INSTRUCTIONS AND PARTS MANUAL

VACUUM PUMP W/ TANK

100-1297-120 (120V)

100-1297-240 (240V)

LIT-VAC-TANK-IPM-240723

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.

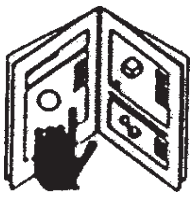
1) The equipment is not waterproof. Using the unit in a wet environment may result in serious injury. Do not touch equipment when wet or standing in a wet location.

2) The unused connectors have power on them. Always keep the unused connectors covered with the supplied protective panels. Operation of the machine without the protective panels may result in injury.

3) Never open the equipment without first unplugging the power cord or serious injury may result.

4) Verify the customer-supplied power connections are made in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.

5) Never remove or bypass the equipment power cord ground. Verify the equipment is grounded in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.



READ INSTRUCTIONS.

Read the instruction manual before installing and using the equipment.

EQUIPMENT DAMAGE POSSIBLE.

1) Do not plug in the power cord without first verifying the equipment is OFF and the cord input voltage is the same as required by the machine or serious damage may result.

2) Always verify both the pinion and wheels are fully engaged before applying power or equipment damage may occur.

3) Do not leave the equipment unattended.

4) Remove from the work site and store in a safe location when not in use.

FALLING EQUIPMENT can cause serious personal injury and equipment damage.

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

MOVING PARTS can cause serious injury.

1) Never try to stop the pinion from moving except by removing power or by using the STOP control.

2) Do not remove any protective panels, covers or guards and operate equipment.

HIGH FREQUENCY WARNINGS

SPECIAL PRECAUTIONS ARE REQUIRED WHEN USING PLASMA, TIG OR ANY WELDING PROCESS THAT USES HIGH FREQUENCY TO STRIKE AN ARC.

WARNING: HIGH FREQUENCY CAN EFFECT MACHINE OPERATION AND THEREFORE, WELD QUALITY.

Read the precautions below before installing and using the equipment.

PRECAUTIONS:

1) Some plasma or welding cables are strong sources of high frequency interference. NEVER lay a plasma or welding cable across the controls of the machine.

2) Always physically separate the plasma or welding cable leads from the machine cables. For example, the plasma or welding cable leads should NEVER be bundled with a pendant cable or the machine power cord. Maximize the separation between any machine cables and the plasma or welding cables.

3) Strictly follow the grounding procedures specified for the plasma or welding unit. NOTE: Some plasma and welding units produce exceptionally large amounts of high frequency noise. They may require a grounding rod be driven into the earth within six feet (2 meters) of the plasma or welding unit to become compatible with an automatic cutting or welding process.

4) If the high frequency is produced using a spark gap, adjust the points so the gap is as small as possible. The larger the gap, the higher the voltage and the higher the interference.

5) Some plasma or welding units will inject high frequency interference into the AC power line. Use separate power line branches whenever possible to power the plasma or welding source and the machine. Do not plug them into the same outlet box.

6) High frequency noise may enter the machine through the plasma or welding supply remote contactor leads. Some plasma and welding sources can produce noise spikes of up to several thousand volts. These sources are not compatible with automated cutting and welding equipment. It is recommended that the remote contactor leads on these plasma or welding sources not be connected to the machine. An alternate solution is to purchase a separate remote contactor isolation box.

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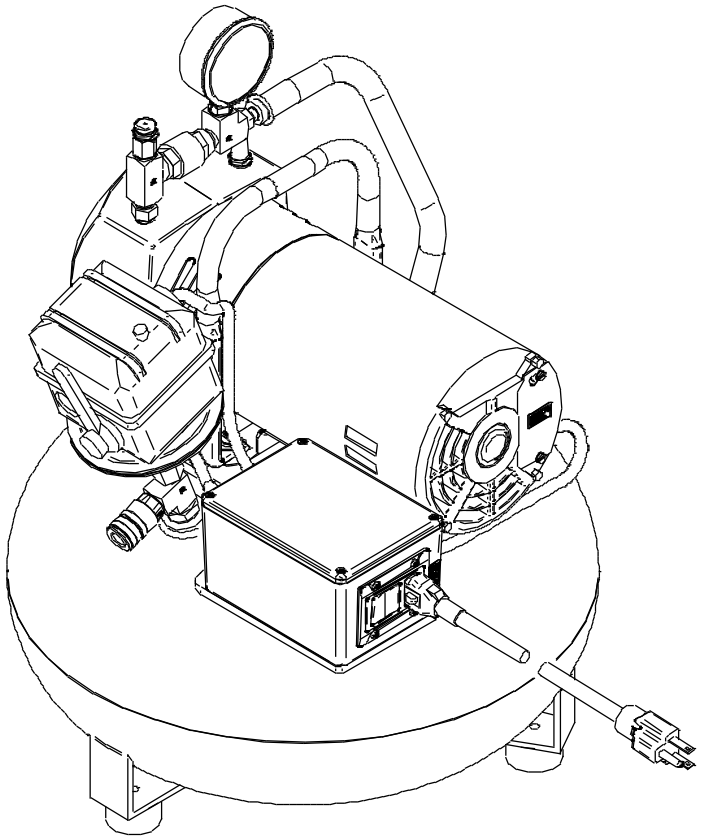
INTRODUCTION

The 100-1297-xxx series vacuum pump with tank was designed to work with Bug-O vacuum rail. The addition of a vacuum tank allows a higher volume of instantaneous vacuum. This helps seating the vacuum cups. The addition of the vacuum switch prolongs the vacuum pump life by reducing the operating temperature of the pump. It accomplishes this by turning the pump on only when more vacuum is needed.

