**SAPPHIRE – BLUELINE ENGINE**

**370/454/460/570/870/1200, RAGE, CHAMP, COBALT, BLUEWAVE, THERMALWAVE**

**ENGINE WON’T TURN OVER:**

**Owner/Operator**

**Battery terminal is loose or corroded**

* Clean and tighten the battery terminal connections.

**Battery is dead**

* Recharge or replace the battery.
**WARNING:** Do not attempt to jump-start a machine from a running vehicle – shutoff the vehicle.
The amperage output from a running vehicle can damage the charging system of the truck mount.

**The Main Circuit Breaker is tripped**

* Inspect the wiring thoroughly for problems and reset the circuit breaker.

**Vacuum blower is seized due to rust**

* With the key in the OFF position, attempt to turn the engine/blower by hand.
* If the machine has not been unused or the blower was not properly lubricated at shut down, will cause rust to build up on internal surfaces. Spray penetrating oil into blower inlet and let sit for at least one hour and try restarting.

**Qualified Technician**

* Circuit Breaker will not reset and needs replacement.
* Vacuum blower is seized due to damage or clog and needs repair.
* Ignition switch needs repair or replacement.
* Wiring repairs needed.
* Starter solenoid needs replacement.
* Starter motor needs repair or replacement.
* Charging system components need repair or replacement.
* Engine needs repair.

**ENGINE WILL TURN OVER BUT WON’T START:**

**Owner/Operator**

**Circuit Breaker is tripped**

* Check all Circuit Breakers and reset as needed.

**Water box is low or empty**

* Increase water source flow rate.
* Inspect and adjust water box float valve.

**No or low fuel flow**

* Add fuel to the fuel tank, the tank must be at least 1/4 full.

**Recovery tank is full**

* Empty the tank.

**Recovery tank float is sticking**

* Move the float up and down a few times and make sure the float is in the down position.

**Engine is flooded with fuel**

* Wait 30 minutes and try to restart engine.

**Heat Exchange/Muffler Knob is not fully engaged**

* Turn knob firmly into heat exchange or muffler and try to restart.

**Engine Oil is low**

* Add oil to the proper level on the dipstick. DO NOT over fill.

**Engine has overheated. (Allow engine to cool down)**

* Make sure Air Flow is not restricted, OPEN all doors.
* Check engine coolant level, fill as needed.(liquid cooled engines)
* Remove debris from radiator. (Liquid cooled engines)

**Engine Air Filter is extremely Dirty or Plugged**

* Remove and replace the engine air filter.

**Fuse is burned**

* Check all Fuses, replace burned fuses and needed.

**Qualified Technician**

* Recovery Tank Float needs repair or replacement.
* High or Low Water Pressure Sensor needs replacement.
* Fuel Pump needs repair or replacement.
* Fuel Tap needs repair or replacement.
* Fuel Filter needs replacement.
* Cooling System Fan belt is warn or broken and needs replacement.
* Cooling System Thermostat needs replacement.
* Engine has no Spark and needs repair.
* Carburetor needs repair or replacement.
* Ignition System needs repair or replacement.
* Electronic Control Unit (ECU) problem.
* Engine sensor needs replacement.
* Engine needs repair.

**ENGINE STARTS BUT RUNS POORLY OR STALLS:**

**Owner/Operator**

**Cleaning Unit/Van is parked on too steep of a hill or incline**

* Reposition van on a level grade.

**Black Smoke from exhaust**

* Push Choke all the way in. (engines with manual choke)
* Clean or replace engine air filter.
* Vacuum Pressure is too high, adjust vacuum pressure to manufacturer spec (12” – 14").

**WARNING:** Vacuum pressure that is too high can cause damage to machine components.

**Engine Throttle/Speed Control is too low**

* Adjust Throttle/Speed Control to increase RPM.

**Engine is Overheating**

* Make sure Air Flow is not restricted, OPEN all doors.
* Check engine coolant level, add as needed. (Liquid cooled engines)
* Remove debris from radiator. (Liquid cooled engines)

**Qualified Technician**

* Maximum engine RPM is too low.
* Engine Throttle/Speed Control needs repair or replacement.
* Engine running rough and needs repair.
* Engine blows black smoke from exhaust under normal operating conditions.
* Engine is backfiring under normal operating conditions.
* Heat Exchanger or Blower is clogged and needs repair.
* Engine needs repair.