



Small Part Sandblasting

Using Portable Single-Stage Air Compressor
per Anthony Rowe ©2022

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Personal Protective Equipment


<p>Leather Gloves to Forearm</p>	<p>Required</p>	
<p>Breathing Protection</p>	<p>Required</p>	
<p>Eye and Face Protection</p>	<p>Required</p>	
<p>Ear Protection</p>	<p>Required</p>	

<p>Closed-Toed Safety Boots</p>	<p>Required</p>	
<p>Clothing Protection</p>	<p>Optional</p>	



Prerequisite Safety Training

<p>OSHA3697</p>	<p>Protecting Workers from the Hazards of Abrasive Blasting Materials</p>	<p>OSHA Fact Sheet</p>
<p>ANSI/ASSP Z9.4-2011 (R2021)</p>	<p>Abrasive-Blasting Operations - Ventilation and Safe Practices for Fixed Location Enclosures</p>	<p>American Society of Safety Engineers</p>





Parts


<p>Rear Axle Bolt</p>	<p>Any small part in need of surface rehabilitation</p>	
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Tools and Equipment


<p>Portable Single-Stage Air Compressor</p>	<p>Capable of at least 10-20 Cubic Feet per Minute (CFM) of airflow; determined by several factors. Chart is located in Troubleshooting Reference section.</p>	
<p>Air Hose</p>	<p>Connects from compressor to base of gun frame.</p>	

<p>Media Hose</p>	<p>Connects from gun venturi chamber to hand-siphon (buried in abrasive blast media).</p> <p>Shortening the media hose can improve sand flow.</p> <p>It takes more suction to draw sand through a longer hose.</p>	
<p>Sandblasting Gun</p>	<p>Left-to-right, image shows nozzle, venturi chamber with media hose, and gun frame with fitting for air hose quick-release.</p>	
<p>Disposable Nozzle</p>	<p>These must be regularly replaced because of abrasive wear.</p> <p>#4 to #8 (1/4" to 1/2" orifice) nozzle is 3 times the diameter range of the 40/70 grit glass bead blast media.</p> <p>In general, a smaller orifice will generate more pressure at the nozzle.</p>	
<p>Fitting for Quick-Release</p>	<p>Allows air hose's quick-release fitting to connect to gun frame.</p>	

<p>Hand-Siphon</p>	<p>Attaches to the end of media hose, draws abrasive blast media (sand) from its container.</p>	
<p>Heavy-Gauge Outdoor Extension Cord</p>	<p>At least 14 AWG.</p>	
<p>Adjustable Pliers</p>	<p>For assembling and disassembling gun components.</p>	
<p>Adjustable Wrench</p>	<p>For assembling and disassembling gun components.</p>	

<p>Allen Wrench</p>	<p>For assembling and disassembling gun components.</p>	
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Materials

<p>Abrasive Blast Media (Sand)</p>	<p>Eastwood 1377910LBS Ground glass, 40/70 grit (particles ranging from .0165" to .0083" in diameter).</p>	
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Procedure

Step 1: Prepare to Assemble Gun

1.) Prepare to assemble, from left to right:

- Nozzle
- Venturi chamber, hose-clamped to media hose
- Gun frame with fitting for quick-release



Step 2: Install Nozzle into Venturi Chamber

1.) Fit selected nozzle into venturi chamber.

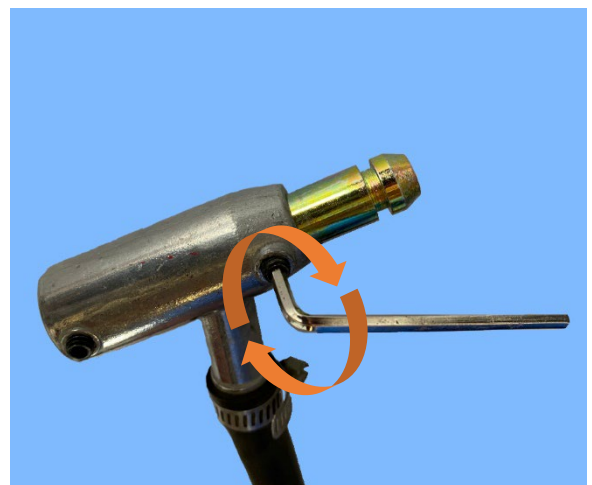
- Start Allen key to hold nozzle in place
- *Clockwise*



Step 3: Tighten Nozzle Allen Key

1.) Securely tighten nozzle Allen key.