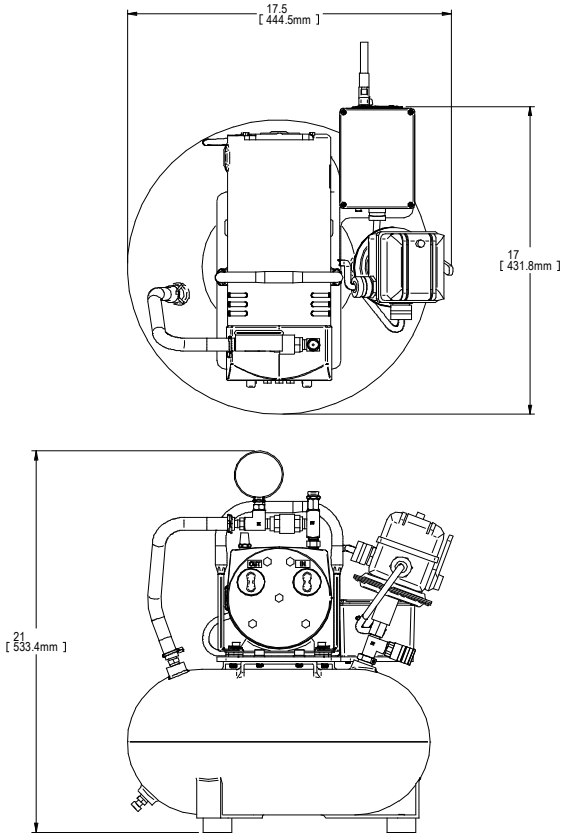
FEATURES

- *Designed for Bug-O vacuum cups and rails*
- *Higher volume of instantaneous vacuum vs tankless system. Vacuum rails seat faster.*
- *Incorporated Vacuum Switch*
- *Longer pump life due to intermittent pump operation and lower pump temperature*
- *Lower energy consumption due to intermittent pump operation.*
- *Easy to Read Gauge*
- *Vacuum Pump can be set to run Continuous or Intermittent*
- *Compact, Stable Design*
- *No Oi, No Mess*
- *4.5 CFM vacuum pump (open flow).*



TECHNICAL DATA

VACCUM PUMP SYSTEM:	*100-1297-120*	VACUUM PUMP ASSEMBLY – 120V 120VAC, 50/60HZ, 1 PHASE, 200W
	100-1297-240	VACUUM PUMP ASSEMBLY – 240V 120VAC, 50/60HZ, 1 PHASE, 200W
SYSTEM WEIGHT:	29.03 kg (64 LB)	
OPERATING TEMPERATURE:	1°C – 40°C (34°F – 104°F)	
VACUUM PUMP RATINGS:	26 inHg (0.88 bar) max. vacuum 4.5 CFM open flow	
VACUUM SWITCH TURN ON:	20 inHg (0.68 bar)	
VACUUM SWITCH TURN OFF:	25 inHg (0.85 bar)	
SYSTEM CAPACITY:	30 BUGO vacuum bars (60 vacuum cups) * *Dependent on the work surface and vacuum cup condition. *It may be possible to use more vacuum bars per pump, but due to wide variability In applications, the system would need to be tested in the application. *Safety straps or other safety devices should be used when rails are used out of position.	



SETUP AND OPERATION

This pump/tank system is available in 120VAC and 240VAC versions.

100-1297-120 is for the 120VAC version.
100-1297-240 is for the 240VAC version.

The pump itself and the power cord are the only items that are voltage specific.

The pump is configured internally at the factory for either 120VAC or 240VAC.
When configured, a sticker is placed on the pump's end plate where the power cord enters the pump. Make sure the pump is set up for the proper voltage by checking this sticker or the model number.

Setup:

1) Make sure the pump is configured for the proper voltage (120VAC or 240VAC)

2) Set the lever on the vacuum switch to **VACUUM & FLOAT**

3) Plug the vacuum pump into the power outlet

4) Let the vacuum build

5) If using with Bug-O vacuum cups and rails, plug in the rails and make sure they are seating properly

Alternate Lever Modes and their pros and cons:

