

**WARNING: DEVIATION FROM THESE INSTALLATION INSTRUCTIONS MAY LEAD TO IMPROPER ENGINE OPERATION WHICH COULD CAUSE PERSONAL INJURY TO OPERATORS OR OTHER NEARBY PERSONNEL.**

## **1.0 DESCRIPTION**

- 1.1 The Altronic I ignition system consists of these basic components:
  1. Altronic I Unit
  2. Pick-up Coil Assembly (1 or 2)
  3. Flywheel Magnet Bar (1 or 2) or Buttons (1 or 2 pair)
  4. Ignition Coils - one per spark plug; use only the following types:  
501061, 591010, 591040, 591050, 501061-S, 591010-S, 591007, 591011A, 591011B.
- 1.2 The system alternator provides the power for the electronic box mounted to it. The electronic box rectifies the alternator's AC output to DC, stores the energy in a storage capacitor and contains an SCR switching device (one per output) to release the stored energy to the ignition coil(s). The alternator provides no timing function; it can be either belt or coupling driven. Timing is set by magnets mounted to the engine's flywheel triggering an associated pick-up coil. The system uses an ignition coil for each spark plug.

## **2.0 INSTALLATION - ALTERNATOR**

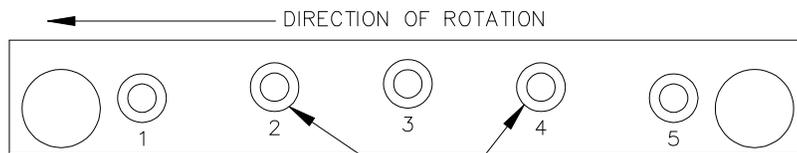
- 2.1 Coupling-driven alternators mount to the engine's magneto drive. Pulley-driven alternators should be driven between 1.0 and 1.5 times engine speed. At starting, the alternator speed should be at least 40 RPM. Hardware for securing the alternator is provided in the field kits.
- 2.2 The electronic box has connectors for the pick-up coil assembly harness and a #10 screw terminal for connection to the engine's shutdown system.

## **3.0 INSTALLATION - PICK-UP COIL(S)**

- 3.1 Mount on bracket so that the pick-up end will be parallel to and approximately 3/16" to 1/4" (4.7 to 6.4 mm) away from the magnet face. On 2-cylinder, 2-cycle engines, use two magnet bars mounted about 2 inches apart. The pick-up coil bracket should be mounted securely to the engine and free from vibration during operation.

## **4.0 INSTALLATION - MAGNET BAR(S) (See Diagram)**

- 4.1 Set the flywheel at the specified degrees (see chart on page 2) before top dead center. Position the magnet bar on the flywheel so that the RECESSED magnet is directly opposite the pick-up coil and so that the other magnet will pass directly opposite the pick-up coil as the engine rotates. With the magnet bar properly positioned, mark the positions of holes 2 and 4 (see page 2) on the flywheel.
- 4.2 Two 8-32 tapped holes (drill size American standard #29) must be provided in the flywheel at the two above marked spots. Two 8-32 x 5/8" screws and lockwashers are supplied. With the magnet bar in place, check that the spacing to the pick-up coil is 3/16" to 1/4". On hand-cranked engines, it may be necessary to use a smaller gap.
- 4.3 For 2-cylinder, 2-cycle engines, use the above setting for #1 cylinder. The pick-up coil nearest the outer rim of the flywheel should be used for #1 cylinder. Rotate the flywheel exactly 180 degrees so the #2 cylinder is at the specified degree setting. Follow the procedure outlined in sections 4.1 and 4.2 with the second magnet bar using the pick-up coil nearest the crankshaft. Both magnet bars should pass directly under their respective pick-up coils with a gap of 3/16" to 1/4".



Recessed magnet directly opposite pick-up coil with flywheel at specified degrees BTDC.

Use holes 2 and 4 to mount magnet bar. Holes 1 and 3 give about 3° retard, and holes 3 and 5 about 3° advance from standard setting.

**TIMING SETTING FOR RECESSED MAGNET**

ENGINE	DEGREES BTDC
Ajax	10-12
Arrow 1-cyl.	25
Clark 1-cyl.	25
Continental-Emsco	25
Cooper Bessemer	10-12
Fairbanks Morse	10-12
I-R	9-10
Leroi	25

ENGINE	DEGREES BTDC
Lorain	10-12
Lorain	10-12
Lufkin	10-12
Oilwell 1-cyl.	22
Oilwell 2-cyl.	12
Superior 1-cyl.	10-12
Witte	25

**5.0 INSTALLATION - MAGNET BUTTONS**

- 5.1 If magnet buttons are used instead of magnet bars, drill .750" diameter holes 3/8" deep in the flywheel face for each button.
- 5.2 Mount the 1/4" thick button directly opposite the pick-up coil with the engine set 2-3 degrees advanced from the setting listed above; this thinner button should be recessed 1/8" to 3/16" below the flywheel face.
- 5.3 Mount the 3/8" thick button directly opposite the pick-up coil with the engine set 3-5 degrees ATDC (after top dead center); this thicker button should be flush with the flywheel face.

**6.0 INSTALLATION - IGNITION COIL(S)**

- 6.1 Use only the Altronic coils indicated in section 1.1.
- 6.2 Mount the ignition coils as close to the spark plugs as possible keeping the high-tension lead length to a minimum but also keeping temperature below 200° F. (95° C.) during operation. On engines exposed to weather, it is preferable to point the high tension outlet down.

**7.0 PRIMARY WIRING**

- 7.1 Refer to the attached wiring diagrams for the appropriate engine type and coil model. The pick-up coil assembly's 3-pin plug connects to the mating socket on the alternator's electronic box. The blue wire connects to the positive (+) terminal of the ignition coil. NOTE: Coil wiring varies on some installations with the 591050 (Hot Spark) coil - see the appropriate wiring diagram.
- 7.2 On 2-cylinder, 2-cycle engines, be sure the blue wire connected to the #1 cylinder ignition coil and the pick-up coil timed to #1 cylinder are wired to a common 3-pin plug.
- 7.3 A ground lead (no. 14 gauge black) is provided to connect the negative (-) ignition coil terminal(s) to engine ground and back to the alternator housing (see wiring diagrams).
- 7.4 All connections should be made using ring type terminals specified for no. 14-16 gauge wire and #10 stud size. Terminals should either be soldered to the wire or attached with an appropriate staking tool. All primary wiring should be protected from physical damage, vibration and temperatures in excess of 200° F. (95° C.).