- *Clockwise*
- Using Allen wrench



Step 4: Install Gun Frame

- 1.) Fit gun frame into venturi chamber.
 - Start Allen key to hold gun frame in place
 - *Clockwise*

**Step 5: Tighten Gun Frame Allen Key**

- 1.) Securely tighten gun frame Allen key.
 - *Clockwise*
 - Using Allen wrench

**Step 6: Attach Hand-Siphon to Hose**

- 1.) Attach hand-siphon to media hose.
 - Insert narrow end of hand-siphon into hose.
 - Tighten hose clamp.



Step 7: Access Drain Port

- 1.) Turn tank on its side to enable access to drain port.
 - i** Drain port will probably be open.
 - i** Port in extended position is closed; port in compacted position is open.
- 2.) If drain port is NOT open, turn *counter-clockwise* to open it.
- 3.) Drain any remaining condensed moisture.



Step 8: Close Drain Port

- 1.) Turn drain port *clockwise* to close securely.



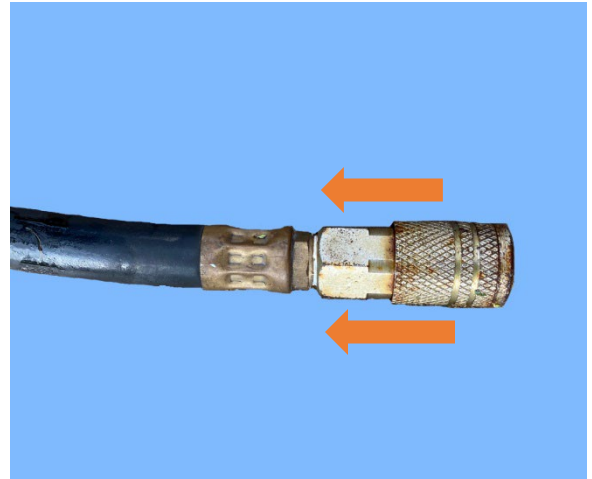
Step 9: Attach Air Hose to Compressor

- 1.) Pull/compress spring-loaded **quick-release fitting** on air hose *toward* hose.
- 2.) Insert air hose fitting onto **compressor air outlet**.
- 3.) **Let go** of quick-release fitting.
- 4.) Gently pull air hose away from compressor to **verify connection**.



Step 10: Attach Air Hose to Gun

- 1.) Grab quick-release fitting.
- 2.) Pull/compress spring-loaded fitting *toward* hose.



Step 11: Join Fittings

- 1.) Continue holding fitting compressed toward hose.
- 2.) Insert gun frame fitting into quick-release fitting.



Step 12: Let Go of Quick-Release

- 1.) Let go of spring-loaded quick-release fitting.
i Hose fitting will move back into place and will secure connection with gun fitting.
- 2.) Gently pull gun and hose away from each other to **verify** connection.

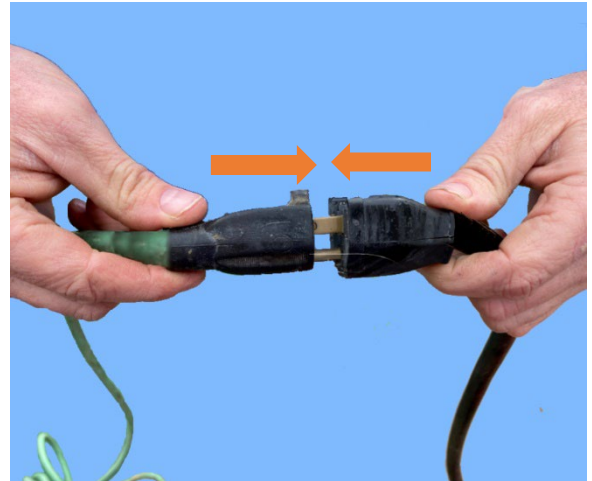


Step 13: Confirm Motor Switch is OFF

- 1.) Confirm that **red motor switch** is in OFF position:
 - O position for open circuit

**Step 14: Plug Compressor into Cord**

- 1.) Connect **compressor cord to extension cord**.
 - *Before* plugging extension cord into outlet

**Step 15: Plug Cord into Outlet**

- 1.) Plug extension cord into electrical outlet.



