



POWERHORSE®

46850; 208cc Powerhorse Engine,
8 Gal. Twin Tank

M46850E.1

Gasoline Portable Air Compressor **Installation, Operation and Maintenance Manual**

To the Owner:

Thank you for purchasing a Powerhorse Air Compressor. Your machine is designed for long life, dependability, and the top performance you demand! Please take time now to read through this manual so you better understand the machine's operation, maintenance and safety precautions. Everyone who operates this machine must read and understand this manual. The time you take now will prolong your machine's life and prepare you for its safe operation. Enjoy the exceptional performance of your Powerhorse Air Compressor, the industry leader!

The manufacturer reserves the right to make improvements in design and/or changes in specifications at any time without incurring any obligation to install them on units previously sold.

Quick Facts

Engine Oil	Engine is shipped without oil. Fill before starting. Use SAE 10W-30 motor oil.	
Pump Oil	Check the pump oil level before starting. Use SAE 30W non-detergent pump oil (part # 4043).	
Air Filter	Replacement air filter part number is AB2281000	
Maximum Pressure	Item #46850 maximum pressure = 130 psi	
Maintenance Schedule	Engine:	Oil: change after first 20 hours, then annually or every 100 hours. Spark Plug: clean every 100 hrs, replace annually or every 300 hrs. Air Filter: clean weekly, replace annually or every 1000 hrs. Refer to your Powerhorse engine owner's manual for further instructions.
	Tank:	Drain water daily.
	Compressor Pump:	Oil: change after first 50 hours, then every 3 months or 500 hours.
Read and understand all manuals before operating.		

Any Questions, Comments, Problems or Parts Orders
Call Powerhorse Product Support 1-866-443-2576

Table of Contents

Important Safety Instructions	2	Kits & Service Parts	6
Receipt and Inspection	2	Exploded View / Component List	7-8
Machine Component Identification	3	Pneumatic Schematic Diagrams	9
Assembly	4	Troubleshooting	10
Operation	5	Engine Exploded View/List/Manual	11
Maintenance	6	Limited Warranty	29

Safety

DEFINITIONS

DANGER!

WILL cause DEATH, SEVERE INJURY or substantial property damage.

WARNING!

CAN cause DEATH, SEVERE INJURY or substantial property damage.

CAUTION!

WILL or CAN cause MINOR INJURY or property damage.

GENERAL SAFETY PRECAUTIONS

ALWAYS wear eye protection when operating or servicing compressor.

NEVER operate where flammable or explosive liquids or vapors such as gasoline, natural gas and solvents are present.

NEVER remove, paint over, or deface decals. Replace any missing decals.

NEVER operate with guards or shields removed, damaged or broken.

NEVER operate indoors. This compressor is intended for outdoor use only. Avoid inhaling exhaust fumes, risk of asphyxiation. Exhaust fumes are deadly.

NEVER add fuel when the product is operating or hot.

NEVER directly inhale compressed air.

NEVER over-pressurize the receiver tank or similar vessels beyond design limits.

NEVER use a receiver tank or similar vessels that fail to meet the design requirements of the compressor.

NEVER drill into, weld or otherwise alter the receiver tank or similar vessels.

NEVER remove, adjust, bypass, change, modify or make substitutions for safety/relief valves, unloader valve or other pressure control related devices.

NEVER use air tools or attachments without first determining the maximum pressure recommended for that equipment.

NEVER point air nozzles or sprayers toward people or animals.

NEVER touch the compressor pump, engine or discharge tubing during or shortly after operation. These parts become hot.

BREATHING AIR PRECAUTION

Powerhorse air compressors are not designed, intended or approved for breathing air. Compressed air should not be used for breathing air applications unless treated in accordance with all applicable codes and regulations.

Receipt and Inspection

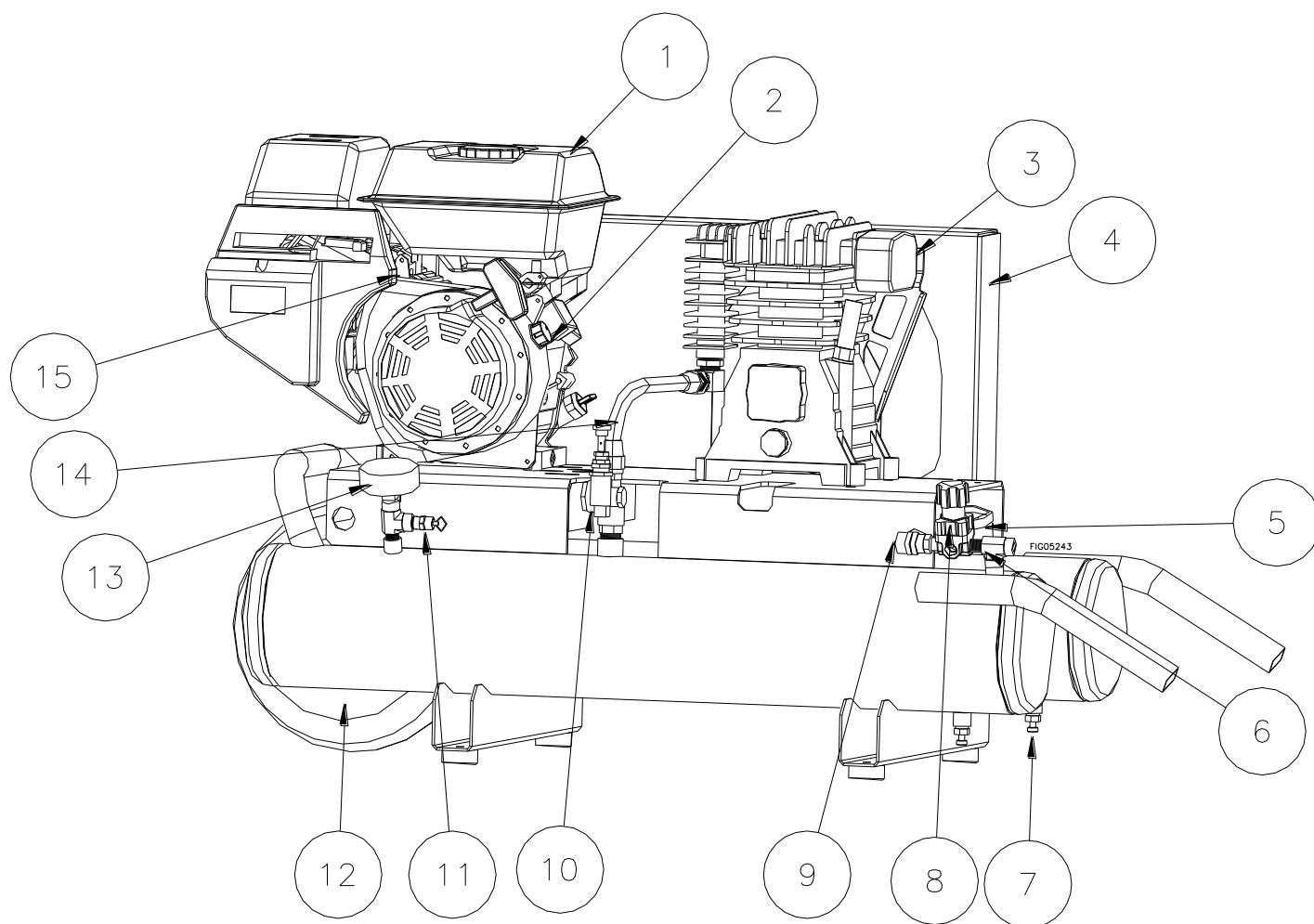
Before signing the delivery receipt, inspect for damage and missing parts. If damage or missing parts are apparent, make the appropriate notation on the delivery receipt, then sign the receipt. Immediately contact Product Support at 1-866-443-2576.

If you discover damage after receiving the air compressor (concealed damage), contact Product Support at 1-866-443-2576.

Read the compressor nameplate to verify it is the model ordered, and read the motor nameplate to verify it is compatible with your electrical conditions. Make sure electrical enclosures and components are appropriate.

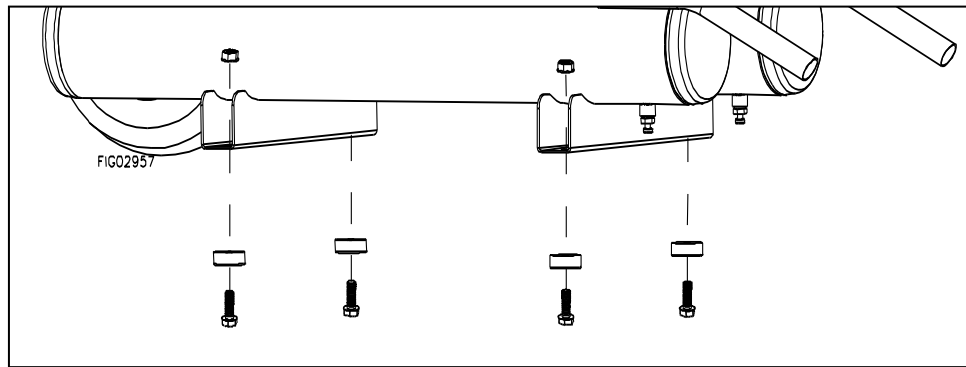


Machine Component Identification



1. **Engine** - Engine is NOT shipped with oil. Refer to engine owners' manual for proper viscosity and capacity of oil for your engine.
2. **On/Off Switch** - Make sure switch is at "ON" position when starting engine.
3. **Compressor Air Filter** - Make sure your air filter is clean and particle free. See pump exploded view for replacement filter part number.
4. **Belt Guard** - Covers the belt, motor pulley and flywheel. **NEVER** operate compressor without belt guard.
5. **Regulated Pressure Gauge** - Easy to read liquid filled gauge indicates regulated pressure.
6. **Port at Tank Pressure** - To access full tank pressure, attach hose to this port. Thread size is 1/4" NPT.
7. **Tank Drain** - Location of tank drains. Drain tank daily or after each use.
8. **Regulator** - Adjust outlet pressure, not to exceed pressure rating of the tool.
9. **Quick Connect** - This is a 1/4" quick connect.
10. **Unloader** - Lift knob to relieve pressure when starting the engine.
11. **ASME Safety Valve** - This valve automatically releases air if the tank pressure exceeds the preset maximum.
12. **Pneumatic Tire** - Keep tire pressure at 20 psi for easy movement.
13. **Tank Pressure Gauge** - Easy to read liquid filled gauge indicates pressure in the tank.
14. **Discharge Tube** - This tube carries compressed air from the pump to the check valve. This tube becomes very hot during use. To avoid the risk of severe burns, never touch the discharge tube.
15. **Engine Control** - Location of choke, engine speed and fuel valve.

