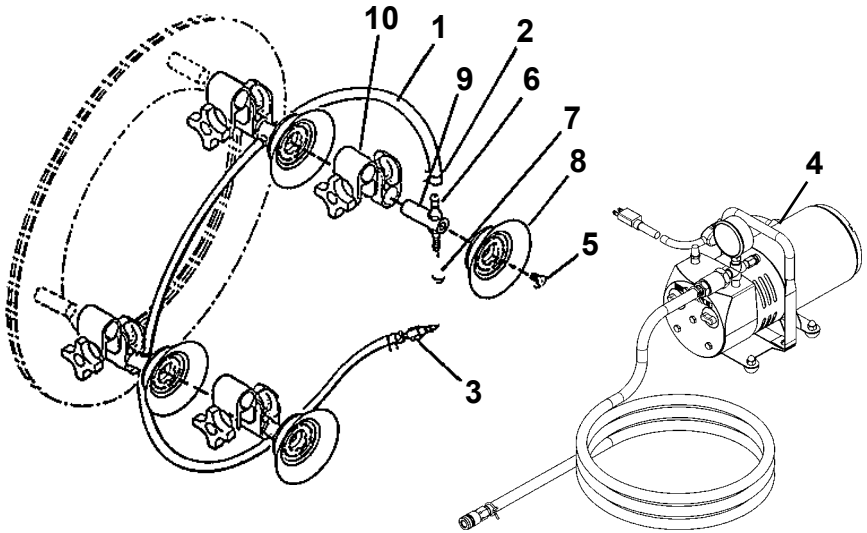
VACUUM SUPPORT KIT

CON-1006 VACUUM SUPPORT KIT can be mounted on any CIR-O or CON-O ring base with standard CON-1003 legs. Vacuum pump kits are available for operation on 120 VAC [ARV-2020] or 240 VAC [ARV-2030]

Each vacuum cup holds 50 lbs (22 kg).

(Dirt and scale block vacuum lines; blow-out when clogged).

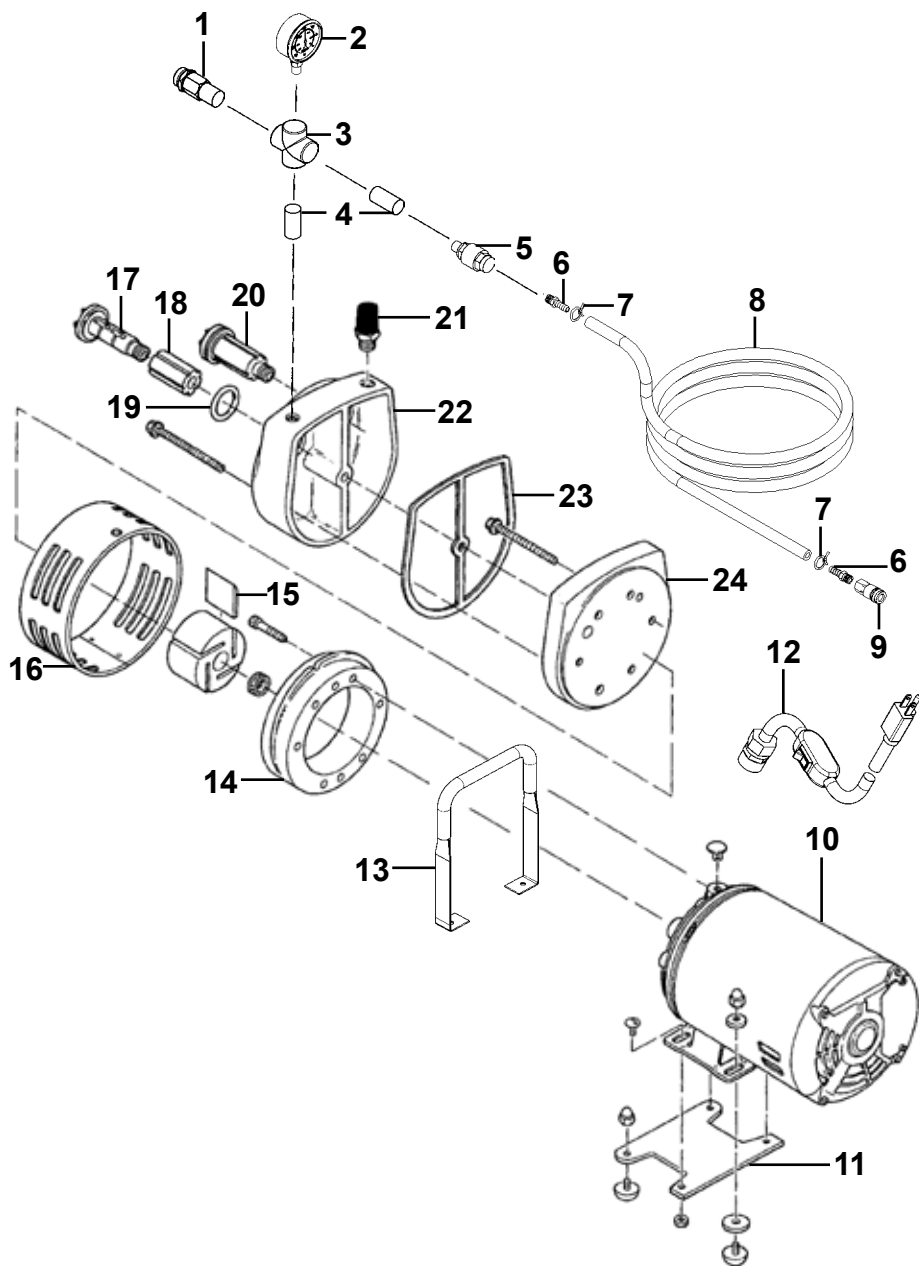
Keep flame 4" (100 mm) away from cups when burning or welding. Silicone vacuum cups will withstand a temperature of 600°F (318° C).