Step 16: Output, Tank Pressure at 0 psi

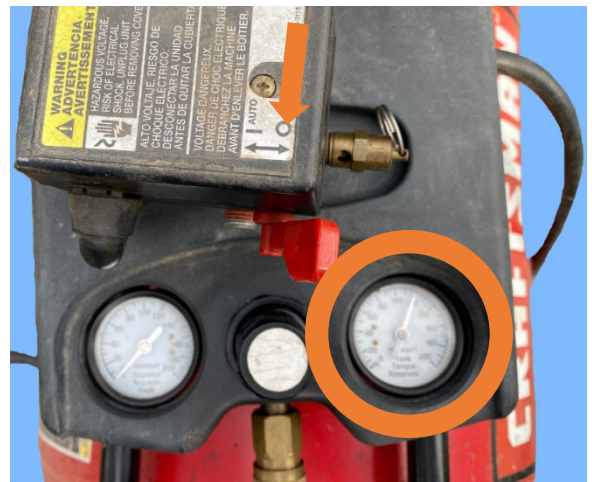
- 1.) Confirm dial readings on compressor control panel:
 - Output pressure dial, on *left*, will be at 0 psi
 - Tank pressure dial, on *right*, will be at 0 psi
- 2.) If NOT, pull ring on pop-up valve to release pressure.

**Step 17: Switch Motor to ON**

- 1.) Move motor switch to ON:
 - | position for closed circuit

**Step 18: Tank Pressure to 115-120 psi**

- 1.) Allow motor to run and increase tank pressure.
- 2.) When tank pressure, on *right*, reaches 115-to-120 psi, switch motor OFF:
 - O position for open circuit



Step 19: Hand-Siphon into Sand

- 1.) Bury intake opening of hand-siphon in abrasive blast media (sand).



Step 20: Open Output Pressure Valve

- 1.) Turn output pressure valve *counter-clockwise* to open pressure to gun.



Step 21: Switch Motor to ON

- 1.) Move motor switch to ON:
 - | position for **closed** circuit



Step 22: Output Pressure to 100 psi

- 1.) Allow output pressure to increase to **at least 100 psi**.
 - See the “Siphon Blast CFM Consumption” chart in the Troubleshooting Reference Section.

**Step 23: Activate Gun Toward Part**

- 1.) When output pressure reaches at least **100 psi**, pull on gun trigger to blast sand at rear axle bolt.

**Step 24: Completely Blast Part Surface**

- 1.) Blast and rehabilitate **complete surface** of rear axle bolt.



Step 25: Switch Motor to OFF

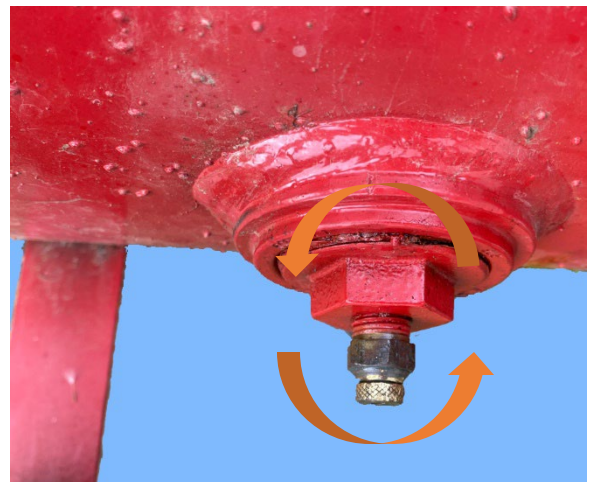
- 1.) Move red motor switch to OFF:
 - O position for open circuit

**Step 26: Release Remaining Pressure**

- 1.) Pull ring to open pop-up valve.
 - i** Any remaining pressure will vent outward.

**Step 27: Open Drain Port**

- 1.) Turn drain port *counter-clockwise* to open.
 - Allow condensed moisture to drain from tank.
 - i** Port in extended position is closed; port in compacted position is open.