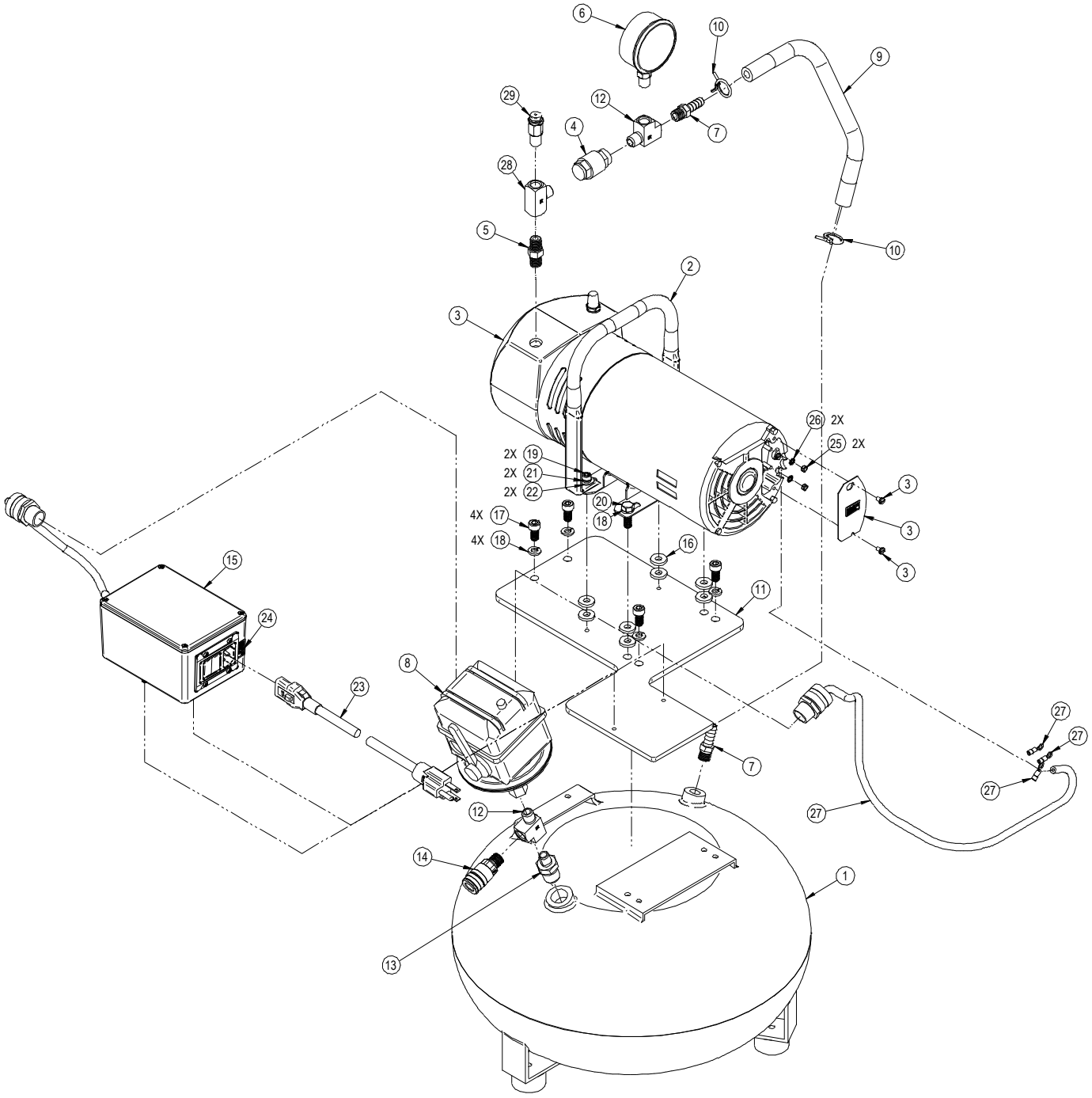
LEVER MODES:

FLOAT ONLY: Do not use. This is for compressed air use. The vacuum pump will not turn on if the lever is in this mode!!!

VACUUM AND FLOAT: This is the standard lever location. In this location, the pump is turned on at the low pressure setting and off at the high-pressure setting. Using it in this mode saves motor life and energy.

CONTINUOUS: This mode is used in cases where the pump needs to always be on. There will be a little more vacuum as the pump will always pump to its limit. The pump will run hotter and use more energy.