**8.0 SHUTDOWN WIRING**

- 8.1 The engine shutdown wires attach to the center screw terminal of the electronic box. This terminal must be grounded to shut off the ignition.
- 8.2 For proper operation of Murphy tattletale switches or fuel valve, use panel adaptor 501213 as shown in the wiring diagrams.
- 8.3 Safety switches and associated wiring must be in good condition for proper operation with the Altronic I ignition system due to the low primary current output of the alternator. Take an ohmmeter reading of resistance between the safety shutdown wire and ground before installing the Altronic I system; on the RX10,000 scale, the reading should be infinite. All uninsulated switch connections that are exposed to weather should be insulated using silicone rubber adhesive (Altronic part no. 503151).

**9.0 SECONDARY WIRING**

- 9.1 The spark plug leads should be fabricated from 7 mm, silicone insulated, tinned copper conductor with suitable terminals and silicone spark plug boot. Keep spark plug leads as short as possible and in all cases not longer than 20 inches (500 mm). Spark plug leads should be kept at least 2 inches (50 mm) away from any grounded engine part. In deep spark plug wells, use rigid, insulated extenders projecting out of the well.
- 9.2 The use of a clear, silicone grease (such as Dow Corning DC-4) is recommended for all high-tension connections and boots. This material helps seal out moisture and prevent corrosion from atmospheric sources.

**10.0 TROUBLESHOOTING ON ENGINE**

- 10.1 **WIRING AND INSTALLATION** - If ignition problems are suspected, first check that all ignition wiring is in good condition. Make sure a ground lead is run from the negative terminal of the ignition coil(s) to engine ground and back to the alternator housing. Check that the gap between the pick-up coil and flywheel magnets does not exceed 1/4".
- 10.2 **SHUTDOWN SYSTEM** - If the system appears to be installed correctly with all wiring in good condition, first remove all shutdown wires from the center terminal of the electronic box on the alternator. Attempt to start the engine. This will isolate the shutdown switches and wiring which may be causing the problem by partially or completely shorting out the ignition.  
CAUTION: Do not leave the engine operating with the shutdown wires disconnected.
- 10.3 **OPERATING TEST** - Remove the wire from the spark plug and hold approximately 1/4" to 3/8" away from the spark plug terminal to check for spark.  
CAUTION: Hold wire on insulated portion at least 2 inches away from any metal termination.

With the engine cranking, there should be a visible spark which would indicate a properly functioning ignition system. If there is no spark or a weak spark in this test, check for output at the electronic box center terminal using a screwdriver to short to the alternator housing. Follow the table below for further troubleshooting.

SPARK TEST	ELECTRONIC BOX CENTER TERMINAL	RECOMMENDED ACTION
Strong spark	Strong flash	System is OK
Weak spark	Strong flash	Replace ignition coil
	Weak or none	Check Altronic I unit
No spark	Strong flash	Replace pick-up coil
	Weak or none	Check Altronic I unit

10.4 ALTRONIC I UNIT CHECK - If the results using the above table indicate a problem in the Altronic I unit, a further test may be performed to determine whether the problem is with the electronic box or the alternator stator winding. First, disconnect all connections to the unit and remove from engine. Proceed as outlined below.

NOTE: Erratic or continuous firing while the engine is operating indicates a faulty electronic box.

A. Remove the electronic box from the alternator and disconnect the two leads. The alternator stator winding can be checked in two ways:

1. Turn the alternator shaft with the two leads shorted together. If the alternator stator winding is OK, a loading effect will be noticed as compared with turning the shaft with the leads separated.
2. Check the stator winding for continuity using an ohmmeter on the RX100 scale; a correct reading is 4,000-5,000 ohms. An infinite reading should be obtained from either lead to the alternator case.

B. If either of the tests of 10.4 A. indicates a defective alternator stator, replace the alternator. If either of the tests indicates an operating stator winding, replace the electronic box.

### **11.0 SPARE PARTS**

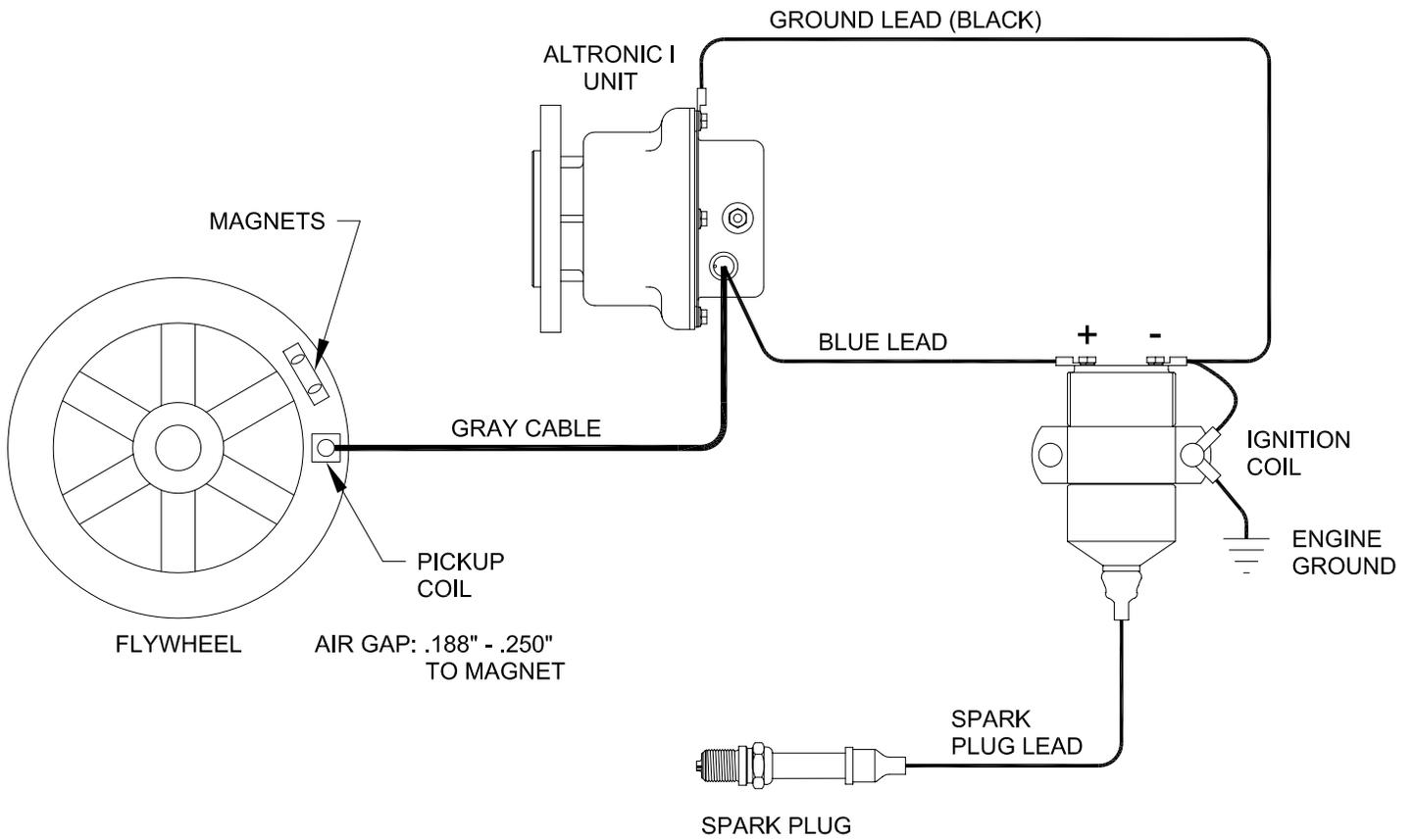
11.1 The following are spare parts for the Altronic I system:

PART NO.	DESCRIPTION
171001	Stator winding (S/N 5,000 and higher)
181001-X*	Electronic box, 1-cylinder
181002-X**	Electronic box, 2-cylinder
101065	Pick-up coil assembly - 33" black, 60" blue
101092	Pick-up coil assembly - 58" black, 70" blue
101104	Pick-up coil assembly - 42" black, 80" blue
101114	Pick-up coil assembly - 66" black, 90" blue
101181	Pick-up coil assembly - 180" black, 200" blue
101233	Pick-up coil assembly - 18" black, 78" blue
101235-2	Pick-up coil assembly - 28" black, 30" blue
101236-2	Pick-up coil assembly - 29" black, 32" blue
101062	Magnet bar, 5.25" length
101076	Magnet bar, 8.25" length
102049	Magnet button, 0.25" thick
102050	Magnet button, 0.38" thick
501061	Ignition coil, unshielded (blue)
591050	Ignition coil, unshielded (black, rectangular)

\* Replaces prior part nos. 101074 and 181001.

\*\* Replaces prior part nos. 101077 and 181002.

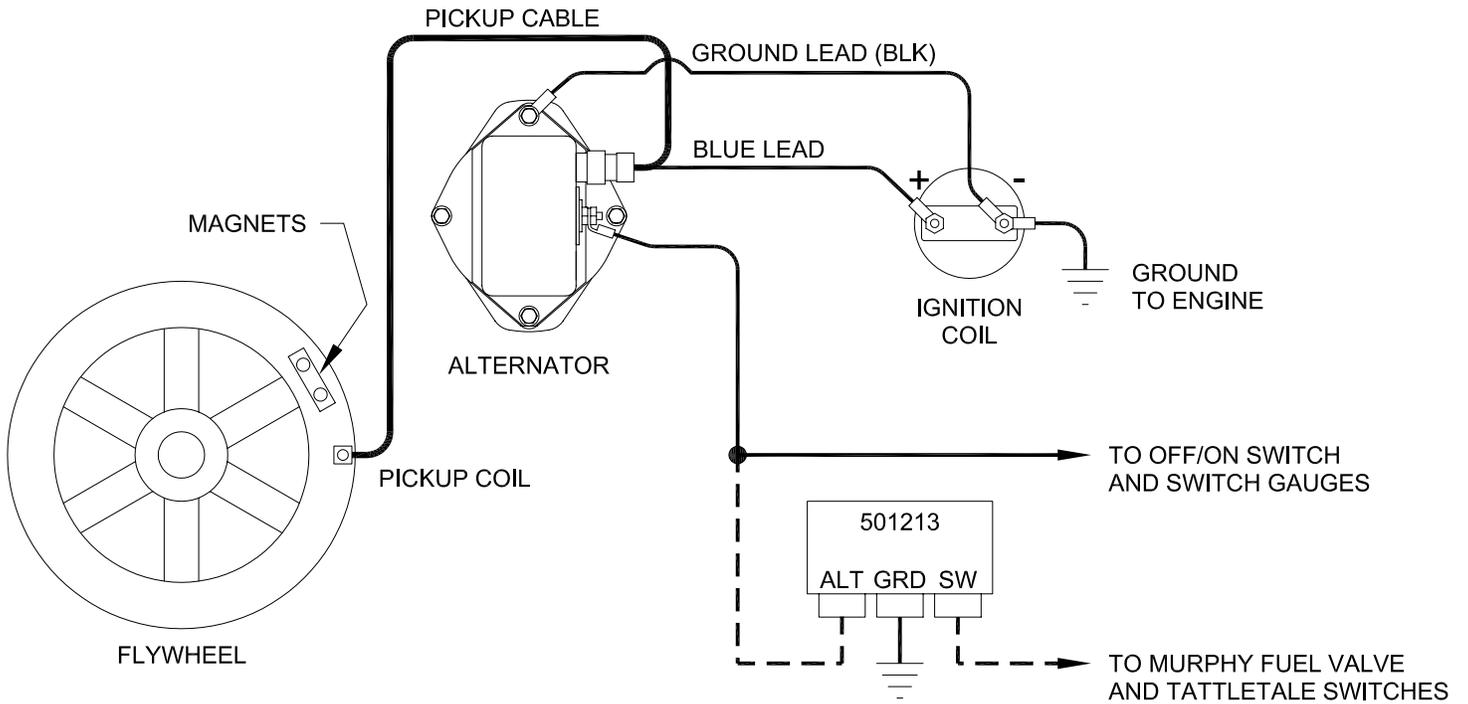
# TYPICAL INSTALLATION - 1-CYLINDER SHOWN