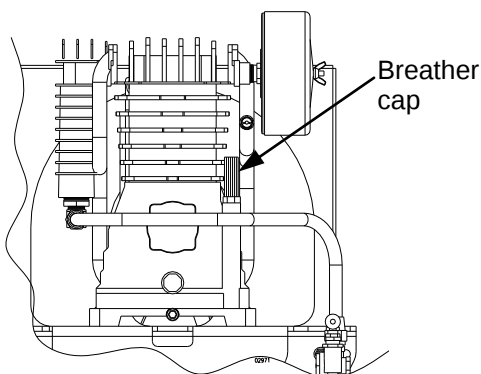
Assembly



Attach rubber feet as shown

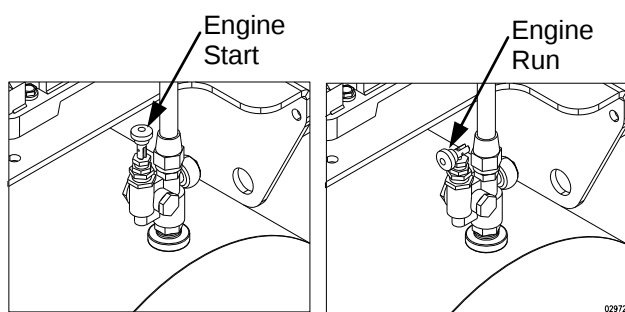
Item#	Description	Qty
2215	Rubber Foot	4
82015	5/16 X 3/4" Flange Bolt	4
82019	5/16 Flange Nut	4

Operation



INITIAL START-UP

1. Pump is shipped with oil. Remove the oil cap and check pump oil level. Add SAE 30 non-detergent pump oil (Part #4043), if necessary. Hand tighten breather cap.
2. Turn pressure relief knob to engine start position.



3. The engine is shipped without oil. Refer to the engine manual for oil capacity and viscosity recommendations.
4. Refer to engine manual to start your engine.
5. Once the engine has started, move the pressure relief knob to the engine run position.

CAUTION! Unusual noise or vibration indicates a problem. Do not continue to operate until you identify and correct the source of the problem.

CAUTION! Do not attach air tools to open end of the hose until start-up is completed and the unit checks out OK.

6. Run the unit for 30 minutes, with ball valve open, to break in pump parts.
7. Close the ball valve to shut off airflow. The compressor is now ready for use.
8. After 50 hours of operation change the compressor oil.

WARNING!

Never disconnect threaded joints with pressure in the tank.

NOTE: Reduce tank pressure below 10 psi, then drain moisture from tank daily to avoid tank corrosion. Drain moisture from tank by opening the drain petcock located at the bottom of the tank.

COMPRESSOR LUBRICATION

CAUTION! Do not operate without lubricant or with inadequate lubricant. Use of compressor without lubricant or inadequate lubricant voids all warranties.

Synthetic Lubricants

Synthetic lubricants are recommended after 50-hour break-in. Compressor life is greatly increased with the use of synthetic lubricants. **CAUTION!** If you will be using synthetic lubricant, all downstream piping material and system components must be compatible.

Suitable Viton®, Teflon®, Epoxy (Glass Filled), Oil Resistant Alkyd, Fluorosilicone, Fluorocarbon, Polysulfide, 2-Component Urethane, Nylon, Delrin®, Celcon®, High Nitrile Rubber (Buna N. NBR more than 36 Acrylonite), Polyurethane, Polyethylene, Epichlorohydrin, Polyacrylate, Melamine, Polypropylene, Baked Phenolics, Epoxy, Modified Alkyds

(® indicates trademark of DuPont Corporation)

Not Recommended

Neoprene, Natural Rubber, SBR Rubber, Acrylic Paint, Lacquer, Varnish, Polystyrene, PVC, ABS, Polycarbonite, Cellulose Acetate, Latex, EPR, Acrylics, Phenoxy, Polysulfones, Styrene Acrylonitile (San), Butyl

Alternate Lubricants. You may use petroleum-based lubricant that is premium quality, does not contain detergents, contains only anti-rust, anti-oxidation, and anti-foam agents as additives, has a flashpoint of 440°F (227°C) or higher, and has a auto-ignition point of 650°F (343°C) or higher.

See the petroleum lubricant viscosity table below. The table is intended as a general guide only. Heavy duty operating conditions require heavier viscosities. Refer specific operating conditions to Powerhorse Product Support at 1-866-443-2576

Temperature around Compressor	Viscosity Grade	
	ISO	SAE
Below 40°F (4°C)	60	20
40°F to 80°F (4°C to 27°C)	100	30
80°F to 100°F (27°C to 38°C)	150	40

Pump Capacities.

Refer to the following table for crankcase capacity

Item #	Crankcase capacity
46850	36 oz

Maintenance

WARNING! Disconnect spark plug wire from spark plug and release air pressure from system before performing maintenance.

NOTE: All compressed air systems contain maintenance parts (e.g. lubricating oil, filters, separators), which are periodically replaced. These used parts may be, or contain, substances that are regulated and must be disposed of in accordance with local, state, and federal laws and regulations.

NOTE: Take note of the position and locations of parts during disassembly to make reassembly easier. The assembly sequences and parts illustrated may differ for your particular unit.

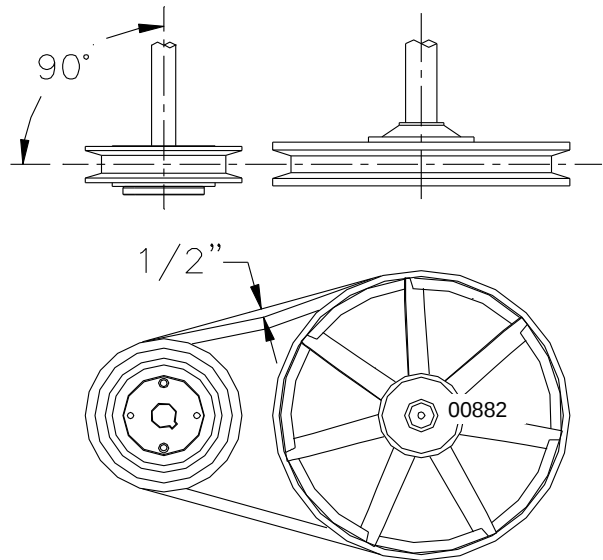
Daily or before each operation	•Check lubrication levels. Fill as needed. •Drain receiver tank condensation. •Check for unusual noise or vibration. •Ensure belt guards and covers are securely in place. •Ensure area around compressor is free from rags, tools, debris, and flammable or explosive materials.
Weekly	•Check safety/relief valves by pulling rings. Replace safety/relief valves that do not operate freely. •Inspect air filter element. Clean if necessary.
Monthly	•Inspect for air leaks. Squirt soapy water around joints during compressor operation and watch for bubbles. Tighten fittings if necessary. •Clean exterior.
3 months or 500 hours	•Change petroleum lubricant in pump while crankcase is warm.
12 months or 1000 hours	•Replace air filter element.

DRIVE BELT

Belts will stretch in normal use. Properly adjusted, a 5 pound force applied to the belt between the motor pulley and the pump will deflect the belt about 1/2".

TO ADJUST DRIVE BELT:

1. Remove belt guard.
2. Loosen the four fasteners holding the engine to the compressor.
3. Shift the engine in the proper direction. The belt must be properly aligned when adjustment is made.
4. To align belt, visually center engine pulley to compressor pulley.
5. If necessary, move the pulley on the engine shaft.
6. Check for proper belt tension (see diagram).
7. Tighten the four fasteners holding the engine to the top plate.
8. Attach belt guard.

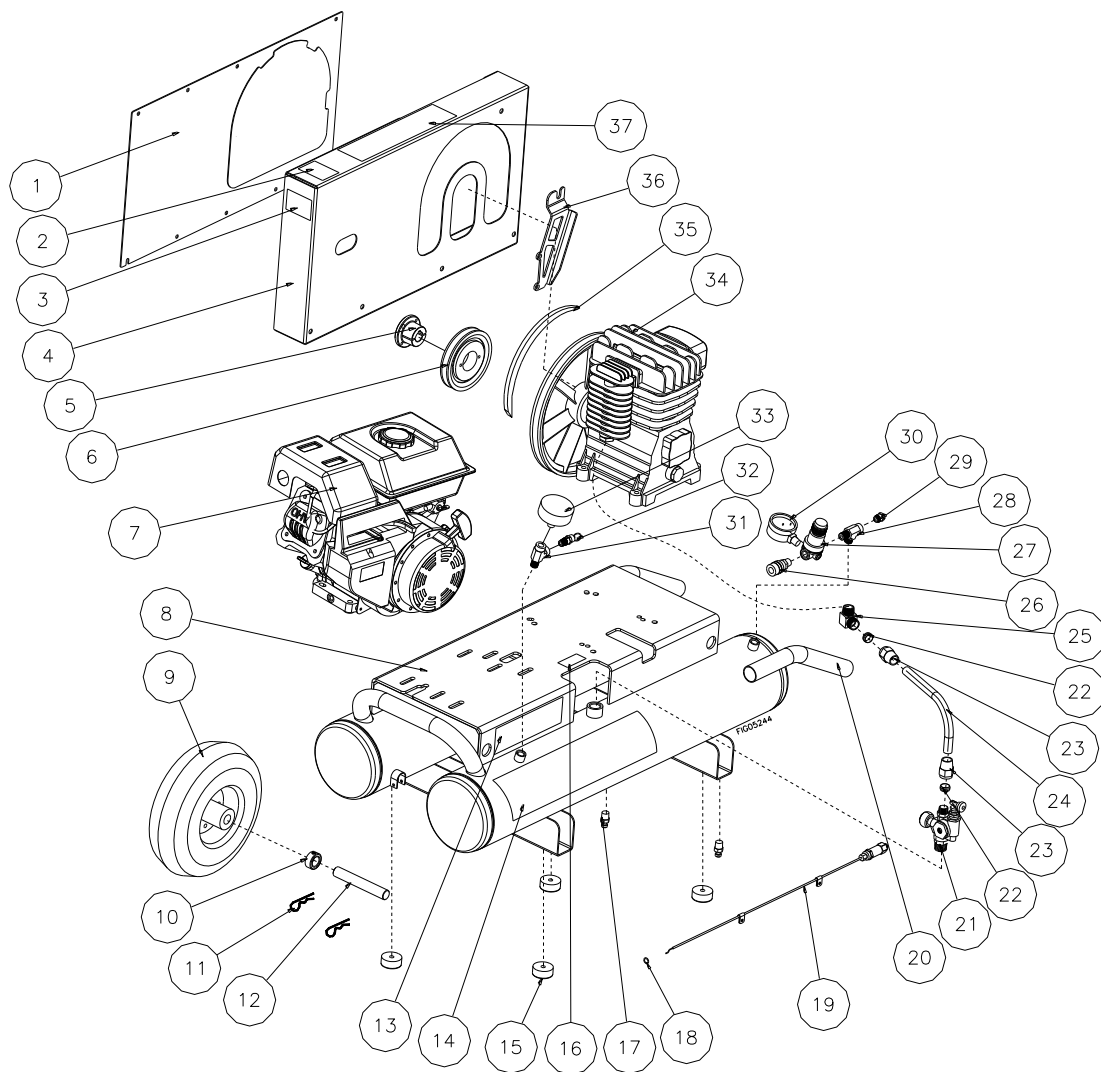


Kits and Service Parts

Air filter: Part #AB2281000

Non-detergent Oil: Part #4043

Exploded View 46850 - Rev. E.1



Item	Description	Part #	Qty
1	Belt Guard Cover	780810	1
2	CO Warning Decal	39259	1
3	Rotating Equip. Decal	35189	1
4	Belt Guard	780811	1
5	Bushing, 3/4"	33562	1
6	Sheave, AK49H	35621	1
7	Engine, Powerhorse 208cc	789712	1
8	8 Gallon Twin Tank	780801	1
9	Tire	788813	1
10	Wheel Retainer	305200	1
11	Cotter Pin	30312	2
12	Axle	780785	1
13	Operation Instruction Decal	34783	1
14	Powerhorse Decal	780307	1
15	Rubber Foot	2215	4
16	Warning Hot Decal	35064	1
17	Drain Valve	779577	2
18	Honda Bushing	CD3203	1
19	Idle Solenoid	35126	1