<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	ARV-1004-14	Hose 14" (355 mm)
2	ARV-1005	Hose Clamp
3	ARV-1013	Male Quick Connector 1/4 NPT
4	ARV-2020	Vacuum Pump Kit (120 VAC/60 Hz/1 Ph)
	ARV-2030	Vacuum Pump Kit (240 VAC/60 Hz/1 Ph)
5	ARV-1034	Choke Nipple
6	ARV-1107	3/8" Hose Barb 1/4 NPT
7	ARV-1109	Protective Cap
8	ARV-1116	Vacuum Cup (Silicone) 50 lbs. (22 kg)
9	CON-1007	Vacuum Leg
10	CON-1020	Double Swivel Clamp Assembly

Vacuum Pump is not included in CON-1006 Vacuum Support Kit.

VACUUM PUMP / EXPLODED VIEW



VACUUM PUMP / PARTS LIST

<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	ARV-2017	1/4" Brass Vacuum Relief Valve
2	1	ARV-2014	Vacuum Gage
3	1	ARV-2018	1/4" NPT Union Cross, Female
4	2	ARV-2012	1/4" NPT Nipple
5	1	ARV-2016	1/4" NPT Brass Check Valve, F
6	2	ARV-1107	3/8" Hose Barb x 1/4" NPT-M
7	2	ARV-1005	11/16" x .112 Thk
8	1	ARV-1004-P	Hose 3/8" ID x 11/16" OD
9	1	ARV-1012	Female Quick Connector
10	1	ARV-2019	Pump
11	1	ARV-1999	Foot Support
12	1	ARV-2021	120 VAC Power Cord w/Switch
13	1	ARV-2013	Handle
14	1	ARV-2011	Body
15	4	ARV-2010	Vane
16	1	ARV-2009	Shroud
17	2	ARV-2003	End Cap
18	2	ARV-2004	Felt
19	2	ARV-2005	O-ring
20	2	ARV-2002	End Cap Assembly
21	1	ARV-2001	Filter / Muffler
22	1	ARV-2006	Muffler Box
23	1	ARV-2007	Gasket
24	1	ARV-2008	End Plate

ARV-2020 VACUUM PUMP KIT, 120 VAC 60 HZ/1 PH
ARV-2030 VACUUM PUMP KIT, 220 VAC 50 HZ/1 PH

The **VACUUM PUMP KITS** are 1/6 HP units that provide 15" (381 mm) Hg. on continuous duty. The ARV-2020/2030 Pump will support 30 vacuum cups.