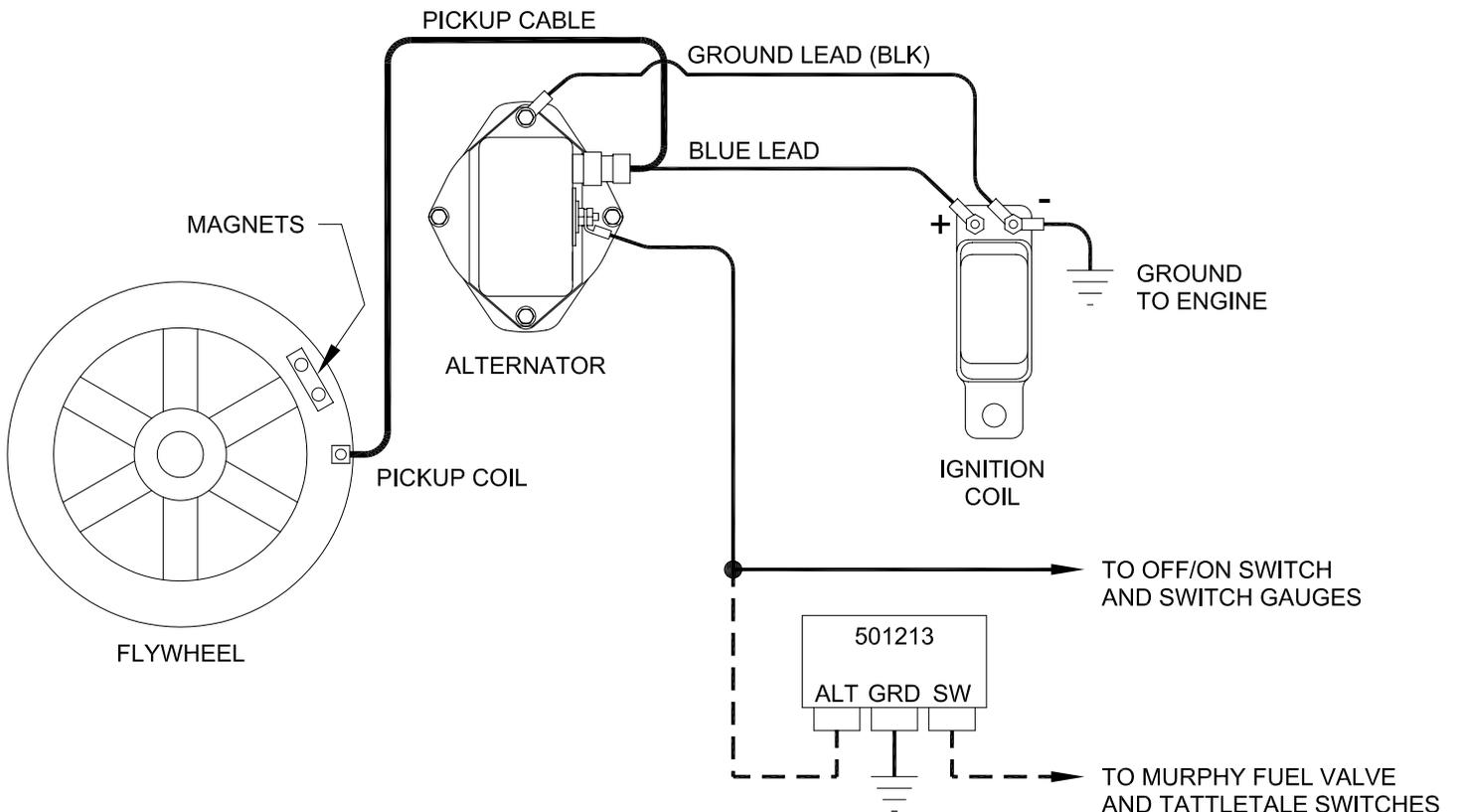
NOTE: SEE THE TIMING SETTING CHART (PG. 2) AND WIRING DIAGRAMS ON THE FOLLOWING PAGES FOR THE SPECIFIC APPLICATION.