Item	Description	Part #	Qty
20	Rubber Grip	30747	2
21	Unloader, 100-130 psi	35025	1
22	5/8" Compression Sleeve	34723	2
23	5/8" Compression Nut	35405	2
24	Copper Tube	780836	1
25	1/2" Elbow	34937	1
26	Quick Connect	780773	1
27	Regulator	780771	1
28	1/4" Pipe Tee	780880	1
29	Hex Plug	777838	1
30	2-1/2" Bottom Mount Gauge	780894	1
31	1/4" Street Tee	780433	1
32	Safety Valve, 150 psi	35120	1
33	Pressure Gauge	34699	1
34	Pump, B2800	779100	1
35	Belt, A50	780834	1
36	Guard Bracket	35610	1
37	Warning Decal	34782	1

779100 Pump Assembly

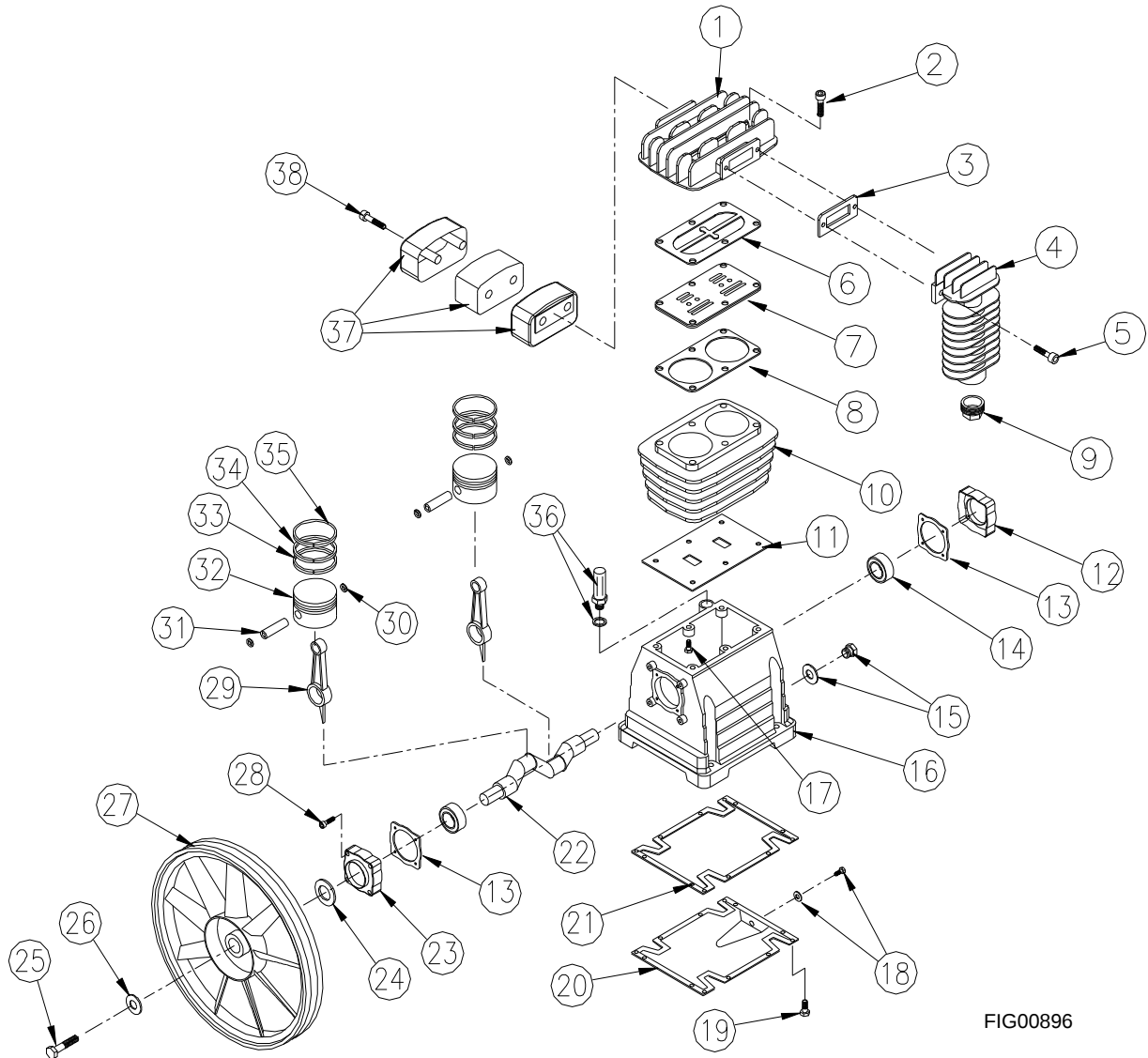


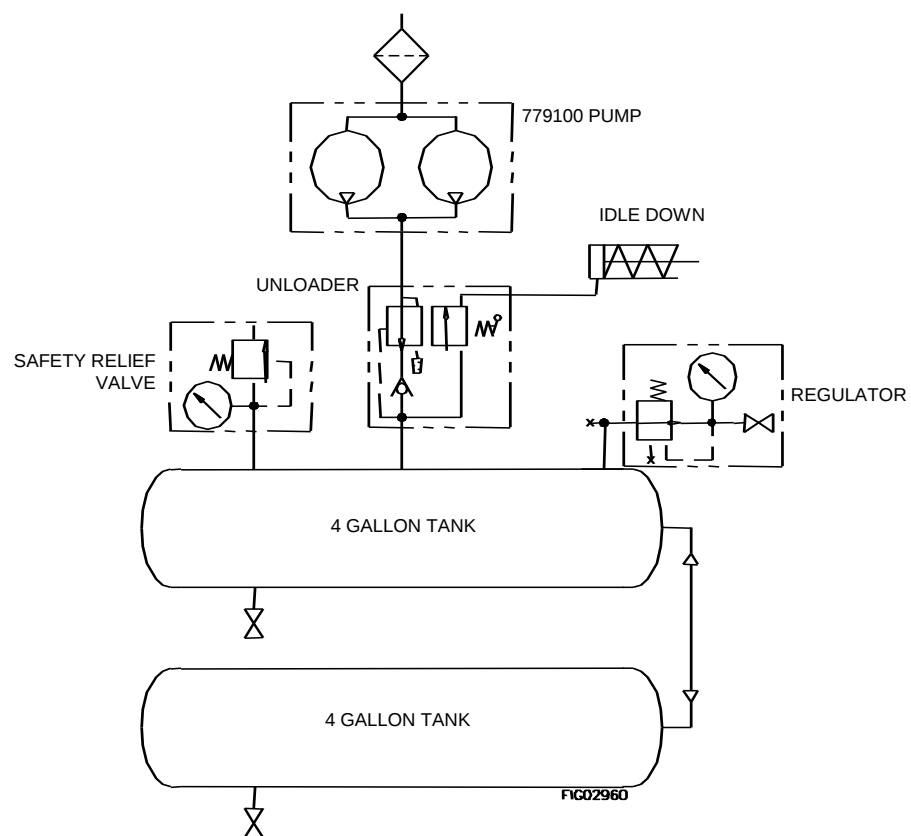
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Item	Description	Part #	Qty
1	Head	AB3860400	1
2	Head Bolt (M8 x 45mm SHCS)	AB9101594	6
3	Aftercooler Gasket	AB3670200	1
4	Aftercooler, 118mm	AB2870100	1
5	Aftercooler Bolt (M6 x 20mm SHCS)	AB9101144	2
6	Head Gasket	AB2850400	1
7	Valve Plate Assembly	AB2840050	1
8	Cylinder Gasket	AB2850300	1
9	Reducer	AB9050283	1
10	Cylinder, Cast Iron Sleeve	AB2830000	1
11	Crankcase Gasket	AB3650201	1
12	Cover N.D.E.	AB2060690	1
13	Bearing Cover Gasket	AB2050500	2
14	Bearing	AB9170030	2
15	Oil Sight Glass	AB9022001	1
16	Crankcase	AB2860100	1
17	Cylinder Bolt (M6 x 20 mm SHCS)	AB9107254	6
18	Oil Drain Plug	AB9101154	1
19	Crankcase Bottom Bolt (M5 x 15mm HHCS)	AB9119273	8

Item	Description	Part #	Qty
20	Oil Pan	AB2660160	1
21	Oil Pan Gasket	AB2650101	1
22	Crankshaft	AB2860200	1
23	Cover D.E.	AB2060590	1
24	Oil Seal	AB9163010	1
25	Screw, Reverse Thread	AB9110014	1
26	Flywheel Washer	AB9004008	1
27	Flywheel, 280 mm	AB2600100	1
28	Bearing Housing Bolt (M6 x 15mm SHCS)	AB9101094	8
29	Connecting Rod	AB2810100	2
30	Circlip	AB9140040	4
31	Wrist Pin	AB3021200	2
32	Piston, Aluminum	AB1421100	2
33	Piston Ring, ROF	AB9020071	1
34	Piston Ring, ROS	AB9020041	1
35	Piston Ring, AC	AB9020011	1
36	Breather Cap	AB9024003	1
37	Filter Assembly	AB2281000	1
38	Filter Assembly Bolt (M6 x 25mm SHCS)	AB9114279	2
	Complete Gasket Kit	AB2850055	1