100-1297-120 VACUUM PUMP ASSEMBLY – 120V EXPLODED VIEW / PARTS LIST

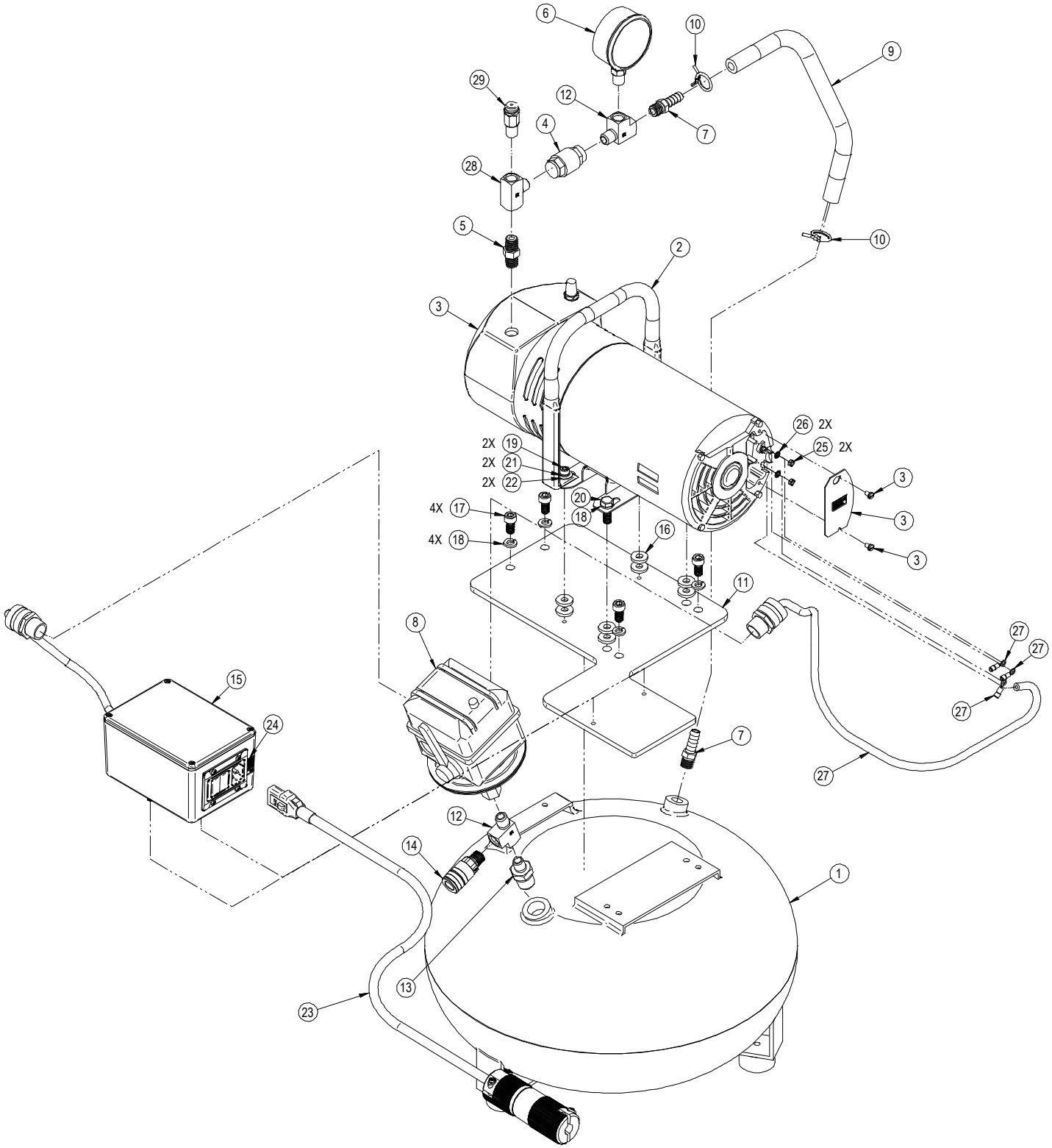


100-1297-120 VACUUM PUMP ASSEMBLY – 120V EXPLODED VIEW / PARTS LIST (CONT'D)

PARTS LIST			
ITEM	PART #	DESCRIPTION	QTY
1	100-1332	AIR TANK , PANCAKE, 5 GAL - MODIFIED	1
2	ARV-2013	HANDLE	1
3	100-1303-120	VACUUM PUMP - 120V	1
4	ARV-2016	1/4 NPT BRASS CHECK VALVE	1
5	ARV-1125	1/4 NPT CLOSE NIPPLE BRASS	1
6	ARV-1002	VACUUM GAUGE 1/4 NPT	1
7	ARV-1107	3/8 HOSE BARB X 1/4 NPT-M	2
8	100-1288	DPST VACUUM SWITCH, DIFFERENTIAL: 5" TO 10" HG	1
9	ARV-1004-12	HOSE 12	1
10	ARV-1005	SINGLE WIRE HOSE CLIP	2
11	100-1291	MOUNTING PLATE	1
12	100-1293	BRANCH TEE, FNPT x FNPT x MNPT, 1/4"	2
13	100-1300	1/2" to 1/4" HEX NIPPLE	1
14	100-1287	QUICK-CONNECT AIR HOSE SOCKET	1
15	100-1316	POWER ENTRY BOX ASSEMBLY	1
16	100-1296	NYLON REINFORCED NEOPRENE RUBBER WASHER	8
17	FAS-3102	SOC HD CAP SCR M8 X 16	4
18	WAS-0251	5/16" SPLIT LOCK WASHER	6
19	MET-0579-SS	SOC HEAD CAP SCREW M6 X 20	2
20	MET-2382-SS	HEX HD CAP SCR M8 X 25	2
21	WAS-5571-SS	M6 LOCKWASHER	2
22	WAS-0240-SS	1/4" SAE FLAT WASHER	2
23	BUG-9454	V-LOCK 110VAC CORD 2M	1
24	BUG-9234	LABEL, 120V	1
25	FAS-1320	HEX NUT 8-32	2
26	WAS-0221	#8 INTERNAL STAR LOCKWASHER	2
27	100-1335	VACUUM SWITCH-TO-PUMP CABLE	1
28	100-1292	STREET TEE, FNPT x MNPT x FNPT, 1/4"	1
29	ARV-2017	1/4" BRASS VACUUM RELIEF VALVE	1

* 100-0427-1 (1) - NON-CE NAME PLATE - (NOT SHOWN)