A Repair Kit, **ARV-1029** is available for the **ARV-2020** and **ARV-2030** pumps. The kit contains (4) vanes, (1) body gasket, filter felts for the muffler, oiler filter, oiler wick, a cover gasket and separator felt for the oiler filter.

LUBRICATION OF ARV-2020 AND ARV-2030 VACUUM PUMP KITS:

Fill jar to line indicated on "oil level decal" to avoid wetting felt, which would increase oil feed. Use **SOCONY DTE LIGHT OIL OR EQUIVALENT PETROLEUM BASE OIL WITHOUT DETERGENTS**. One filling should last 20-50 hours of operation. For slower feed, pull wick downward so that less wick is exposed to air stream. Using the same oil as above, oil the motor bearings yearly with 1/2 teaspoon or 30 drops.

TEMPLATE KIT

The purpose of the **TEMPLATE KIT** is to permit cutting of elliptical and obround holes. The manner of accomplishing this job involves dragging the torch barrel against a template which is made 11/16" (18 mm) larger on the radius than the cut-out desired (when using standard US machine torches).

The **TEMPLATE KIT** consists of a master layout template (aluminum sheet), which is used to locate the bolt holes and center on the actual template which should be made from 1/8" (3 mm) masonite or similar material.

A full-size drawing of the shape to be cut, should be made showing a center point, then add 11/16" (18 mm) to the radius. (Because the torch body drags against the template, adding one-half the diameter of the torch to the drawing will put the center of the torch tip in the right position.)

MAKING THE TEMPLATE

Lay the aluminum master layout template on the masonite board. Transfer the holes from the master by tracing with a pencil or use a quick-drying spray paint. Next, position the oversized drawing, so that the center point is directly over the center on the template and the shape is located symmetrically between the 'leg holes' (see sketch Page 17, number 8. Trace [or spray] the outline onto the template.)

Next, drill the holes in the template. Then, cut-out the outside circle (outside of the template) and the shape to be cut (on the inside).

MOUNTING THE TEMPLATE

The four CIR-9031 spacer legs should be screwed into the ring gear. (Remove existing 2" (50 mm) legs.) The template is then placed on these legs and the 2" (50 mm) legs, or 5" (127 mm) legs, when using the recommended CON-1040 leg and foot assemblies) are screwed - through the template - into the CIR-9031 spacer legs, which clamp the template under and parallel to the ring gear. Insert four round head screws (see sketch Page 17, number 12) through the template - into the alignment bars (see sketch Page 17, number 7.)

SET UP

Place the rod [see sketch Page 17 number 5 in the base post on the carriage. Slip the tensioning assembly (see sketch Page 17, number 6) on the rod. Install machine torch in torchholder - make sure torch is straight up-and-down in both planes. Adjust tensioning assembly so that torch maintains firm contact with template when carriage is rotated. Connect hoses. Place machine on work - locate feet and lock in position.

STARTING THE CUT

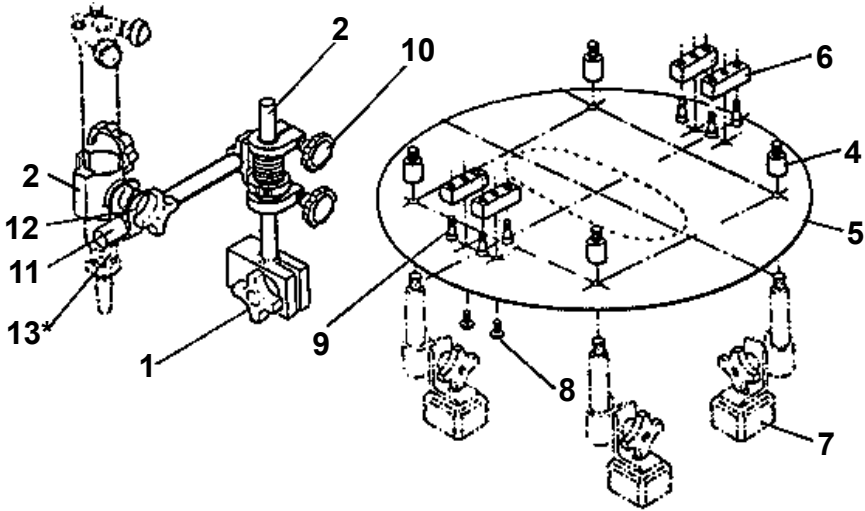
Lock tensioning assembly so that the torch tip is over scrap area, piece - or start the cut in starting hole. When preheat is complete start motor (carriage travel), release tensioning assembly and let it gradually swing to template - (this action 'feathers' the start into the cut.)