Pneumatic Schematic Diagram

Item # 46850



Troubleshooting

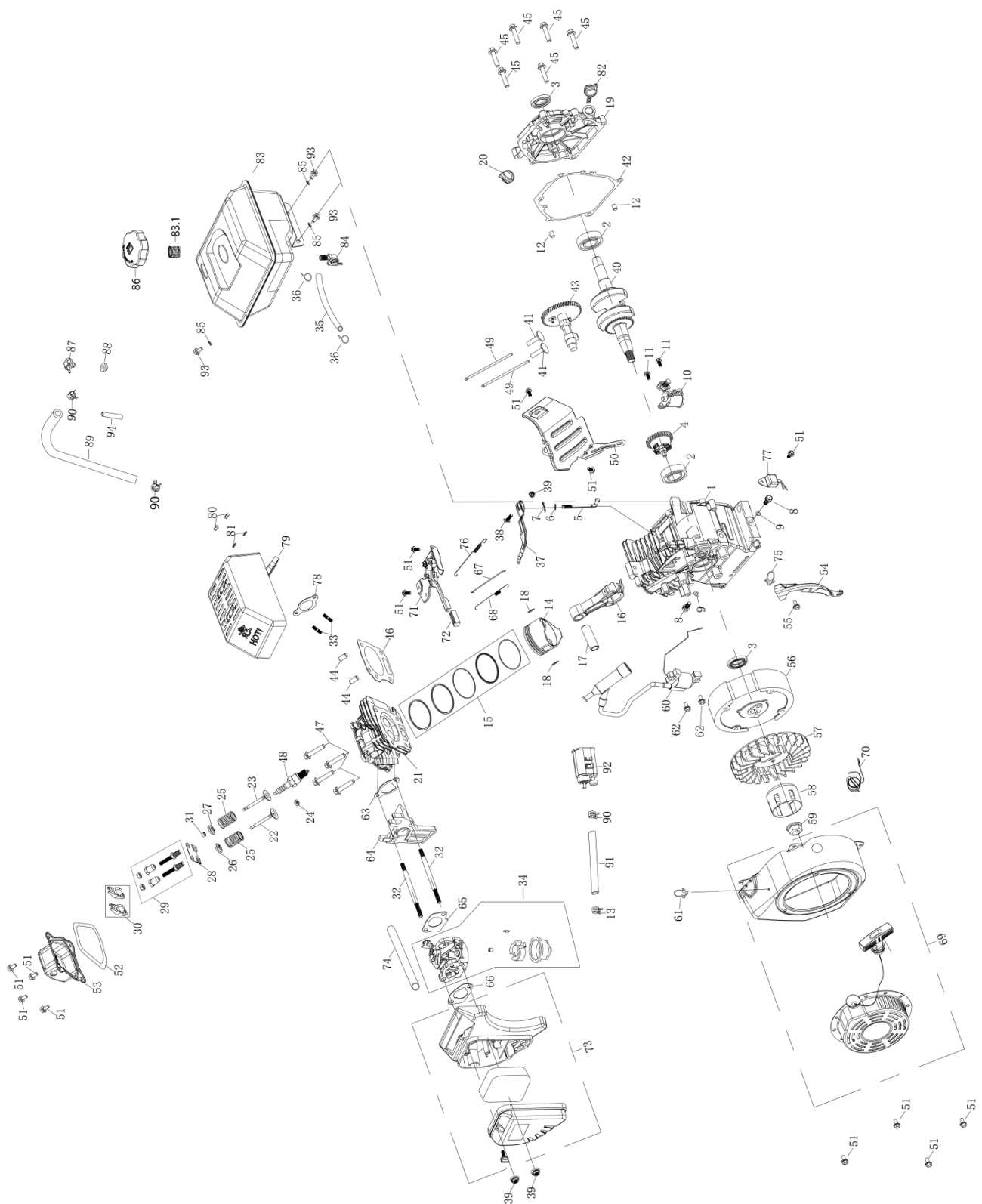
This section provides a list of the more frequently encountered compressor malfunctions, their causes and corrective actions. Some corrective actions can be performed by the operator or maintenance personnel, and others may require assistance of a qualified electrician or Service Center.

PROBLEM	POSSIBLE CAUSE
Engine does not start.	A,B,C,D,E
Air delivery drops off.	H, I, J, L, M, N, P
Compressor does not come up to speed.	F, G, J, K
Compressor is slow to come up to speed.	F, G, J, K, L
Compressor will not unload cycle.	H, L, N, P
Compressor will not unload when stopped.	H, L, N, P
Excessive starting or stopping.	N, Q, S
Moisture in crankcase, "milky" substance in oil.	R
Oil in discharge air.	T
Safety/relief valve "pops".	L, M, N
Low interstage pressure.	W
High interstage pressure.	V

POSSIBLE CAUSE	POSSIBLE SOLUTION
A.) Low Oil Shutdown	Fill engine with the adequate amount of oil.
B.) Cold Engine	Choke engine to start.
C.) No Fuel	Add gas to engine. Make sure fuel shutoff valve is open
D.) Engine not turned ON	Place ON/OFF switch in the ON position.
E.) Spark plug wire not attached	Attach spark plug wire to spark plug.
F.) Compressor viscosity too high for ambient temperature.	Drain existing lubricant and refill with proper lubricant.
G.) Belt tension too tight or sheaves not aligned.	Check tension/ alignment.
H.) Air leaks in discharge piping.	Check tubing connections, Tighten joints or replace as required.
I.) Compressor components leaky, broken, loose.	Inspect components. Clean or replace as required.
J.) Loose flywheel or motor pulley, excessive end play in motor shaft or loose drive belts.	Check flywheel, motor pulley, and crankshaft drive belt tension/alignment. Replace or repair as required.
K.) Leaking check valve or check valve seat blown out.	Replace check valve.
L.) Clogged or dirty inlet and/or discharge line.	Clean or replace.
M.) Defective safety/relief valve.	Replace.
N.) Pressure switch unloader leaks or does not work.	Realign stem or replace.
O.) Inadequate ventilation around flywheel.	Relocate compressor for better airflow.
P.) Leaking, broken or worn inlet unloader parts at check valve.	Inspect parts and replace as required.
Q.) Excessive condensation in receiver tank.	Drain receiver tank.
R.) Detergent lubricant in crankcase.	Replace with proper lubricant.
S.) Light duty cycle.	Increase duty cycle.
T.) Lubricant level too high.	Drain excess lubricant.
U.) Worn cylinder finish.	Degaze cylinder with 180 grit flex-hone.
V.) Low pressure inlet valve leaking.	Inspect, clean or repair as required.
W.) High pressure inlet valve leaking.	Inspect, clean or repair as required.

Any Questions, Comments, Problems or Parts Orders
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Exploded View – 789712 Engine

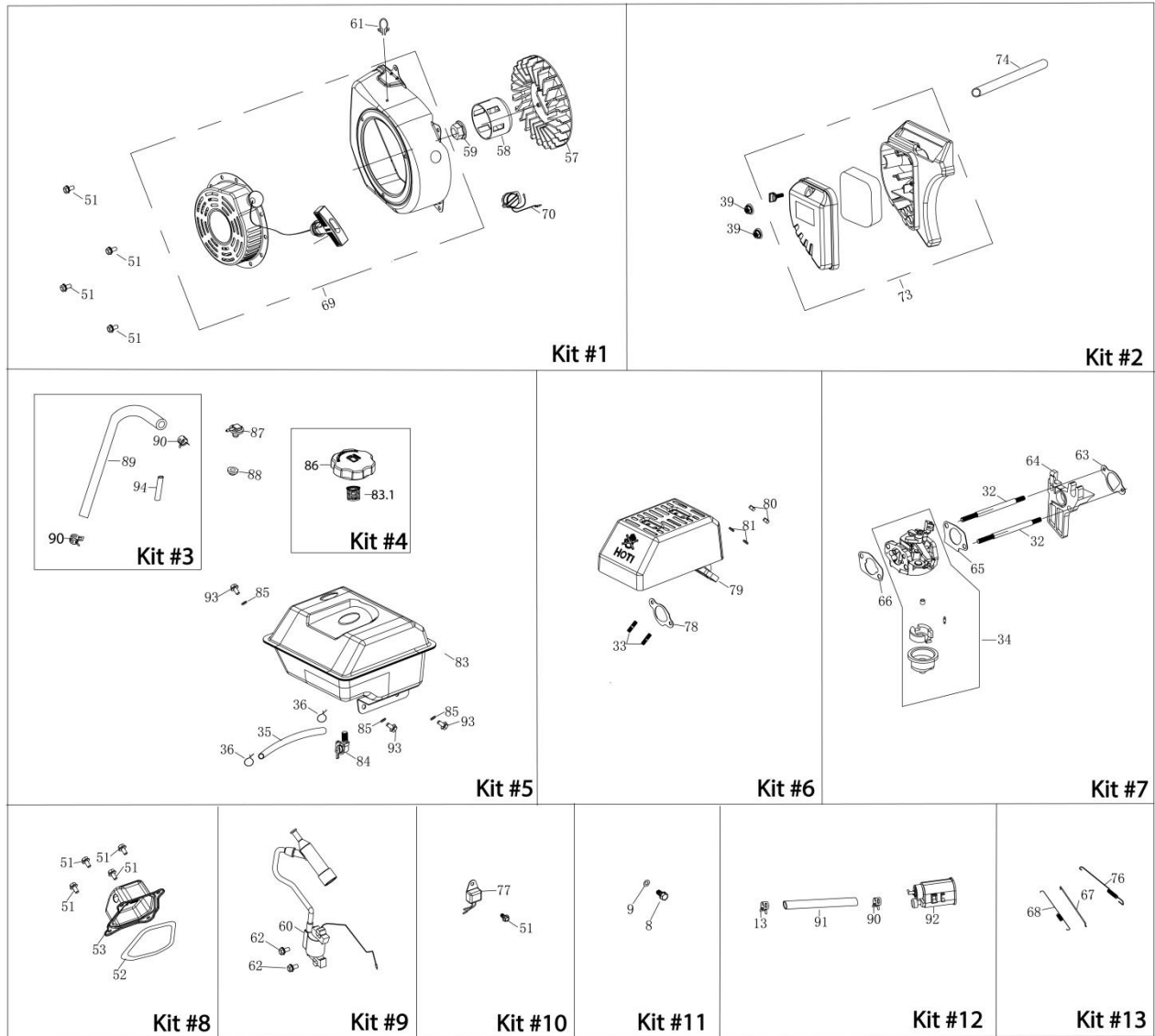


Parts List – 789712 Engine

Ref#	Part #	Description	Qty
1	N/A	CRANKCASE	1
2	N/A	BALL BEARING	2
3	N/A	OIL SEAL	2
4	N/A	GOVERNOR ASSEMBLY	1
5	N/A	SHAFT, GOVERNOR ARM	1
6	N/A	WASHER, GOVERNOR ARM SHAFT	1
7	N/A	PIN, LOCK	1
8	Kit # 11	BOLT, DRAIN PLUG	2
9		WASHER, DRAIN PLUG	2
10	788901	SWITCH ASSEMBLY, OIL LEVEL	1
11	N/A	BOLT	2
12	N/A	DOWEL PIN, CASECOVER	2
13	Kit # 12	CLIP, FUEL LINE	1
14	N/A	PISTON	1
15	N/A	SCRAPER RING SET, PISTON	1
16	N/A	ROD ASSEMBLY, CONNECTING	1
17	N/A	PIN, PISTON	1
18	N/A	CLIP, PISTON	2
19	N/A	COVER ASSEMBLY, CRANKCASE	1
20	N/A	OIL PLUG	1
21	N/A	CYLINDER HEAD	1
22	N/A	VALVE, IN	1
23	N/A	VALVE EXHAUST	1
24	N/A	RETURNER, INTAKE VALVE	1
25	N/A	SPRING, VALVE	2
26	N/A	SEAT, VALVE SPRING, IN	1
27	N/A	SEAT, VALVE SPRING, EX	1
28	N/A	PLATE, PUSH ROD GUIDE	1
29	N/A	ROCKER FASTENING BOLT	2
30	N/A	ROCKER	2
31	N/A	ROTATOR	1
32	Kit # 7	BOLT, STUD	2
33	Kit # 6	BOLT, STUD	2
34	Kit # 7	CARBURETOR ASSEMBLY	1
35	Kit # 5	FUEL LINE	1
36	Kit # 5	CLIP, FUEL LINE	2
37	N/A	GOVERNOR ARM	1
38	N/A	BOLT, GOVERNOR ARM	1
39	Kit # 2	NUT	3
40	N/A	CRANKSHAFT ASSEMBLY	1
41	N/A	LIFTER, VALVE	2
42	N/A	PACKING, CASECOVER	1
43	N/A	CAMSHAFT ASSEMBLY	1
44	N/A	PIN, DOWEL	2
45	N/A	BOLT	6
46	N/A	GASKET, CYLINDER HEAD	1
47	N/A	BOLT	4
48	783127	SPARK PLUG	1
49	N/A	ROD, PUSH	2
50	N/A	SHROUD	1
51	Kit # 1 Kit # 8, Kit # 10	BOLT	13