100-1297-240 VACUUM PUMP ASSEMBLY – 240V EXPLODED VIEW / PARTS LIST

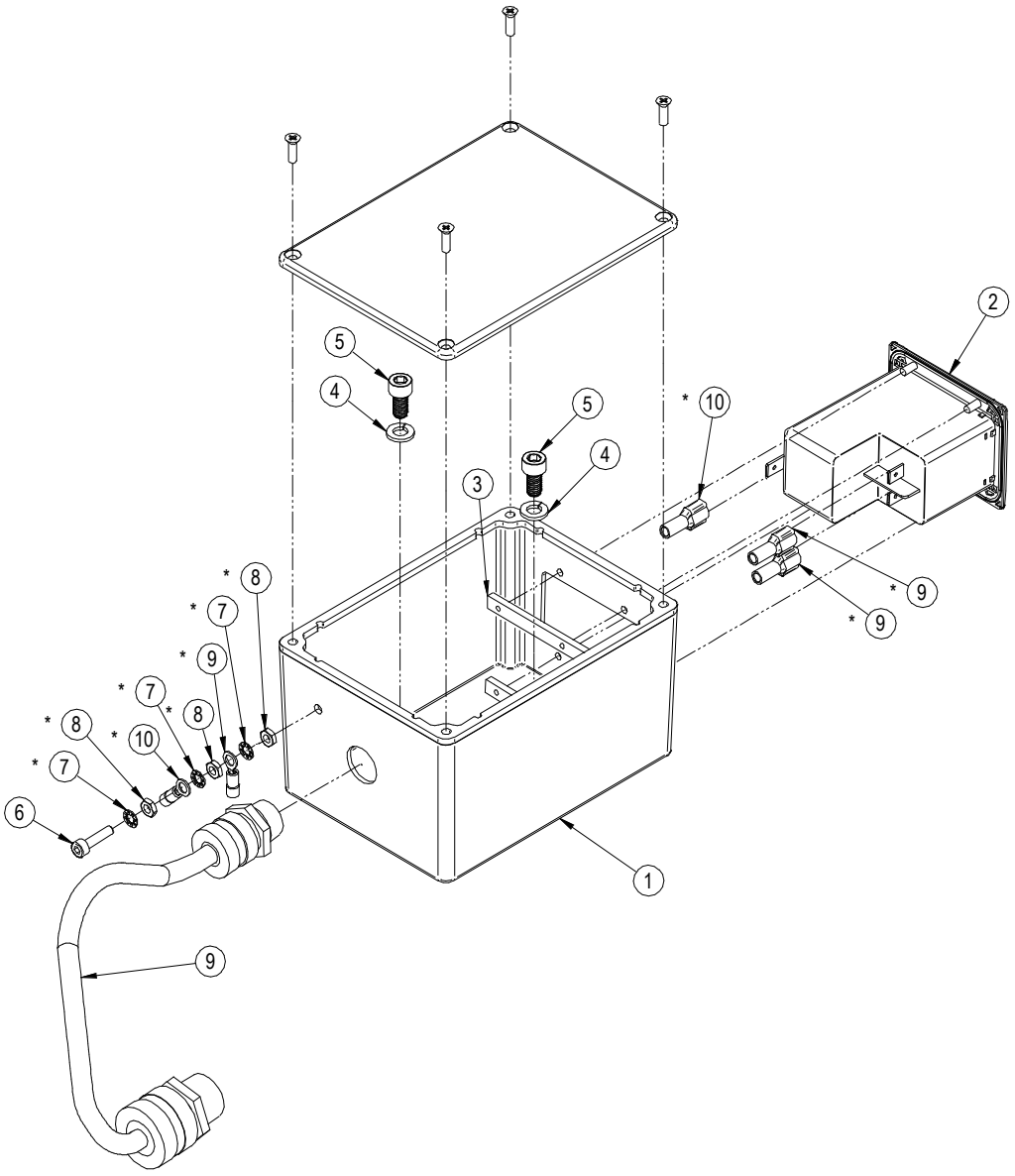


100-1297-240 VACUUM PUMP ASSEMBLY – 240V EXPLODED VIEW / PARTS LIST (CONT'D)

PARTS LIST			
ITEM	PART #	DESCRIPTION	QTY
1	100-1332	AIR TANK , PANCAKE, 5 GAL - MODIFIED	1
2	ARV-2013	HANDLE	1
3	100-1303-240	VACUUM PUMP - 240V	1
4	ARV-2016	1/4 NPT BRASS CHECK VALVE	1
5	ARV-1125	1/4 NPT CLOSE NIPPLE BRASS	1
6	ARV-1002	VACUUM GAUGE 1/4 NPT	1
7	ARV-1107	3/8 HOSE BARB X 1/4 NPT-M	2
8	100-1288	DPST VACUUM SWITCH, DIFFERENTIAL: 5" TO 10" HG	1
9	ARV-1004-12	HOSE 12	1
10	ARV-1005	SINGLE WIRE HOSE CLIP	2
11	100-1291	MOUNTING PLATE	1
12	100-1293	BRANCH TEE, FNPT x FNPT x MNPT, 1/4"	2
13	100-1300	1/2" to 1/4" HEX NIPPLE	1
14	100-1287	QUICK-CONNECT AIR HOSE SOCKET	1
15	100-1316	POWER ENTRY BOX ASSEMBLY	1
16	100-1296	NYLON REINFORCED NEOPRENE RUBBER WASHER	8
17	FAS-3102	SOC HD CAP SCR M8 X 16	4
18	WAS-0251	5/16" SPLIT LOCK WASHER	6
19	MET-0579-SS	SOC HEAD CAP SCREW M6 X 20	2
20	MET-2382-SS	HEX HD CAP SCR M8 X 25	2
21	WAS-5571-SS	M6 LOCKWASHER	2
22	WAS-0240-SS	1/4" SAE FLAT WASHER	2
23	BUG-9454-240	V-LOCK POWER CORD, 240V	1
24	BUG-9233	LABEL, 240V	1
25	FAS-1320	HEX NUT 8-32	2
26	WAS-0221	#8 INTERNAL STAR LOCKWASHER	2
27	100-1335	VACUUM SWITCH-TO-PUMP CABLE	1
28	100-1292	STREET TEE, FNPT x MNPT x FNPT, 1/4"	1
29	ARV-2017	1/4" BRASS VACUUM RELIEF VALVE	1