WIRING DIAGRAM  
1-CYLINDER ENGINE  
1 SPARK PLUG/CYLINDER

ROUND COILS

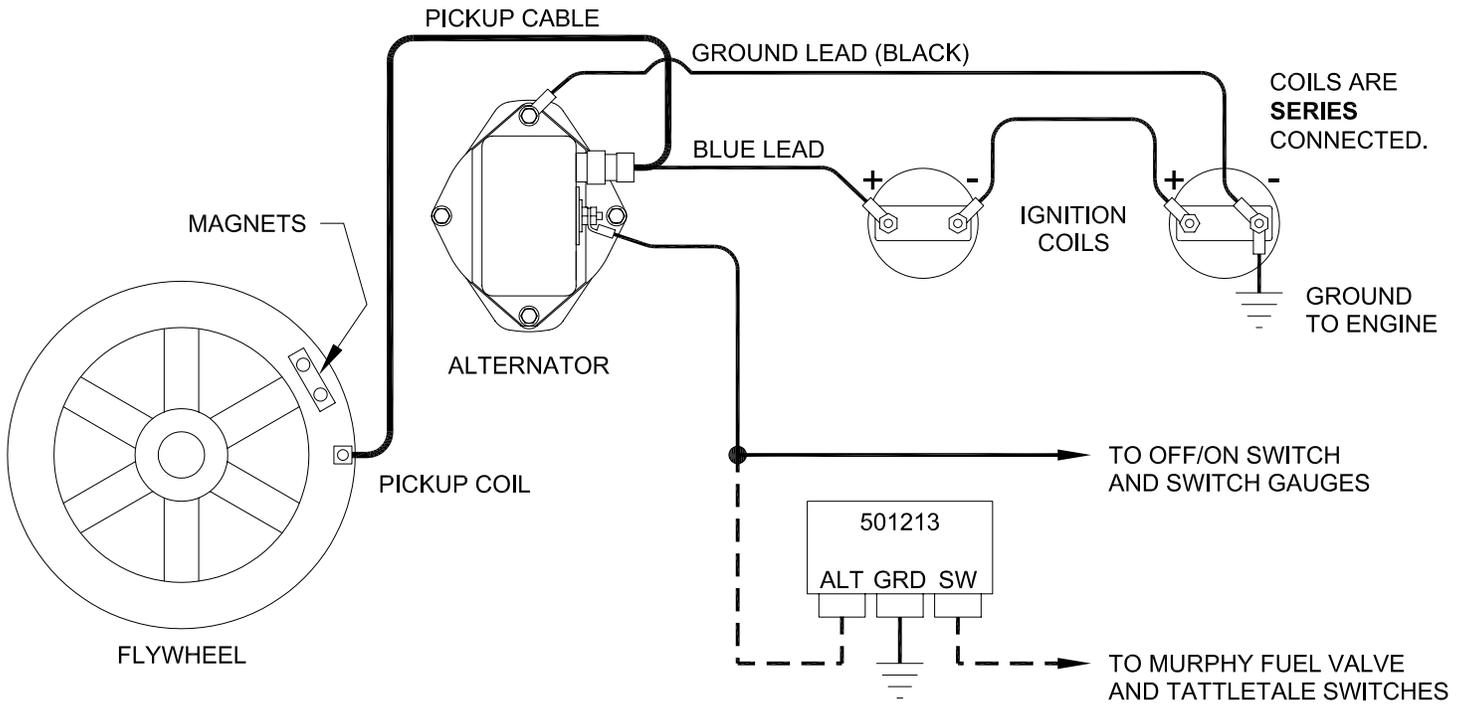


591050 COIL ONLY

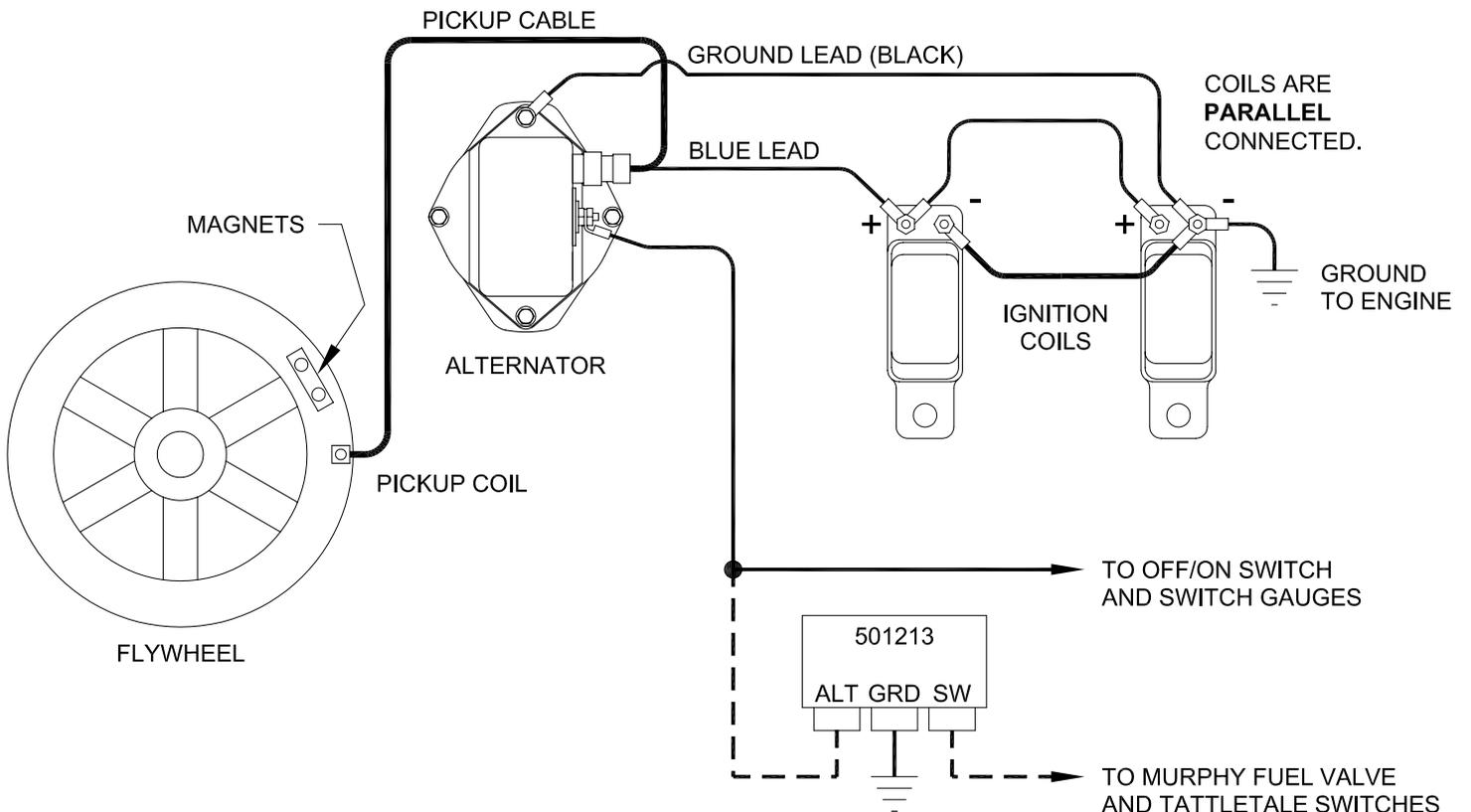


WIRING DIAGRAM  