Ref#	Part #	Description	Qty
52	Kit # 8	PACKING, HEADCOVER	1
53		COVER COMP, CYLINDER HEAD	1
54	N/A	WIND SHIELD COMP.	1
55	N/A	BOLT	1
56	N/A	FLYWHEEL ASSEMBLY	1
57	Kit # 1	FAN, RECOIL STARTER	1
58		PULLEY, STARTER	1
59		NUT	1
60	Kit # 9	IGNITION COIL ASSY	1
61	Kit # 1	CLIP	2
62	Kit # 9	BOLT	2
63	Kit # 7	PACKING, INTAKE	1
64		INSULATOR, CARBURETOR	1
65		PACKING, CARBURETOR	1
66		SPACER, CARBURETOR	1
67	Kit # 13	ROD, GOVERNOR	1
68	Kit # 13	SPRING, THROTTLE RETURN	1
69	Kit # 1	RECOIL STARTER ASSEMBLY	1
70		SWITCH ASSEMBLY	1
71	N/A	SHROUD ASSY, UPPER	1
72	N/A	SPEED REGULATING HANDLE	1
73	Kit # 2	AIR CLEANER ASSEMBLY	1
74		TUBE, BREATHER	1
75	N/A	CLIP	1
76	Kit # 13	SPRING, GOVERNOR	1
77	Kit # 10	AMPLIFIER	1
78	Kit # 6	PACKING, EXHAUST	1
79		MUFFLER COMP	1
80		NUT	2
81		SPRING WASHER	2
82	783136	DIPSTICK	1
83	Kit # 5	FUEL TANK ASSEMBLY	1
83.1	Kit # 4, Kit # 5	FUEL FILTER	1
84	789697 & Kit # 5	FUEL COCK	1
85	Kit # 5	SPRING WASHER	3
86	Kit # 4, Kit # 5	FUEL TANK CAP COMP	1
87	Kit # 5	TANK VENT FITTING	1
88		PACKING WASHER, ONE-WAY VALVE	1
89	Kit # 3, Kit # 5	CONNECTING PIPE	1
90	Kit # 3, Kit # 5, Kit # 12	CLIP, FUEL LINE	3
91	Kit # 12	CONNECTING PIPE	1
92		CARBON TANK COMP	1
93	Kit # 5	BOLT	3
94	Kit # 3, Kit # 5	VENTILATION TUBE PROTECTOR	1

Exploded View – 789712 Engine Kits



Kit Ref #	Kit Part #	Description	Qty
1	791621	Recoil & Fan Kit	1
2	791622	Air Filter Kit	1
3	791623	Vent Hose Kit	1
4	789262	Fuel Cap Kit	1
5	791624	Tank Kit	1
6	789693	Muffler Kit	1
7	791625	Carburetor Kit	1
8	791626	Valve Cover Kit	1
9	789696	Ignition Coil Kit	1
10	791627	Oil Alert kit	1
11	783126	Drain Bolt Kit	2
12	791628	Carbon Canister Kit	1
13	791629	Governor & Spring Kit	1

Safety

CAUTION

- This engine is shipped without oil. If you start the engine without oil, the engine will be damaged beyond repair and will not be covered under warranty.



WARNING

Gasoline and its vapors are extremely flammable and explosive. Fire or explosion can cause severe burns or death.

WHEN ADDING FUEL

- Turn engine OFF and let engine cool at least 2 minutes before removing gas cap.
- Fill fuel tank outdoors or in well-ventilated area.
- Do not overfill fuel tank.
- Keep gasoline away from sparks, open flames, pilot lights, heat, and other ignition sources.
- Check fuel lines, tank, cap, and fittings frequently for cracks or leaks. Replace if necessary.

WHEN STARTING ENGINE

- Make sure spark plug, muffler, fuel cap and air cleaner are in place.
- Do not crank engine with spark plug removed.
- If fuel spills, wait until it evaporates before starting engine.
- If engine floods, set choke to OPEN/RUN position, place throttle in FAST and crank until engine starts.

WHEN OPERATING EQUIPMENT

- Do not choke carburetor to stop engine.

WHEN TRANSPORTING EQUIPMENT

- Transport with fuel tank EMPTY.

WHEN STORING GASOLINE OR EQUIPMENT WITH FUEL IN TANK

- Store away from furnaces, stoves, water heaters or other appliances that have pilot light or other ignition source because they can ignite gasoline vapors.



WARNING

Starting engine creates sparking. Sparking can ignite nearby flammable gases. Explosion and fire could result.

- If there is natural or LP gas leakage in area, do not start engine.
- Do not use pressurized starting fluids because vapors are flammable.



WARNING



Rapid retraction of starter cord (kickback) will pull hand and arm toward engine faster than you can let go. Broken bones, fractures, bruises or sprains could result.

- When starting engine, pull cord slowly until resistance is felt, then pull rapidly.
- Direct coupled equipment components such as, but not limited to, blades, impellers, pulleys, sprockets, etc., must be securely attached.



WARNING



Rotating parts can contact or entangle hands, feet, hair, clothing, or accessories. Traumatic amputation or severe laceration can result.

- Operate equipment with guards in place.
- Keep hands and feet away from rotating parts.
- Tie up long hair and remove jewelry.
- Do not wear loose-fitting clothing, dangling drawstrings or items that could become caught.



WARNING



Engines give off carbon monoxide, an odorless, colorless, poison gas. Breathing carbon monoxide can cause nausea, fainting or death.

- Start and run engine outdoors.
- Do not start or run engine in enclosed area, even if doors or windows are open.



WARNING



Running engines produce heat. Engine parts, especially muffler, become extremely hot.

Severe thermal burns can occur on contact.

Combustible debris, such as leaves, grass, brush, etc. can catch fire.

- Allow muffler, engine cylinder and fins to cool before touching.
- Remove accumulated debris from muffler area and cylinder area.
- Install and maintain in working order a spark arrester before using equipment on forest-covered, grass-covered, brush-covered unimproved land. The state of California requires this. Other states may have similar laws. Federal laws apply on federal land.

Safety Precautions

WARNING

Before operating the engine, be sure to read and familiarize yourself with the manual, otherwise personal injury or equipment damage may result.

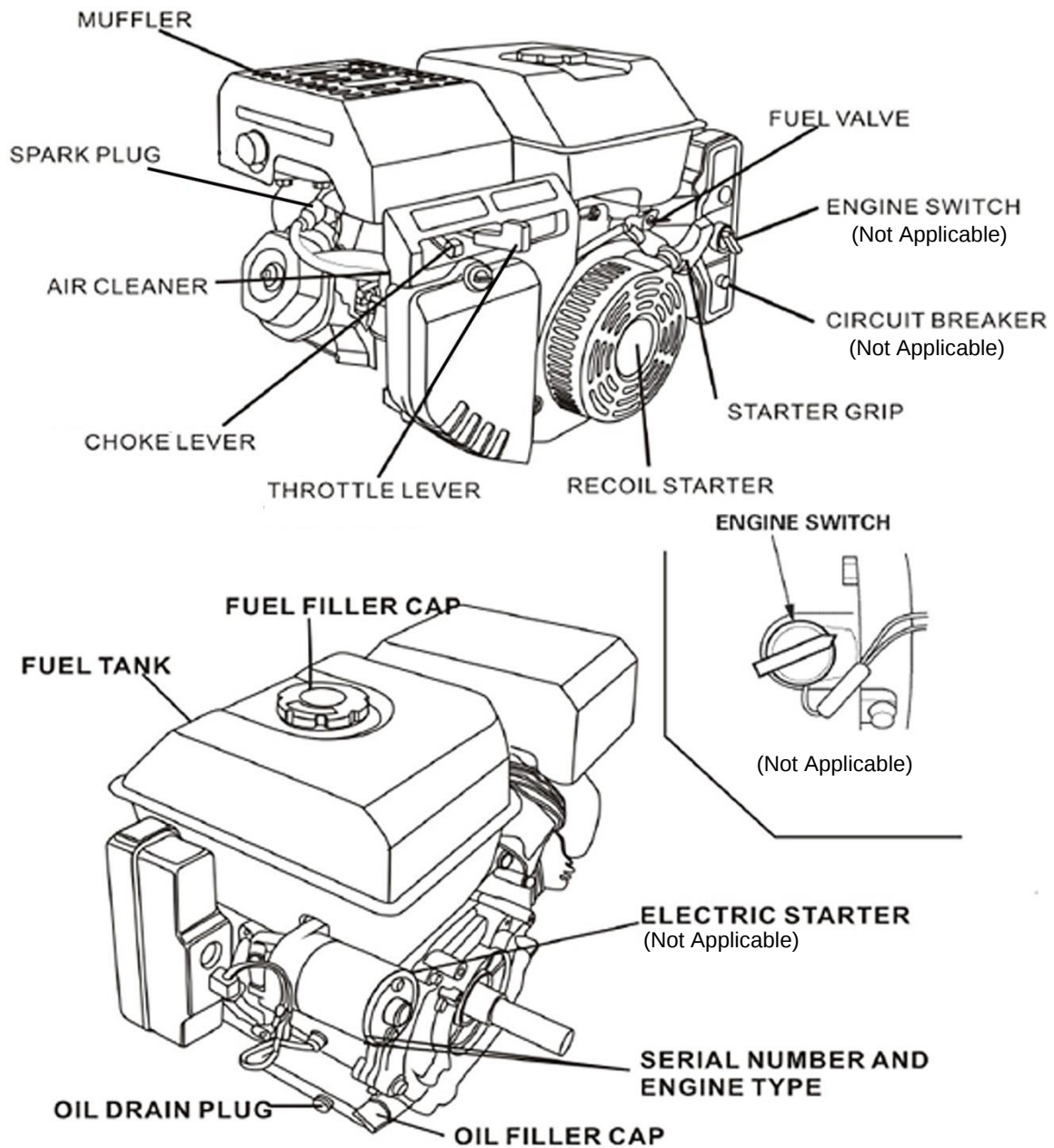
Pay special attention to the following:

- 1.) To prevent fire hazards and to provide adequate ventilation, keep engine at least 7 feet away from buildings and other equipment during operation. Do not place flammable objects close to the engine.
- 2.) Children and pets must be kept away from the area of operation due to a possibility of burns from hot engine components or injury from any equipment the engine may be used to operate.
- 3.) Know how to stop the engine quickly, and understand the operation of all controls. Never permit anyone to operate the engine without proper instructions.
- 4.) Gasoline is extremely flammable and is explosive under certain conditions.
- 5.) Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the refueling area or where gasoline is stored.
- 6.) Do not overfill the fuel tank. After refueling, make sure the tank cap is closed properly and securely.
- 7.) Be careful not to spill fuel when refueling. Fuel vapor or spilled fuel may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.
- 8.) Never run the engine in an enclosed or confined area. Exhaust contains poisonous carbon monoxide gas; exposure may cause loss of consciousness and may lead to death.
- 9.) The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. To avoid severe burns or fire hazards, let the engine cool before transporting or storing it indoors.