Step 28: Teardown

- 1.) Unplug extension cord from outlet.
- 2.) Unplug compressor from extension cord.
- 3.) Remove hand-siphon from sand container.
- 4.) Disconnect air hose from gun.
 - Compress spring-loaded quick-disconnect fitting to release gun.
- 5.) Disconnect air hose from compressor.
 - Compress spring-loaded quick-disconnect fitting to release fitting.
- 6.) Disassemble gun frame from venturi chamber.



Step 29: Cleanup

- 1.) Wipe and store gun components.
- 2.) Roll up and store extension cord and hoses.
- 3.) Securely close sand container lid and store.
- 4.) Return compressor to its storage location.
- 5.) Return tools to their storage locations.

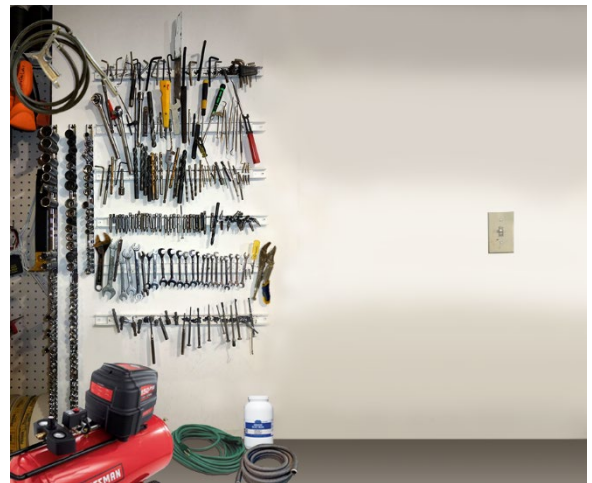


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Troubleshooting Reference

Problem 1: Tank Pressure Does Not Rise with Motor ON

- Is drain port closed?
- Is output pressure valve closed?

Problem 2: Output Pressure Does Not Rise with Motor ON

- Is output pressure valve open?
- Is drain port closed?

Problem 3: Sand Does Not Flow

You have to create **airflow**, in units of Cubic Feet per Minute (**CFM**), in order to have enough suction to carry sand from the media container through the nozzle of the gun: around **10-to-20 CFM**.

- Is the hole size in your nozzle optimal, compared to the size of the blast media?
- Are your compressor's tank size, motor, and pump capable of creating 10-to-20 CFM of airflow/suction?
- Is your hose too long?
- Is the end of your hand-siphon well-engaged and buried in the blast media?
 - Move the hand-siphon up-and-down to keep its supply of sand constant. If it remains in one location, it will evacuate all of the sand within its reach and then will lose suction.
- Is your compressor consistently maintaining the minimum pressure required to keep the pop-up valve from opening?
 - If the end-result of all of the above factors is that you are releasing more air from the nozzle than can be replaced by the compressor, the pop-up valve will unseal and release all the pressure. No sand will be carried through the nozzle.