* 100-0427-1 (1) - NON-CE NAME PLATE - (NOT SHOWN)

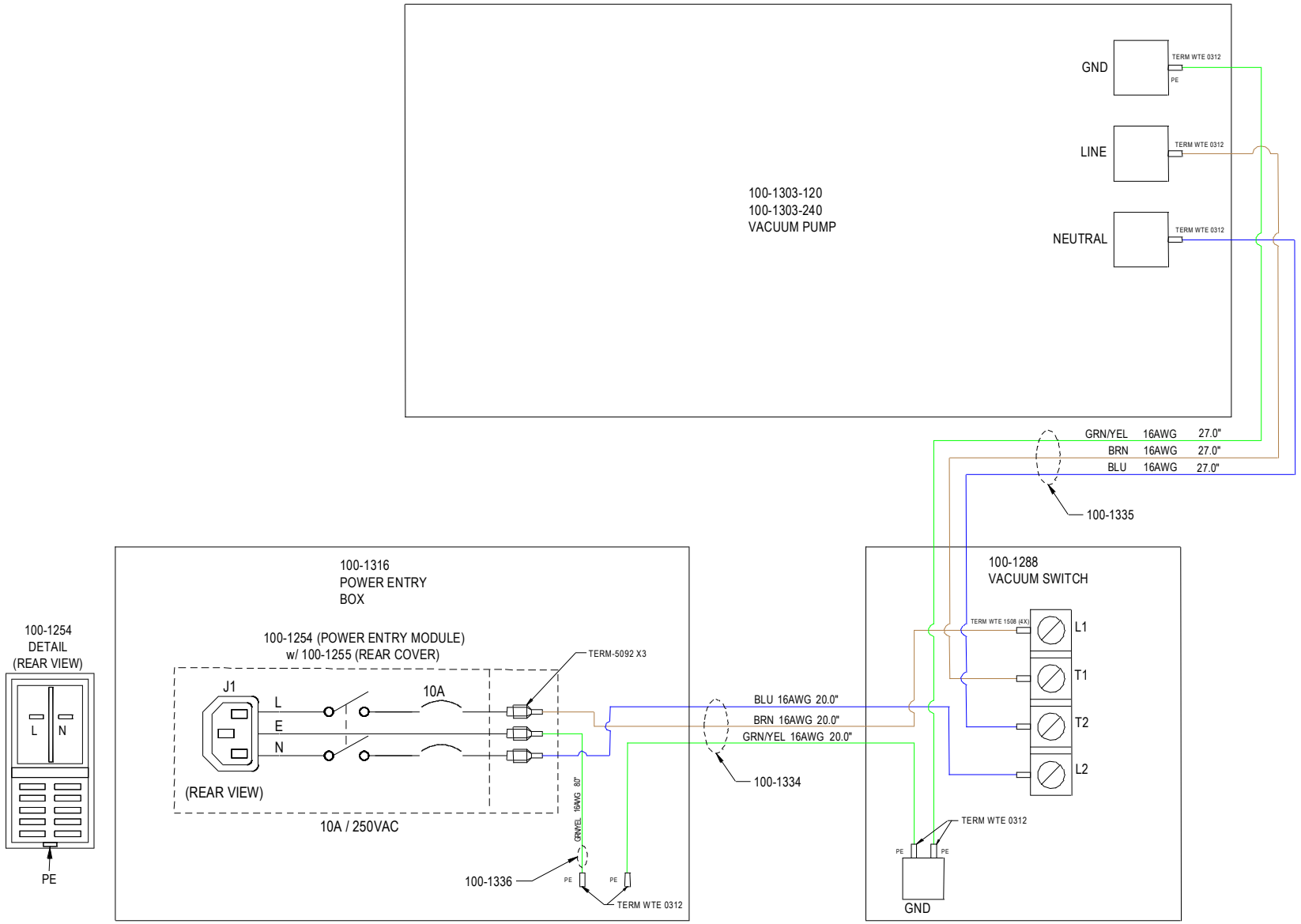
100-1316 POWER ENTRY BOX ASSEMBLY – EXPLODED VIEW / PARTS LIST