1-CYLINDER ENGINE  
2 SPARK PLUGS/CYLINDER

ROUND COILS

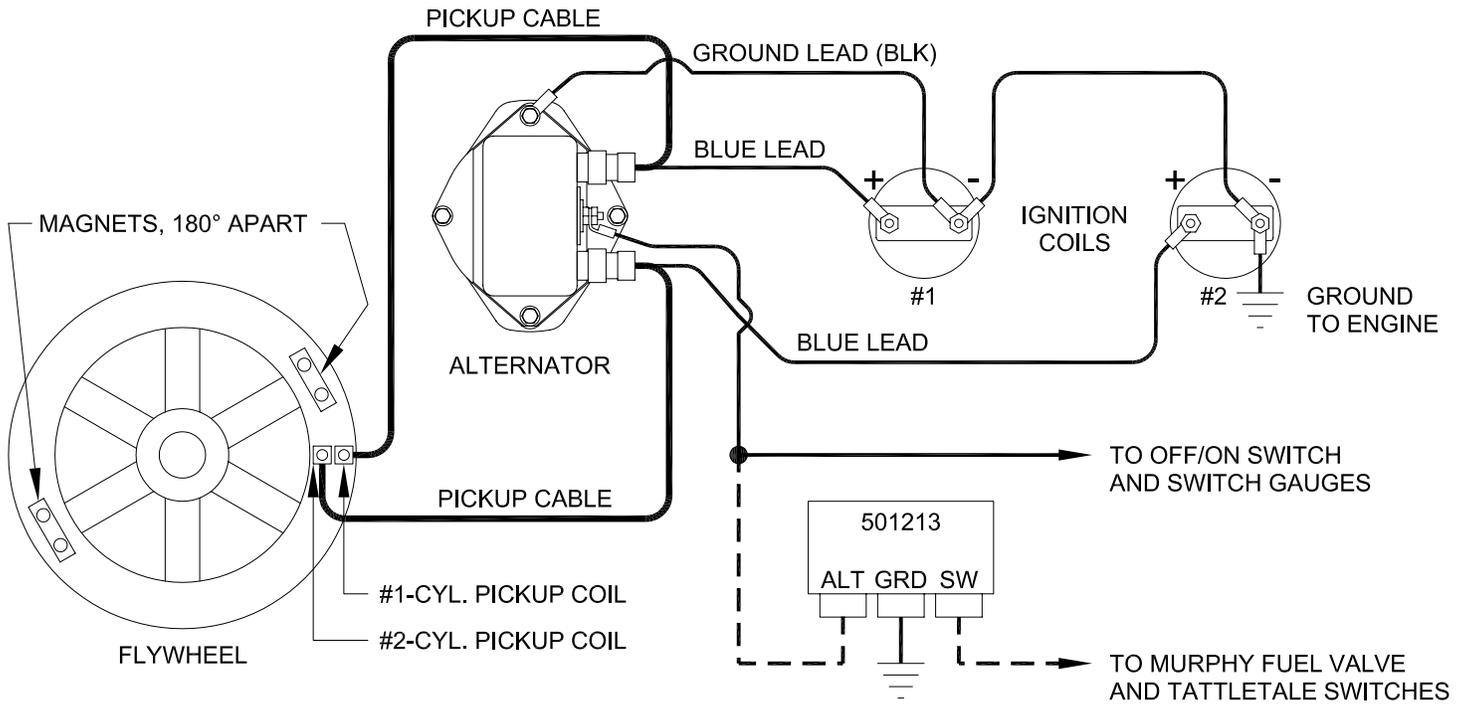


591050 COIL ONLY

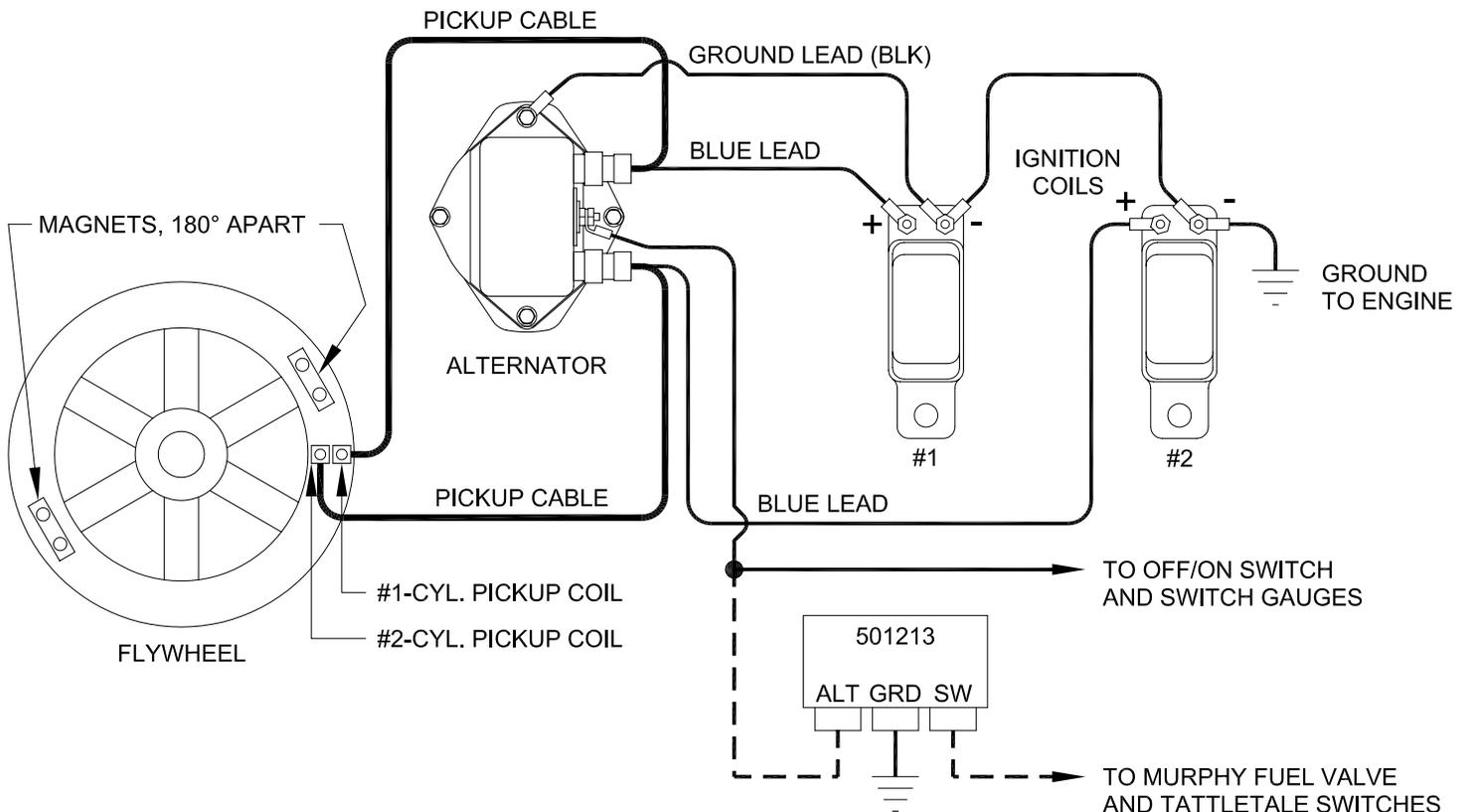


**WIRING DIAGRAM  
2-CYLINDER, 2-CYCLE ENGINE  