COMPRESSED AIR REQUIREMENT AND ABRASIVE CONSUMPTION CHART

Nozzle Orifice	Pressure at the Nozzle (psi)								Air (In cfm) Abrasive HP requirements
	50	60	70	80	90	100	125	140	
No. 2 (1/8")	11	13	15	17	18.5	20	25	28	Air (cfm)
	.67	.77	.88	1.01	1.12	1.23	1.52	1.70	Abrasive (cu.ft/hr)
	67	77	88	101	112	123	152	170	lbs/hr
	2.5	3	3.5	4	4.5	5	5.5	6.2	Compressor hp
No. 3 (3/16")	26	30	33	38	41	45	55	62	Air (cfm)
	1.5	1.71	1.96	2.16	2.38	2.64	3.19	3.57	Abrasive (cu.ft/hr)
	150	171	196	216	238	264	319	357	lbs/hr
	6	7	8	9	10	10	12	13	Compressor hp
No. 4 (1/4")	47	54	61	68	74	81	98	110	Air (cfm)
	2.68	3.12	3.54	4.08	4.48	4.94	6.08	6.81	Abrasive (cu.ft/hr)
	268	312	354	408	448	494	608	681	lbs/hr
	11	12	14	16	17	18	22	25	Compressor hp
No. 5 (5/16")	77	89	101	113	126	137	168	188	Air (cfm)
	4.68	5.34	6.04	6.72	7.40	8.12	6.08	6.81	Abrasive (cu.ft/hr)
	468	534	604	672	740	812	608	681	lbs/hr
	18	20	23	26	28	31	22	25	Compressor hp
No. 6 (3/8")	108	126	143	161	173	196	237	265	Air (cfm)
	6.68	7.64	8.64	9.60	10.52	11.52	13.93	15.6	Abrasive (cu.ft/hr)
	668	764	864	960	1052	1152	1393	1560	lbs/hr
	24	28	32	36	39	44	52	58	Compressor hp
No. 7 (7/16")	147	170	194	217	240	254	314	352	Air (cfm)
	8.96	10.32	11.76	13.12	14.48	15.84	19.31	21.63	Abrasive (cu.ft/hr)
	896	1032	1176	1312	1448	1584	1931	2163	lbs/hr
	33	38	44	49	54	57	69	77	Compressor hp
No. 8 (1/2")	195	224	252	280	309	338	409	458	Air (cfm)
	11.60	13.36	15.12	16.80	18.56	20.24	24.59	27.54	Abrasive (cu.ft/hr)
	1160	1336	1512	1680	1856	2024	2459	2754	lbs/hr
	44	50	56	63	69	75	90	101	Compressor hp

*Consumption rates are based on abrasives that weigh 100 pounds per cubic foot.

Figure 1. Compressed Air Requirement and Abrasive Consumption Chart

Credit: [https://sandblastingmachines.com/blog/understanding-sandblasting-compressor-size-requirements-/](https://sandblastingmachines.com/blog/understanding-sandblasting-compressor-size-requirements/) (SandblastingMachines.com)

TROUBLESHOOTING

SIPHON BLAST CFM CONSUMPTION										
NOZZLE SIZE	AIR JET ORIFICE	CFM CONSUMPTION AT SPECIFIC PRESSURES								
		30 PSI	40 PSI	50 PSI	60 PSI	70 PSI	80 PSI	90 PSI	100 PSI	120 PSI
1/8" (#2)	1/16"	2.45	3.00	3.55	4.10	4.65	5.20	5.74	6.70	7.60
3/16" (#3)	3/32"	5.52	6.79	8.00	9.22	10.48	11.68	12.90	14.4	17.10
1/4" (#4)	7/64"	7.66	9.41	11.13	12.80	14.55	16.20	17.94	19.65	25.00
1/4" (#4)	1/8"	9.80	12.03	14.26	16.39	18.62	20.76	22.99	25.00	30.00
5/16" (#5)	5/32"	15.31	18.80	22.28	25.61	29.09	32.43	35.92	40.00	49.00
3/8" (#6)	3/16"	22.11	27.16	32.01	36.86	41.90	46.85	51.60	56.00	66.00
1/2" (#8)	1/4"	39.28	48.11	56.84	65.57	74.40	83.13	91.95	102.00	120.00

Custom size siphon air jets available for special air flow requirements

Figure 2. Siphon Blast CFM Consumption Chart

Credit: <https://mediablast.com/air-consumption-rates/> (MBA: Media Blast & Abrasive, Inc.)

Sandblasting Nozzle Sizing Chart

Use The Chart Below To Find Your Nozzle Bore Size:

- #2 Nozzle has a 1/8" orifice (3.2mm)
- #3 Nozzle has a 3/16" orifice (4.8mm)
- #4 Nozzle has a 1/4" orifice (6.35mm)
- #5 Nozzle has a 5/16" orifice (8mm)
- #6 Nozzle has a 3/8" orifice (9.5mm)
- #7 Nozzle has a 7/16" orifice (11.1mm)
- #8 Nozzle has a 1/2" orifice (12.7mm)
- #10 Nozzle has a 5/8" orifice (16mm)
- #12 Nozzle has a 3/4" orifice (19mm)

Use The Chart Below To Find Your Minimum Nozzle Bore Size For Different Blasting Grits:

- 3060 grit = Minimum nozzle bore size of 1/8"
- 2040 = Minimum nozzle bore size of 3/16"
- 16/20, 1240 = Minimum nozzle bore size of 1/4"
- **As a general rule, your nozzle orifice should be 3 times the size of the grit, MINIMUM.**

Figure 3. Sandblasting Nozzle Sizing Chart

Credit: <https://sandblastingabrasives.com/sandblasting-nozzle-sizing-chart.html> (Industrial Supply, Inc.)