PARTS LIST			
ITEM	PART #	DESCRIPTION	QTY
1	100-1315	MACHINED POWER ENTRY BOX ENCLOSURE	1
2	100-1254	POWER ENTRY MODULE, 10A, 250VAC	1
3	100-1340	POWER ENTRY MODULE NUT PLATE	1
4	WAS-5571-SS	M6 LOCKWASHER	2
5	MET-0574-SS	SOC HD CAP SCR M6 x 12	2
6	MET-0577-SS	SOC HD CAP SCR M4 X 16	1
7	WAS-5552-SS	LOCKWASHER, M4 INTERNAL STAR	3
8	MET-1350-SS	M4 HEX NUT (STAINLESS STEEL)	3
9	100-1334	VACUUM SWITCH-TO-POWER ENTRY CABLE	1
10	100-1336	GROUND HARNESS 8"	1

(*) - ITEM IS INSTALLED INSIDE OF ENCLOSURE

100-1297-XX-WD VACUUM PUMP – WIRING DIAGRAM



VACUUM SWITCH (100-1288) – SETUP AND MAINTENANCE

DESCRIPTION:
The vacuum switch is a 2-Pole, NEMA 1 enclosure switch for controlling vacuum pumps. The vacuum switch includes a 3-way lever plus nameplate with marking:
Float only—Vacuum and Float---Continuous (factory modification only)

LEVER MODES:

FLOAT ONLY:	**Do not use. This is for compressed air use. The vacuum pump will not turn on if the lever is in this mode!!!**
VACUUM AND FLOAT:	This is the standard lever location. In this location, the pump is turned on at the low pressure setting and off at the high-pressure setting. Using it in this mode saves motor life and energy.
CONTINUOUS:	This mode is used in cases where the pump needs to always be on. There will be a little more vacuum as the pump will always pump to its limit. The pump will run hotter and use more energy.

FACTORY SETTINGS:

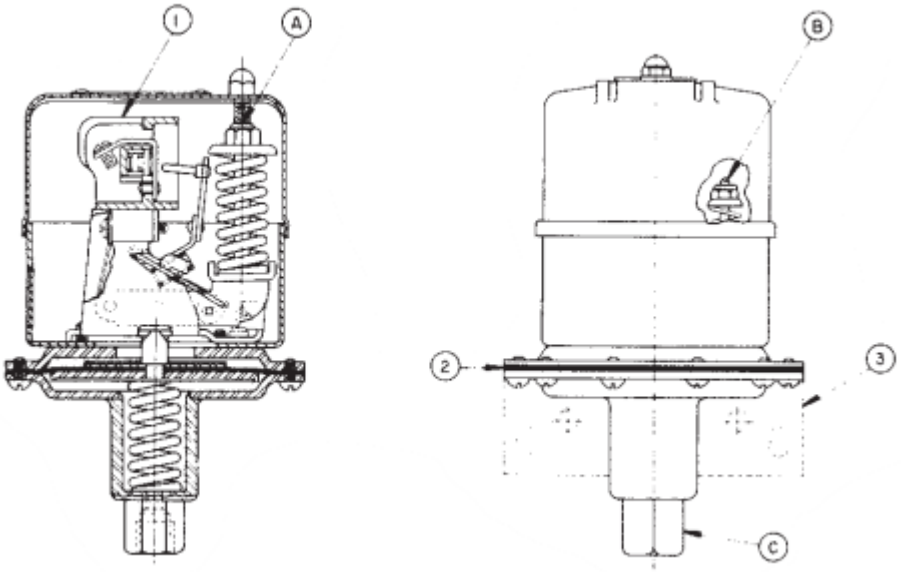
VACUUM SWITCH TURN ON:	20 inHg (0.68 bar)
VACUUM SWITCH TURN OFF:	25 inHg (0.85 bar)

VACUUM SWITCH ADJUSTMENT:

This vacuum switch is set close to the limits of the pump at the factory. It should never need to be adjusted. The vacuum adjustment procedure below can be used to decrease or otherwise adjust the level of vacuum if desired.

***** HAZARDOUS VOLTAGE *****
*** Disconnect all Power before working on equipment. ***
***** Failure to follow this instruction will result in death or serious injury. *****

VACUUM SWITCH (100-1288) – SETUP AND MAINTENANCE (Cont'd)



ADJUSTMENT (RANGE):
Adjust the range spring nut (A) first until the desired vacuum operating point is obtained (see Figure 1). This adjustment changes both the high and low operating points but should always be set the higher vacuum operating point. Turn the nut clockwise to decrease (lower vacuum) both operating points. The range spring nut (A) adjusts the high and low operating points simultaneously. It does not change the differential.

DIFFERENTIAL:
The differential spring nut (B) adjusts the lower vacuum point (see Figure 1), changing the operation range. Turn the nut clockwise to decrease the lower vacuum point.