Parts Descriptions

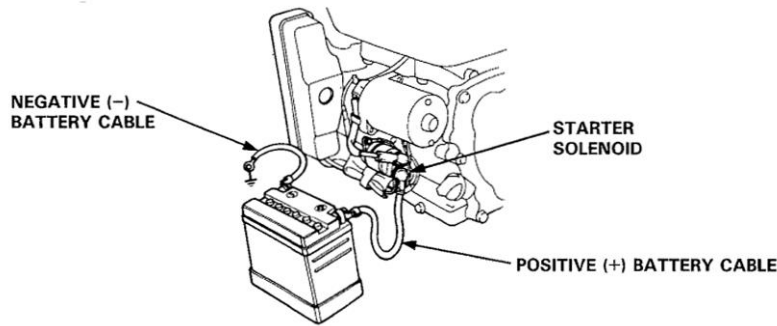
The main parts of engine are located as follows



Battery Connection (Electric-Start Type)

Use a 12 volt battery with an ampere-hour rating of at least 18AH.

1. Connect the battery positive (+) cable to the starter solenoid terminal, as show.
2. Connect the battery negative (-) cable to an engine mounting bolt, frame bolt, or other good engine ground connection.
3. Check the battery cable connections to be sure the cables are secured and free of corrosion. Remove any corrosion and coat the terminals and cable ends with grease.



WARNING

- The battery may give off explosive gas; keep sparks, flames, and cigarettes away. Charge or use it in an area with good ventilation.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and face shield.
- If electrolyte gets on your skin, flush with water.
- If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous. If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.
- KEEP OUT OF REACH OF CHILDREN.

CAUTION

- Be careful not to connect the battery in reverse polarity, as this will short circuit the battery charging system.

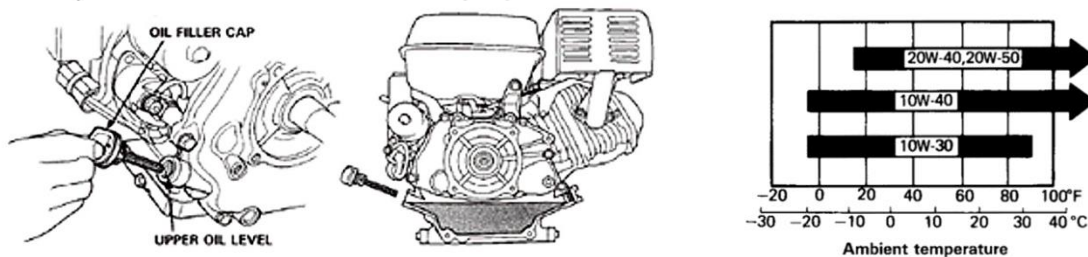
CAUTION

- Engine oil is a major factor affecting engine performance and service life. Non-detergent oils and vegetable oils are NOT recommended. Be sure to check the engine oil level on a level surface with the engine stopped.

1. Engine Oil

SAE-10W-30 is recommended for general, all temperature use. Other viscosities shown in the chart may be used when the average temperature in your area is within the indicated range.

- 1.) Ensure that the engine is stopped and on level ground.
- 2.) Remove the oil filler cap and wipe the dipstick clean.
- 3.) Insert the dipstick into the oil filler neck but do not screw it in.
- 4.) If the level is low, fill to top of the oil filler neck with the recommended oil.
- 5.) Reinstall the dipstick.

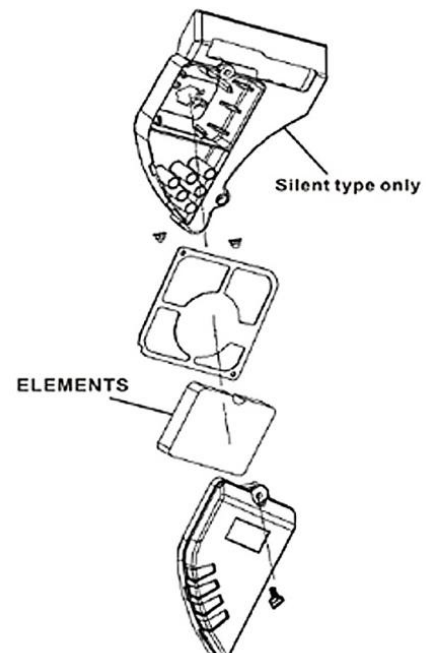


CAUTION

- Running the engine with insufficient oil can cause serious engine damage.

2. Air Cleaner

Dismantle the air cleaner housing and check its filter element, make sure it is clean and intact, otherwise clean or replace the filter.



CAUTION

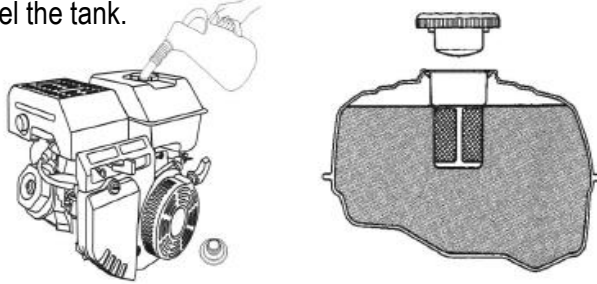
- Never run the engine without the air cleaner. Rapid engine wear will result from contaminants, such as dust and dirt, being drawn through the carburetor and into the engine.

3. Fuel and Fuel Tank

Fuel

- Your engine is designed to use FRESH, UNLEADED GAS WITH AN OCTANE RATING OF 87 OR HIGHER.
- Unleaded gasoline is recommended because it produces fewer engine and spark plug deposits and extends the life of exhaust system components.
- Never use stale or contaminated gasoline or an oil/gasoline mixture. Avoid getting dirt, dust or water in the fuel tank.

- 1.) Remove the fuel filler cap and check fuel level.
- 2.) If the fuel level is too low, refuel the tank.
- 3.) Do not overfill.



Gasoline Containing Alcohol

If you decide to use gasoline containing alcohol (gasohol), be sure its octane rating is at least as high as that recommended by Powerhorse. There are two types of “gasohol”. One contains ethanol, the other contains methanol.

WARNING

- Gasoline is extremely flammable and is explosive under certain conditions.
- Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sprats in the area where the engine is refueled or where gasoline is stored.
- Do not overfill the fuel tank (there should be no fuel in the filler neck). After refueling, make sure the tank cap is closed properly and securely.
- Be careful not to spill fuel when refueling. Spilled fuel or fuel vapor may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.
- Avoid repeated or prolonged contact with skin or breaking of vapor.
- KEEP OUT OF REACH OF CHILDREN.

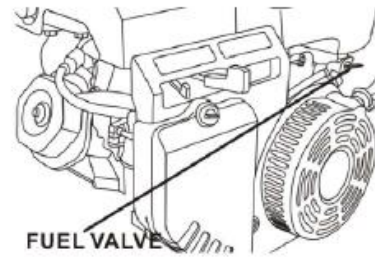
- DO NOT use gasohol that contains more than 10% ethanol.
- Do not use gasoline containing methanol (Methyl or Wood Alcohol) that does not also contain cosolvents and corrosion inhibitors for methanol.
- Never use gasoline containing more than 5% methanol, even if it has cosolvents and corrosion inhibitors.

If “spark knock” or “pinging” occurs at a steady engine speed under normal load, change brands of gasoline. If spark knock or pinging persists, consult an authorized Powerhorse dealer. If this continues, it could result in engine damage.

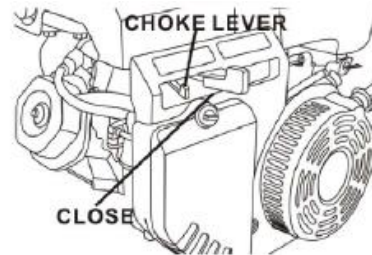
Fuel Tank Capacity: 208cc (3 Liters) (0.79 Gallons)

Starting the Engine

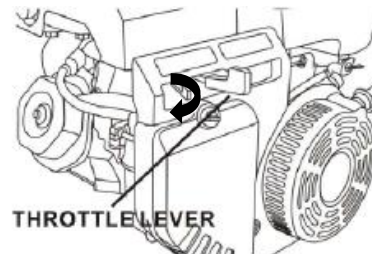
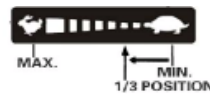
1. Push the fuel valve to the "ON" position.



2. Move the Choke Lever to the "CLOSED" position.
Note: if the engine is hot, closing the choke is not necessary.



3. Move the throttle lever slightly to the left.



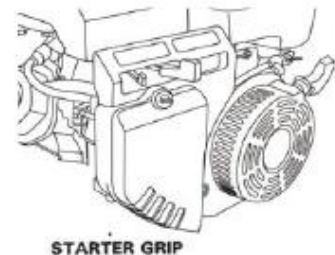
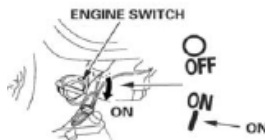
4. Start the engine.

Recoil Start

- a. Turn engine switch to the "ON" position.
- b. Pull the starter grip towards your shoulder, until you feel it catch, then pull briskly.

CAUTION

- Releasing the handle suddenly and allowing the starter grip to hit the engine may cause damage to the starter. Return it gently to prevent damage.

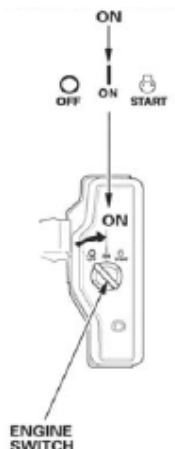


With Electric Start

- a. Turn the engine switch to the "START" position and hold it until the engine starts.
- b. Once engine starts, release the engine switch to "On".