1 SPARK PLUG/CYLINDER**

**ROUND COILS**

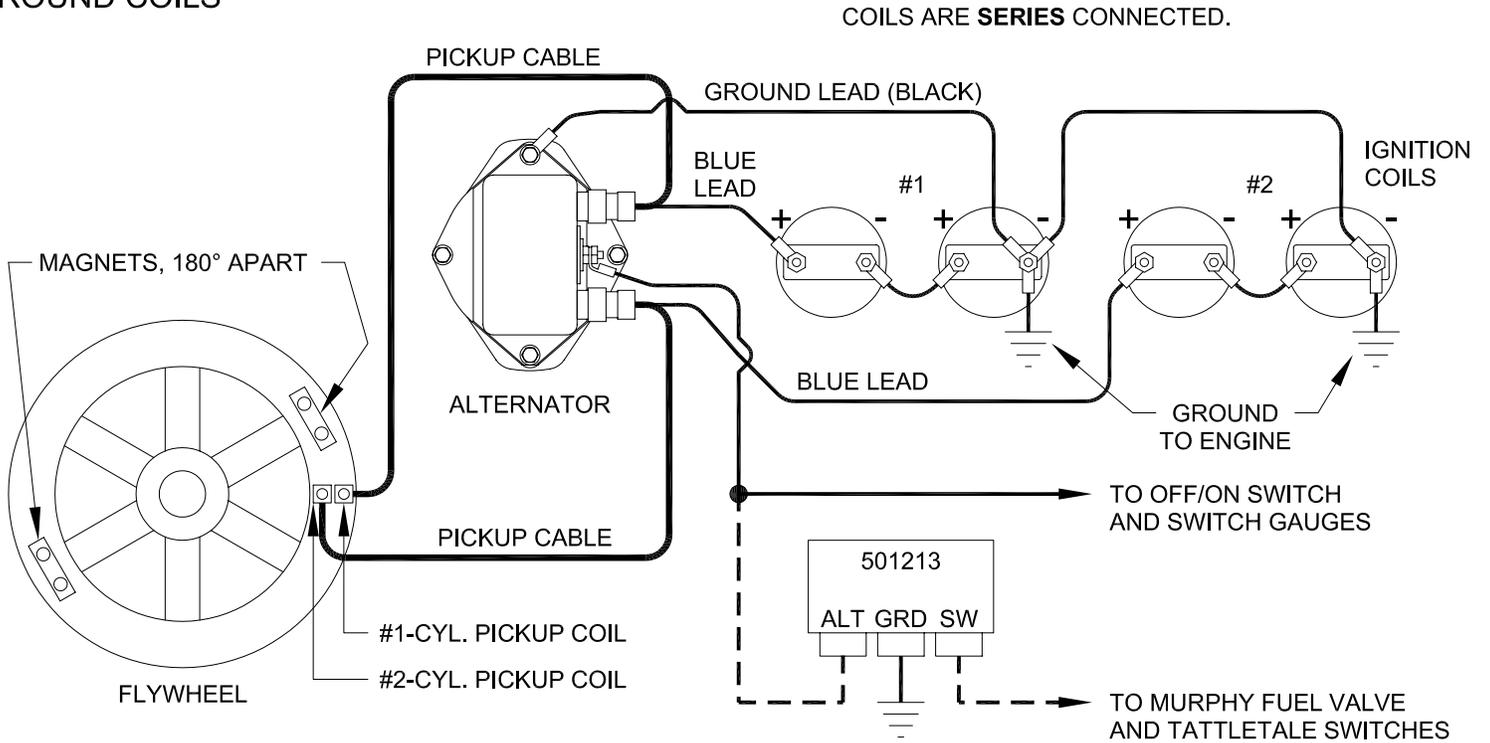


**591050 COIL ONLY**

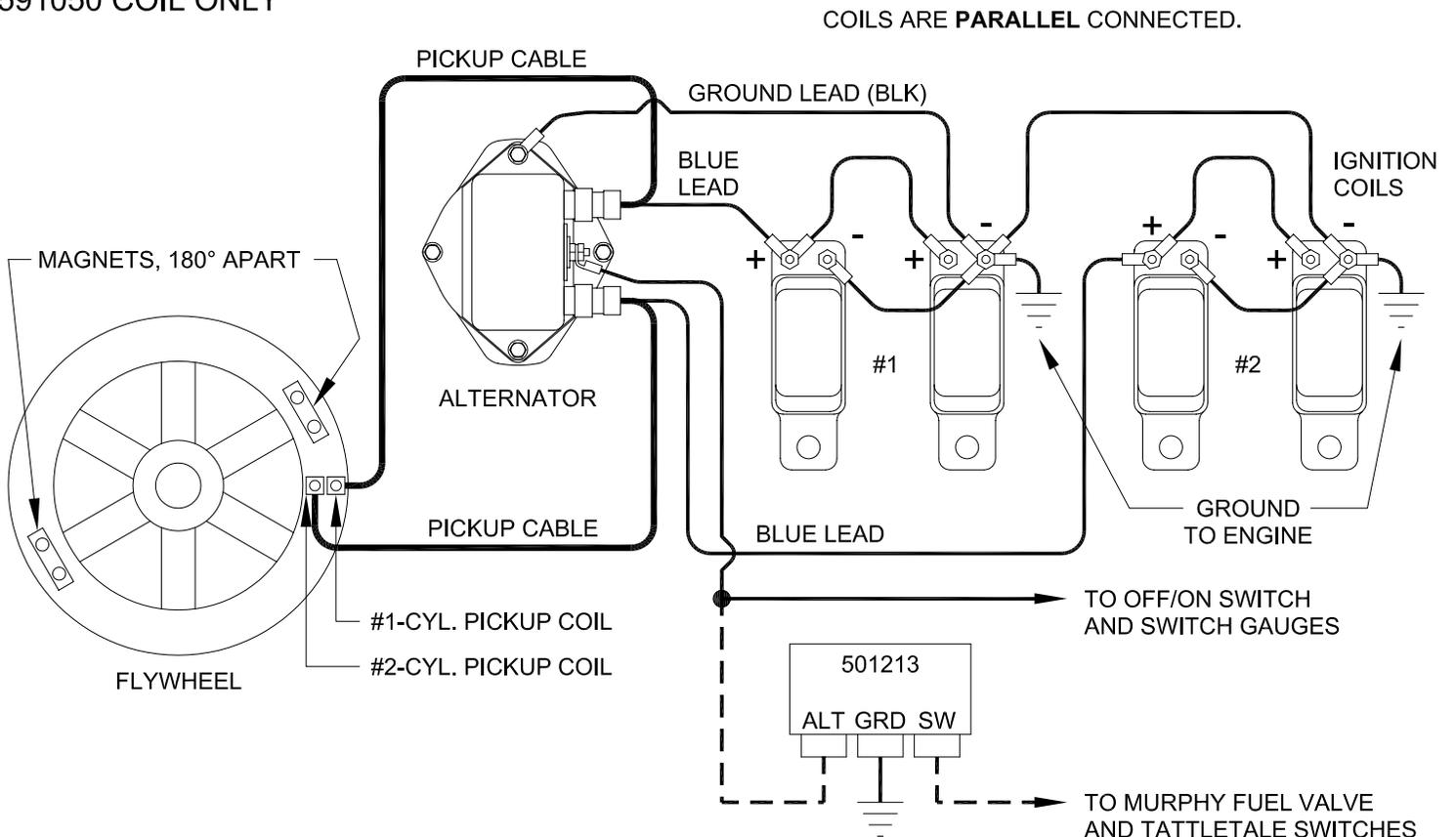


**WIRING DIAGRAM  
2-CYLINDER, 2-CYCLE ENGINE  