TEMPLATE KIT / PARTS LIST

CIR-9030 [FOR CIR-3]

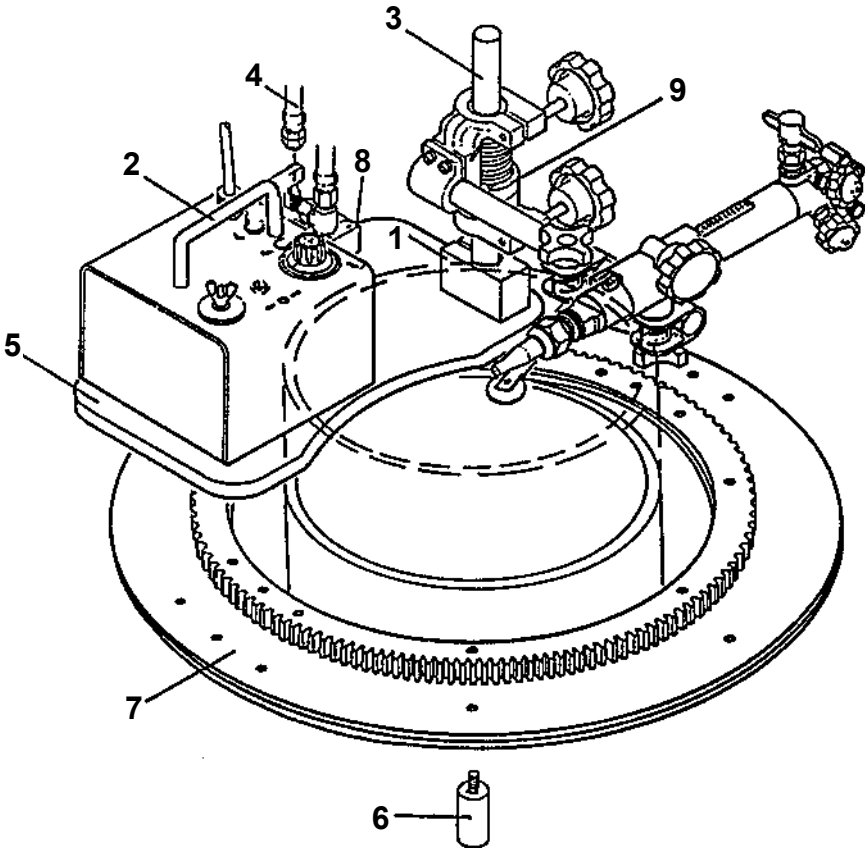
CIR-9040 [FOR CIR-4]

CIR-9050 [FOR CIR-5]



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-2440	Base, Post (Block) - Order separately
2	1	BUG-2915	Torchholder Assembly
3	1	BUG-9180-10	1/8" (22 mm) rod, 10" (254 mm) Long
4	4	CIR-9031	Spacer Leg
5	1	CIR-9032	Aluminum Master Template Guide (For CIR-3)
6	4	CON-1004	Alignment Bars (included with Ring Gear Assembly)
7	4	CON-1040	Magnet Foot and Leg Assembly-Order separately-use of 4 recommended with this kit
8	4	FAS-0257	Rnd Hd Scr 1/4-20 x 3/4"
9	8	FAS-2553	Soc Hd Cap Scr 1/4-20 x 1-1/2" (included with Ring Gear Assembly)
10	1	PAN-1009	Tensioner
11	1	PAN-1018	Rod w/Key-10" (254 mm) Long
12	1	PAN-1033	Rod Clamp
13		-----	Torches are not furnished with kit, order separately