CAUTION

- Do not use the electric starter for more than 5 seconds or motor damage may occur. If the engine fails to start, release the switch and wait 10 seconds before operating the starter again.



Stopping the Engine

In emergency, push the engine switch to “OFF” to stall the engine; to stop it in normal, do so as follows:

- 1.) Push the throttle lever to the right.
- 2.) Turn the engine switch to the “OFF” position.
- 3.) Turn the fuel valve to the “OFF” position.

CAUTION

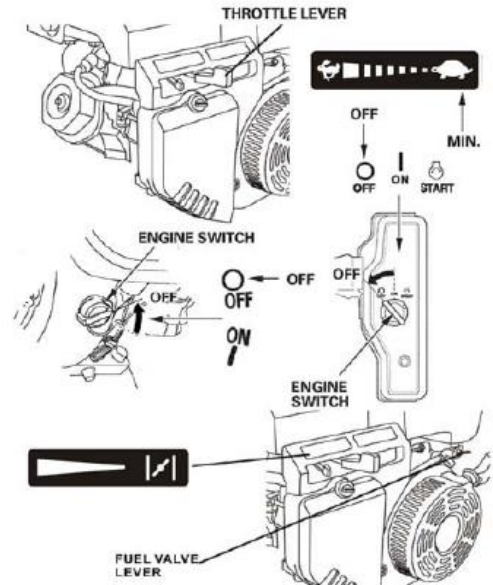
- Sudden stopping at high speed under heavy load is not recommended. Engine damage may result.

High Altitude Operation

At high altitude, the standard carburetor air-fuel mixture will be excessively rich. Performance will decrease, and fuel consumption will increase.

High altitude performance can be improved by installing a smaller diameter main fuel jet in the carburetor and re-adjusting the pilot screw. If you always operate the engine at altitudes high than 6,000 feet above sea level, have your Powerhorse dealer perform these carburetor modifications.

Even with suitable carburetor jetting, engine horsepower will decrease approximately 3.5% for each 1,000 foot increase in altitude. The effect of altitude on horsepower will be greater than this if no carburetor modifications are made.



CAUTION

- Operation of the engine at an altitude lower than the carburetor is jetted for, may result in reduced performance, overheating, and serious engine damage caused by excessively lean air/fuel mixture.

Exhaust Control System

While the engine is running, carbon monoxide, oxide of nitrogen and hydrocarbon will produce, and in certain conditions, oxide of nitrogen and hydrocarbon will react with each other chemically and create a toxic carbon monoxide.

1. Maintenance
Maintain the engine periodically in accordance with the maintenance schedule. The maintenance schedule has been created based on normal use and normal conditions. If using heavy load, operating in dusty and wet conditions, or in extreme temperatures, service of the engine should be done more frequent.
2. Replacement of Parts
It's recommended that you should choose parts which are manufactured by Powerhorse. Using a lower standards or an incompatible part may impair the exhaust control system.

Exhaust Control System (cont'd)

3. Modifying

Modifying the exhaust control system may affect the exhaust emissions to the point where it exceeds legal limits.

Illegal modification such as:

- a.) Dismantling or modification of air intake or exhaust system.
- b.) Modification of takeoff speed-adjustment connection device or speed-adjustment device to result in the engines running beyond pre-set parameters.

4. Problems Affecting Exhaust Emissions

- a.) Difficult starting or difficult stopping.
- b.) Unstable idling.
- c.) Puffs of black smoke or excessive fuel consumption.
- d.) Poor ignition sparks or sparks returned.

Should you experience any of the problems listed above, please contact your Powerhorse dealer.

Maintenance

MAINTENANCE SCHEDULE		Each Time	First Month of 20 Hrs	Each Season or 50 Hrs	Every 6 Months or 100 Hrs	Each Year or 300 Hrs
Engine Oil	Oil level check	✓				
	Replace		✓			
Air Cleaner	Check	✓				
	Clean			✓ ①	✓ ②*	
	Replace					✓ **
Sediment Cup	Clean				✓	
Spark Plug	Clean, Adjust				✓	
	Replace					✓
Spark Eliminator	Clean				✓	
Idling	Check, Adjust					✓ ②
Valve Clearance	Check, Adjust					✓ ②
Fuel Tank & Fuel Filter	Clean					✓ ②
Fuel Supply Line	Check	Every two years (do a replacement if necessary)				

* Only for inside-ventilated double core-carburetors.

** Only for paper core air cleaners. Every two years or 600 hours for dust collecting air cleaners.

① Service engine more frequent if used in dusty conditions.

② Should be done by your Powerhorse dealer, unless you are trained and equipped with the proper tools.

WARNING

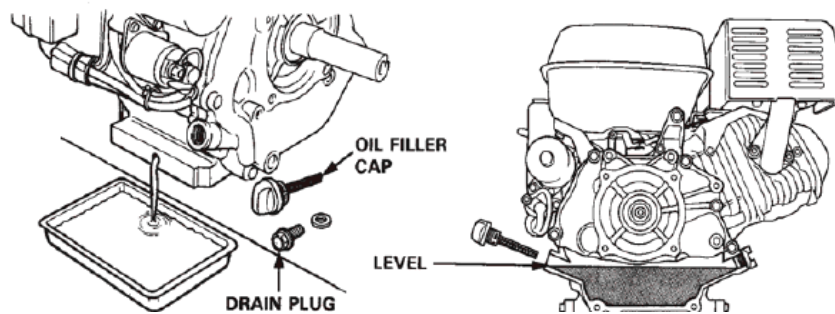
- Shut off the engine before performing any maintenance. If the engine must run, make sure the area is well ventilated. The exhaust contains poisonous carbon monoxide gas.

CAUTION

- Use replacement parts from a Powerhorse dealer or equivalent source; otherwise damage may result.

Change engine oil

While engine is still hot, drain all engine oil out from the crankcase.



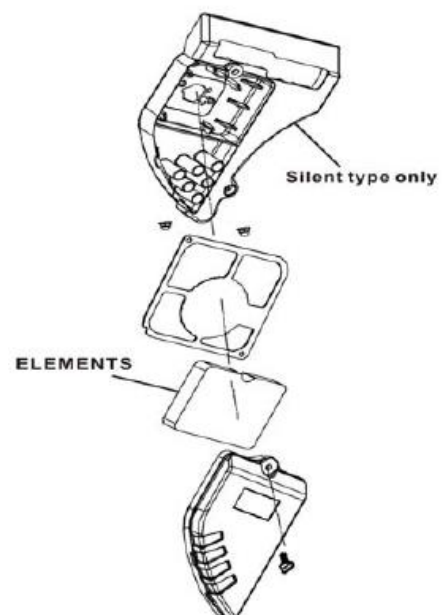
- 1.) Remove the oil filler cap and drain plug to drain oil
- 2.) Install the drain plug and tighten it securely.
- 3.) Refill with the recommended oil and check the oil level.
208cc (.6 Liters/20 ounces)
- 4.) Install the oil filler cap.

Note: Please dispose of used motor oil in a manner that is compatible with the environment. Do not throw in trash or pour on the ground.

Air Filter

A dirty air cleaner may block air flowing into the carburetor. To keep the carburetor in good working condition, service the air filter periodically. If operating engine in a dusty environment, it should be cleaned frequently.

- 1.) Remove the wing nut and the air cleaner cover. Remove the element and separate them. Carefully check element for holes or tears and replace if damaged.
- 2.) Clean element with household detergents and warm water, rinse thoroughly. Allow element to dry completely.
- 3.) Soak element in clean engine oil and squeeze out the excess oil. Engine will smoke during initial start-up if too much oil is left on foam.
- 4.) Reinstall the filter element and air cleaner housing.

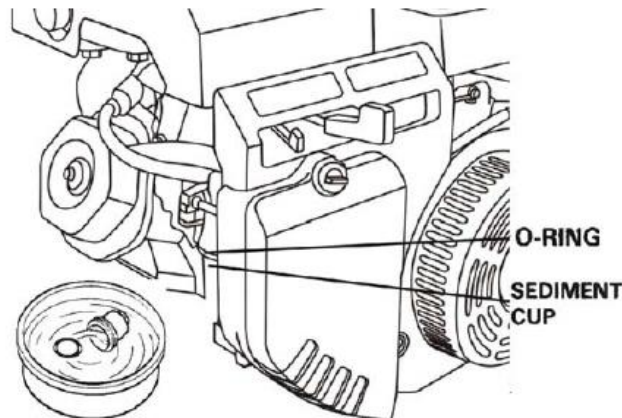


CAUTION

- Never run the engine without an air cleaner. Dirt and dust may enter the engine and cause it to wear.

Sediment Cup Cleaning

Turn the fuel valve to "OFF". Remove the sediment cup and o-ring and wash them in nonflammable or high flash point solvent. Dry them thoroughly and reinstall securely. Turn the fuel valve on and check for leaks.



⚠ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in the area.
- If any fuel is spilled, make sure the area is dry before testing the spark plug or starting the engine. Fuel vapor or spilled fuel may ignite.

Spark Plug

Recommended Spark Plug:

⚠ CAUTION

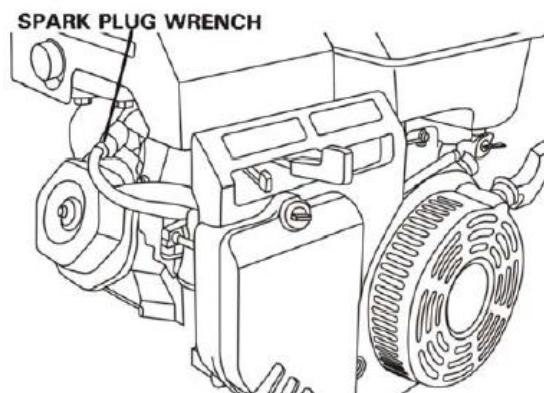
- Never use a spark plug of incorrect heat range.

⚠ WARNING

- If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.

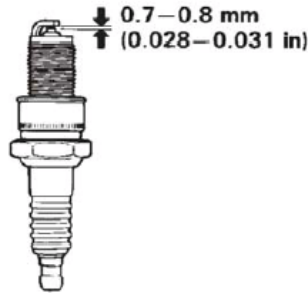
To ensure the proper engine operation, the spark plug must be properly gapped and free of deposits.

1. Remove the spark plug cap and use a spark plug wrench to remove the plug.



Maintenance (cont'd)

2. Visually inspect the spark plug. Discard if the insulator is cracked or chipped. Clean the spark plug with a wire brush if it is to be reused.
3. Measure the plug gap with a feeler or gauge. The gap should be .07-.08mm (0.028-0.031 in). Correct as necessary by bending the side electrode.



4. Check that the spark plug washer is in good condition and thread the spark plug in by hand to prevent cross-threading. If spark plug is damaged, replace with a new one.
5. After the spark plug is seated, tighten with a spark plug wrench to compress the washer.