2 SPARK PLUGS/CYLINDER**

**ROUND COILS**

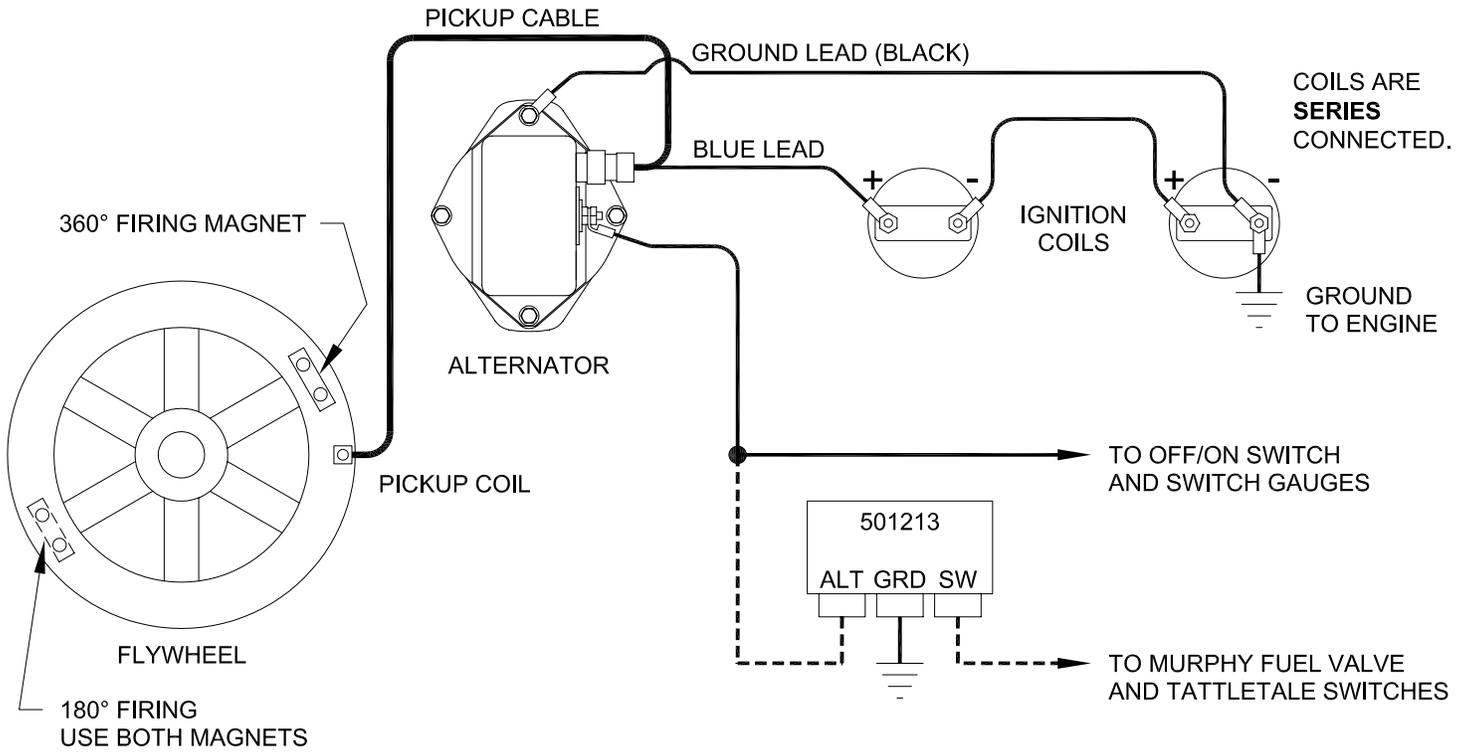


**591050 COIL ONLY**



# WIRING DIAGRAM 2-CYLINDER, 4-CYCLE ENGINE

## ROUND COILS



## 591050 COIL ONLY