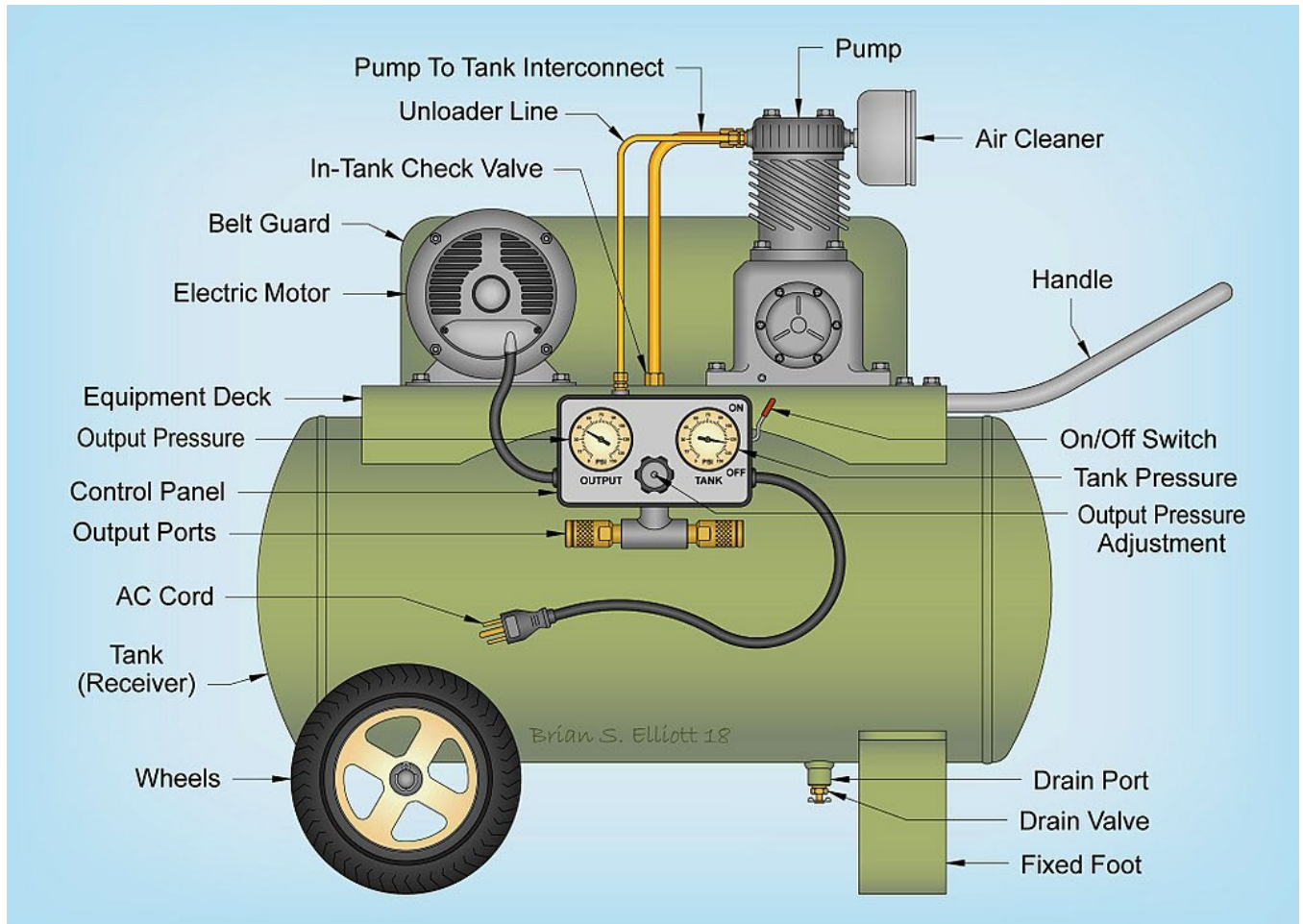


Figure 4. Diagram of Portable Single-Stage Air Compressor

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