CIR-O WITH ANNULAR CARRIAGE



CIR-3304
CIR-4405
CIR-5506

CIR-0 III w/ANNULAR CARRIAGE
CIR-0 IV w/ANNULAR CARRIAGE
CIR-0 V w/ANNULAR CARRIAGE

<u>ITEM</u>	<u>QTY</u>	<u>PART NO</u>	<u>DESCRIPTION</u>
1	1	BUG-2440	Base, Post (Block)
2	1	BUG-5100-F	DC III Drive Unit Assembly (150: 1)
3	1	BUG-9180-10	7/8" (22 mm) Rod, 10" (254 mm) Long
4	1	CIR-1010-3	Twin Hose Assembly 32" (812 mm) 42" (1066 mm): CIR-1010-4 50" (1270 mm): CIR-1010-5
5	1	CIR-5031	Carriage Plate-Annular
6	4	CON-1003	Leg 2" (50 mm)
7	1	CON-(3,4,5)000	Ring & Gear Assembly
8	1	GOF-3025	2-Hose Quick-Acting Manifold
9	1	PAN-1010	Panograph Assembly with Torchholder

CIR-O SPEED RANGE CHART

Capacities and Speed Ranges

		DIAMETER		DIAMETER		
		INCH	IPM	INCH	IPM	
CIR-III	INSIDE RING	3	.4-8	75	10-210	
		6	.8-16	150	20-420	
		10	.4-28	250	35-700	
		14	2-39	350	50-1000	
	OUTSIDE RING	26	3.5-70	650	90-1805	
		30	4-80	750	105-2100	
		34	4.5-92	850	120-2400	
		38	5.2-105	950	130-2640	
		42	5.7-115	1050	150-3000	
		46	6.3-125	1140	160-3200	
		50	6.8-135	1250	175-3500	
		56	7.6-155	1420	200-4000	
	CIR-IV	INSIDE RING	3	.3-5	75	7-140
			6	.6-11	150	14-280
10			.9-18	250	23-460	
14			1.3-26	350	32-650	
18			1.7-33	450	42-840	
OUTSIDE RING		22	2-40	550	50-1000	
		34	3.2-63	850	80-1600	
		38	3.5-70	950	87-1760	
		42	3.9-78	1050	97-1950	
		46	4.3-85	1150	105-2130	
		50	4.6-93	1250	115-2300	
		54	5-100	1350	125-2500	
		58	5.4-110	1450	135-2700	
		64	6-120	1625	150-3000	
CIR-V	INSIDE RING	3	.2-4	75	5-100	
		6	.4-8	150	10-210	
		10	.7-13	250	17-350	
		14	1-19	350	42-500	
		18	1.3-25	450	32-640	
		22	1.5-30	550	38-760	
		26	1.8-37	650	45-900	
		30	2-41	750	52-1050	
	OUTSIDE RING	42	2.9-57	1050	73-1458	
		46	3.2-63	1150	80-1600	
		50	3.4-68	1250	87-1750	
		54	3.7-75	1350	94-1900	
		58	4-80	1450	100-2000	
		62	4.3-85	1550	105-2150	
66	4.5-90	1650	115-2300			
72	4.9-100	1825	125-2500			

TROUBLESHOOTING GUIDE

PROBLEM	CAUSE	REMEDY
Does not run- Indicator light off.	No power to machine.	Check power line supply voltage. Plug in line cord firmly.
Does not run, indicator light off. Circuit breaker tripped.	Wiring shorts.	Disconnect machine and examine internally; rewire at fault. If none found, throw direction switch to 'OFF', reset breaker and plug in.
	Shorted motor.	If breaker does not trip, replace drive unit.
	Faulty speed control board.	If breaker trips again, replace control board. (OR)
Does not run. indicator light on.	Burned out transformer.	Replace transformer.
	Bad connection.	Check wiring connections, 12 VAC should appear across secondary of transformer. Tighten terminal screws on speed control board.
Unit runs, but no control over speed.	Faulty speed control board.	If DC Volts = 0 across leads to motor; replace control board.
	Faulty speed control board.	Replace control board. (Check connection first).

NOTE:

Make sure unit is pugged into correct voltage.
(120 VAC, 240 VAC, 42 VAC) corresponding to model number rating.

12 VAC should appear across secondary of transformer in all DC III Drive Units.

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.