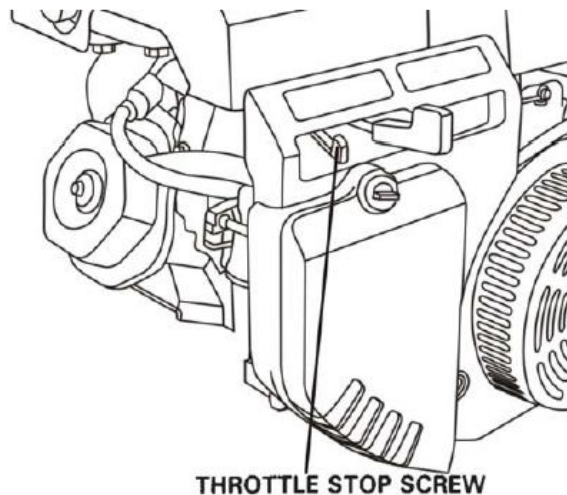
NOTE: When installing a new spark plug, tighten $\frac{1}{2}$ turn after the spark plug seats to compress the washer. When reinstalling a used spark plug, tighten $\frac{1}{8}$ - $\frac{1}{4}$ turn after the spark plug seats to compress the washer.

CAUTION

- The spark plug must be securely tightened. An improperly tightened spark plug can become very hot and may damage the engine.

Idling Adjustment

1. Start the engine and allow it to warm up to normal operating temperature.
2. With the engine idling, turn the pilot screw in or out to the setting that produces the highest idle rpm. Standard idling will be 1500 ± 150 rpm.



Transport, Storage, and Removal from Storage

Transport

Transport with the fuel valve turned to the "OFF" position. Only store the engine when it has cooled off to avoid fires or burns.

CAUTION

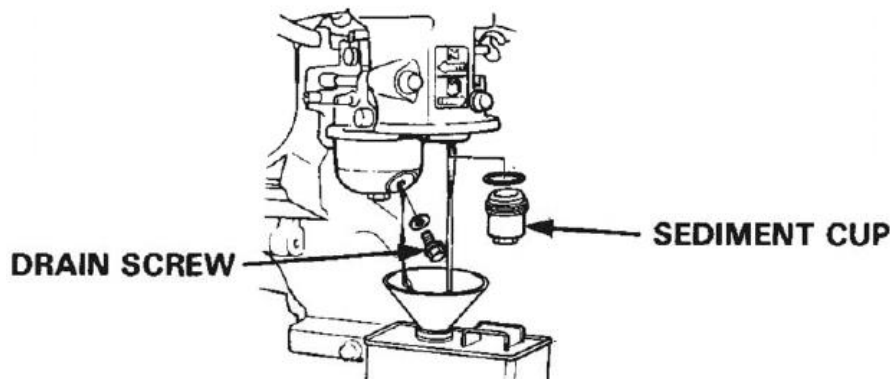
- Do not tilt engine, keep engine at a level position to prevent fuel spillage. Fuel vapor or spilled fuel may ignite.

Storage

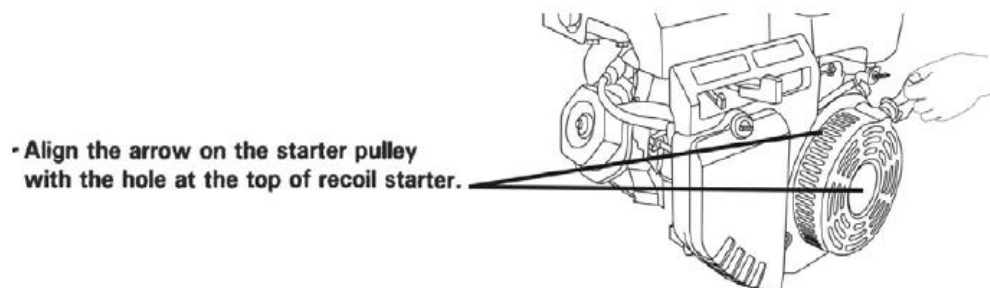
Before Storing Engine

Before storing the unit for an extended period:

1. Be sure the storage area is free of excessive humidity and dust.
2. Drain the fuel.
 - a. With the fuel valve in the "OFF" position, remove and empty the sediment cup.
 - b. Turn the fuel valve to the "ON" position and drain the gasoline from the fuel tank into a suitable container.
 - c. Replace the sediment cup and tighten securely.
 - d. Draining the carburetor by loosening the drain screw. Drain the gasoline into a suitable container.



3. Change the engine oil.
4. Remove the spark plug and pour about a tablespoon of clean engine oil into the cylinder. Crank the engine several revolutions to distribute the oil, then reinstall the spark plug.
5. Pull the starter rope slowly until resistance is felt. Continue pulling until the notch on the starter pulley aligns with the hole on the recoil starter. See illustration below. At this point, the intake and exhaust valves are closed, and this will help to protect the engine from internal corrosion.



6. Electric starter type: Remove the battery and store it in a cool, dry place. Recharge it once a month.
7. Cover the engine to keep out dust.

Transport, Storage, and Removal from Storage (cont'd)

Removing From Storage

Before reusing, service the engine.

STORAGE TIME	SERVICE
1-2 Months	• Drain out any old fuel in tank and refuel with fresh gasoline.
2 Months +	• Drain out any old fuel in tank and refuel with fresh gasoline. • Drain fuel from carburetor. • Empty sediment cup.

Note: Please dispose of fuel in a manner that is compatible with the environment. Do not throw in trash or pour on the ground.

WARNING

- Fuel is extremely flammable and explosive under certain conditions. Keep cigarette, open flames and sparks away from operating site.

Engine Specifications

	Powerhorse 208cc
Engine Type	4-Stroke, OHV, Single Cyl., Forced Air Cooled
Bore x Stroke (mm)	70 x 54
Rated Power (kW/rpm)	4.2/3600
Max Torque	13.2
Displacement (ml)	208
Starting Type	Recoil
Ignition Type	Induction Ignition
Lubricating Type	Splashing
Dry Weight	35.3 lbs
Dimension (L x W x H)	16.54 x 14.96 x 15.75

Tune-up Specifications

Model	208cc
Spark Plug Gap	0.7~0.8mm (0.028~0.03in)
Spark Plug Torque	18~22N.m
Intake Valve Clearance	0.08~0.12mm (0.003~0.005in)
Exhaust Valve Clearance	0.13~0.18mm (0.005~0.007in)

Troubleshooting

Trouble	Cause	Remedy
Engine will not start using recoil starter.	1. Is the engine switch in the "ON" position? 2. Is the fuel valve "ON"? 3. Is there fuel in the fuel tank? 4. Is gasoline reaching the carburetor? 5. Is there spark at the plug?	1. See "Starting Engine" Section. 2. See "Starting Engine" Section. 3. See "Pre-Operating Instructions." 4. To check, loosen the drain screw with the fuel valve on. See "Storage" Section for instructions. 5. Remove the spark plug cap, clean, then remove spark plug. Install plug in cap, turn engine switch to "ON" position. Ground the side electrode to any engine ground, and pull the recoil starter to see if sparks jump across the gap. If no spark, replace plug. If OK, reinstall spark plug and try to start engine again.
Engine will not start using electric starter.	1. Are the battery cables securely connected and free of corrosion? 2. Is the battery fully charged?	1. See "Battery Connection" Section. 2. Charge battery.
Engine shut down while running.	1. Engine out of fuel? 2. Is the carburetor clogged? 3. Is the spark plug bad?	1. Refuel. 2. See "Maintenance" Section. 3. See "Maintenance" Section.
Abnormal Noise or Pinging	1. Does the fuel have an octane rating of 87 or higher?	1. Change brands of fuel.

Limited Warranty

Dear Valued Customer:

The Powerhorse Product you just purchased is built with the finest material and craftsmanship. Use this product properly and enjoy the benefits from its high performance. By purchasing a Powerhorse product, you show a desire for quality and durability. Like all mechanical equipment this unit requires a due amount of care. Treat this unit like the high quality piece of machinery it is. Neglect and improper handling may impair its performance. Please thoroughly read the instructions and understand the operation before using your product. Always contact Powerhorse Product Support at 1-866-443-2576 prior to having any service or warranty work performed, as some services performed by parties other than Powerhorse approved service centers may void this warranty. This warranty is in lieu of any other warranty expressed or implied and Powerhorse assumes no other responsibility or liability outside that expressed within this warranty.

Limited Warranty

Powerhorse shall warranty any piece of equipment manufactured, or parts of equipment manufactured, to be free from defects in material or workmanship for a period of:

Powerhorse Warranty		
Item #	Consumer Warranty Period	Commercial Warranty Period
46850	2 years from date of purchase by user	90 days from date of purchase

Powerhorse Engine Warranty		
Item #	Consumer Warranty Period	Commercial Warranty Period
46850	2 years from date of purchase by user	90 days from date of purchase

"Consumer use" means personal residential household use by a consumer. "Commercial use" means all other uses, including use for commercial, income producing or rental purposes or when purchased by a business.

This warranty applies to the original purchaser of the equipment (verification of purchase, in the form of a receipt, is the responsibility of the buyer), is non-transferable, and covers parts and labor. Parts will be replaced or repaired at no charge, except when the equipment has failed due to lack of proper maintenance. If a part is no longer available, the part may be replaced with a similar part of equal function. Any misuse, abuse, alteration or improper installation or operations will void warranty. Determining whether a part is to be replaced or repaired is the sole decision of Powerhorse. Powerhorse will not provide for replacement of complete products due to defective parts. Any costs incurred due to replacement or repair of items outside of a Powerhorse approved facility is the responsibility of the buyer and not covered under warranty. Transportation costs to and from service center is the responsibility of the customer.

In addition to the normal warranty, Powerhorse shall warrant any normal wear item from defects in material or workmanship for a period of 90 days from the date of purchase by user. Normal wear items include, but are not limited to, belts and filter elements.

This warranty specifically excludes the following; failure of parts due to damage caused by accident, fire, flood, windstorm, acts of God, applications not approved by Powerhorse in writing, corrosion caused by chemicals, use of replacement parts which do not conform to manufacturer's specifications, damage related to rodent and/or insect infestation and damage caused by vandalism. Additional exclusions: loss of running time, inconvenience, loss of income, or loss of use, including any implied warranty of merchantability of fitness for a specific use. Also, Outdoor Power Equipment needs periodic parts and service to perform well, and this warranty does not cover instances when normal use has exhausted the life of a component or the engine.

This warranty does not cover any personal injury or damage to surrounding property caused by failure of any part. Repair or replacement of parts does not extend the warranty period.

The engine warranty is covered under the same terms and conditions as outlined above. Normal engine maintenance such as spark plugs, air filters, adjustments, fuel system cleaning and obstruction due to build up is not covered by this Powerhorse warranty.

Please fill in the following information and have it on hand when you call in on a warranty claim.

Customer Number: _____

Date of Purchase: _____

Powerhorse Serial Number: _____

Item Number: _____



POWERHORSE[®]

Manufactured by
Northern Tool + Equipment Co.,
2800 SouthCross Drive West
P.O. Box 1499 Burnsville, MN 55337-0499