100-1303-120 (-240) VACUUM PUMP – TROUBLESHOOTING/MAINTENANCE

START UP

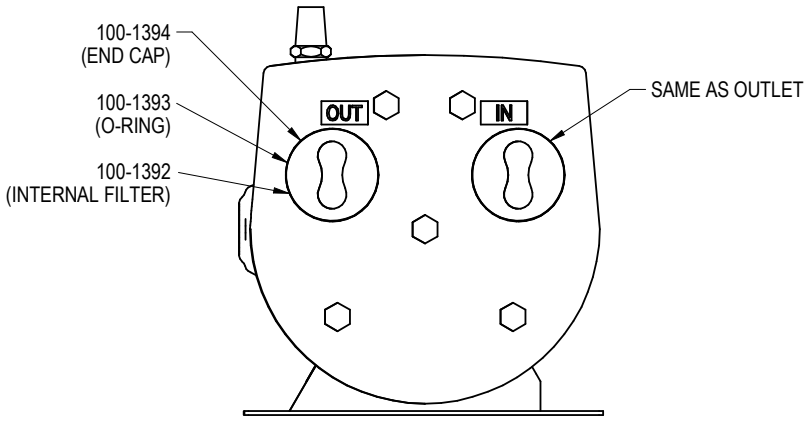
If the motor fails to start or slows down significantly under load, shut off and disconnect from power supply. Check that the voltage is correct to the motor.

GENERAL MAINTENANCE

1 – Remove end cap and filters. Inspect filters for rips, tears, cuts, brittleness, and excessive foreign material.
2 – Clean filters if in good condition with compressed air. Re-inspect for wear conditions. Set filters aside.
3 – Check filter for compacted debris. If debris is present, replace filter.
4 – Check condition of O-ring for end cap. It should not be soft and flexible. Replace if it is not.
6 – Check gasket for cracks or tears. Install new gasket.
8 – Reinstall filters or install new filters if required. Reinstall end cap.
9 – Check vacuum hoses and suction cups for cracks and leaks.

EVERY 2 YEARS

It is recommended every two years to rebuild/service the pump using the 100-1395 PUMP SERVICE KIT. This kit returns the pump to the original factory performance specifications.



REPLACEMENT PARTS

100-1392	INTERNAL FILTER, VACUUM PUMP
100-1393	0-RING, VACUUM PUMP
100-1394	END CAP, VACUUM PUMP
100-1395	PUMP SERVICE KIT
	Included in the kit are 4 vanes, 1 GASKET, 2 FILTERS, 2 O-RINGS and instructions.

100-1303-120 (-240) VACUUM PUMP – TROUBLESHOOTING/MAINTENANCE (CONT'D)

TROUBLE-SHOOTING ITEMS TO CHECK FIRST

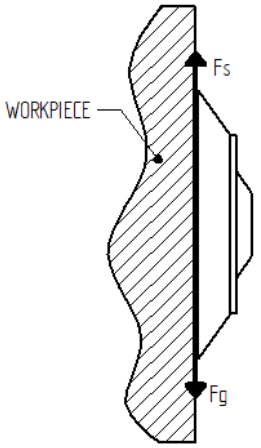
1) Make sure circuit breaker is not tripped. The switch incorporates a circuit breaker. Reset it by turning the power switch off and then back on.
2) Float switch must be in VACUUM & FLOAT mode or CONTINUOUS. If it is in FLOAT ONLY, the vacuum pump will never turn on.
3) Make sure none of the cables are not damaged.
4) For general vacuum pump checks, see the chart below.

TROUBLESHOOTING CHART

Low Vacuum		High Vacuum		Pump Overheat	Motor Overload	Reason and remedy for problem.
●		At pump		●	●	Filter dirty. Clean or replace.
●		At pump		●	●	Vacuum line collapsed. Repair or replace.
●						Relief valve set too low. Inspect and adjust.
●		At pump		●	●	Plugged vacuum/pressure line. Inspect and repair.
●						Vanes sticking. Clean or replace.
●						Vanes worn. Replace.
●						Shaft seal worn. Replace.
●				●	●	Dust or offset powder in pump. Inspect and clean.
●				●	●	Motor not wired correctly. Check wiring diagram and line voltage.

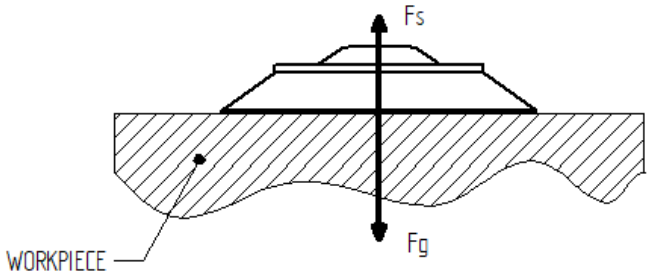
SUCTION CUP RATINGS

LOAD CASE 1 – (VERTICAL MOUNT)



HOLDING POWER	WORKPIECE MATERIAL
12.2 kg (26.9 LB)	Maximum mass per cup for smooth and dense workpiece
1.8 kg (4.1 LB)	Maximum mass per cup for porous, rough, or oiled workpiece

LOAD CASE 2 – (HORIZONTAL MOUNT)



HOLDING POWER	WORKPIECE MATERIAL
24.5 kg (54 LB)	Maximum mass per cup for smooth and dense workpiece
18.5 kg (40.8 LB)	Maximum mass per cup for porous, rough, or oiled workpiece

DISCLAMER:

The ratings above are calculated values using 1 bar ambient pressure and a 0.65 bar system vacuum. These values are for informational purposes only and they assume the suction cups are in excellent condition. As all applications are different, the vacuum system must be approved for the application by the end user's company safety standards. Safety straps or other safety devices should be used when rails are used out of position.