

**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-6 ignition system consists of these basic components:
1. Altronic I-6 Unit
  2. Pick-up Module
  3. Magnet Disc
  4. Wiring Harness
  5. Ignition Coils - one per cylinder; use only the following types:  
501 061, 591 010, 591 040, 501 061-S, 591 010-S, 591 007, 591 011A, 591 011B, 591 012
- 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 SCR switching devices to release the stored energy to the ignition coils. The alternator provides no timing function; it can be either belt or coupling driven. Timing is set by a magnet disc mounted to the engine's front crankshaft pulley. The pick-up module has 3 pick-ups, each of which serves either one or two engine cylinders. The system uses an ignition coil for each cylinder.

## **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 100 RPM. Hardware for securing the alternator is provided in the field kits.
- 2.2 The electronic box has connectors for the pick-up module cable and wiring harness.

## **3.0 INSTALLATION - PICK-UP MODULE/MAGNET DISC**

- 3.1 See the diagrams included with these instructions for details on the mounting of the magnet disc and pick-up module. The air gap between the pick-up sensing hex heads and the magnet disc should be 1/8" (3 mm).  
NOTE: Be sure the "A" pick-up bolt is well grounded to the engine.

## **4.0 INSTALLATION - IGNITION COILS**

- 4.1 Use only the Altronic coils indicated in section 1.1.
- 4.2 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.

## **5.0 PRIMARY WIRING (SEE WIRING DIAGRAMS)**

- 5.1 Altronic I-6 uses the exhaust stroke firing principle on 4-cycle engines. On 4 and 6-cylinder engines, two coils are wired in series and connected to one harness lead. Wiring must be as shown in the wiring diagrams for the particular application. Do not use parallel connection of the coils.
- 5.2 Note the wiring for the common ground lead; there must be a ground wire from the coil shown in the wiring diagrams to the engine or coil mounting bracket. Use a short piece of no. 14-16 gauge wire for this purpose.
- 5.3 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.).

### **6.0 SHUTDOWN WIRING**

- 6.1 The engine shutdown wires attach to the white lead of the pick-up module cable assembly. This lead must be grounded to shut off the ignition.
- 6.2 For proper operation of Murphy tattletale switches or fuel valve, use panel adaptor 501 213 as shown in the wiring diagrams.
- 6.3 Safety switches and associated wiring must be in good condition for proper operation with the Altronic I-6 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-6 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. 503 151).

### **7.0 SECONDARY WIRING**

- 7.1 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.
- 7.2 The use of a clear, silicone grease (such as Dow Corning DC-4, G.E. G-623 or GC Electronics Z5) is recommended for all high-tension connections and boots. This material helps seal out moisture and prevent corrosion from atmospheric sources.

### **8.0 TROUBLESHOOTING ON ENGINE**

- 8.1 **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 appropriate ignition coils to engine ground and back to the alternator housing. Check that the air gap between the pick-up module and magnet disc does not exceed 1/8".
- 8.2 **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.
- 8.3 **ONE CYLINDER MISFIRING**
  - A. Check high tension lead for connection at coil and spark plug.
  - B. Check spark plug.
  - C. Change ignition coil.
- 8.4 **TWO OR MORE CYLINDERS MISFIRING**
  - A. Check all ignition wiring and connections.
  - B. Disconnect the white shutdown lead of the pick-up module cable (5-pin connector) from all shutdown devices to be sure problem is not caused by a complete or partial short to ground in the shutdown switches or wiring.
  - C. Check electronic box and alternator - see section 8.5.
  - D. Change pick-up module.

- 8.5 ALTRONIC I-6 UNIT CHECK - If a problem is suspected with the Altronic I-6 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 950-1,250 ohms. An infinite reading should be obtained from either lead to the alternator case.
  - B. If either of the tests of 8.5 A. indicates a defective alternator stator, replace the alternator. If either of the tests indicates an operating stator winding, replace the electronic box.

**9.0 SPARE PARTS**

9.1 The following are spare parts for the Altronic I-6 system:

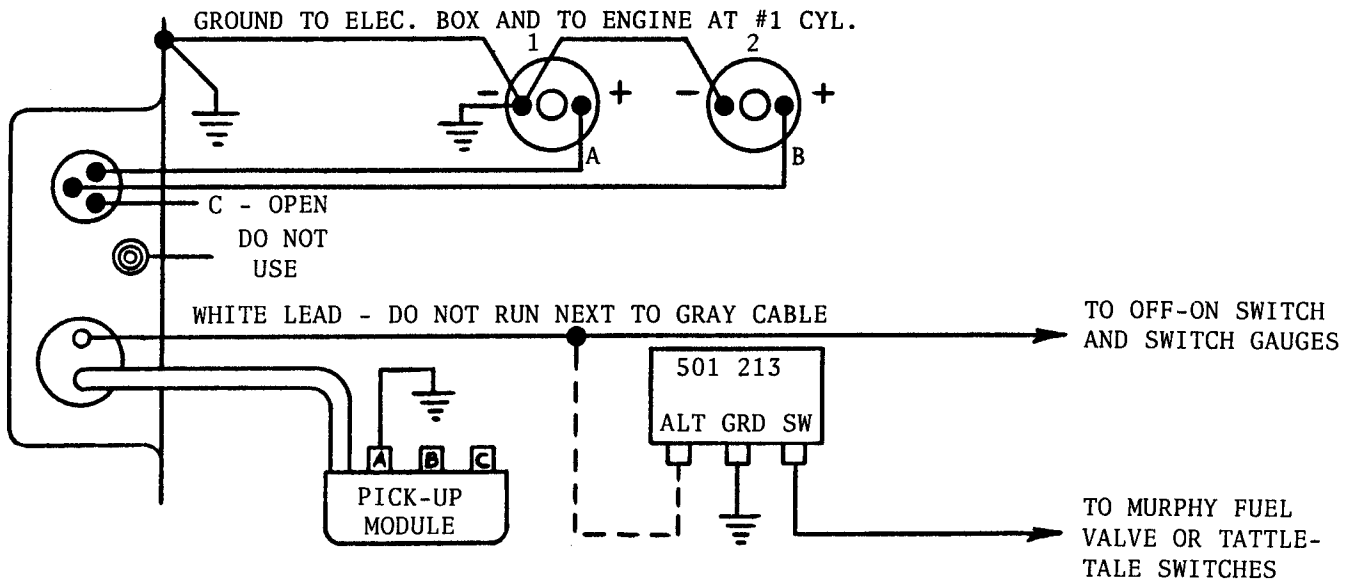
PART NO.	DESCRIPTION
171 003	Stator winding
181 006*	Electronic box, standard
181 006-X**	Electronic box, Ajax engines
191 003-12	Pick-up module, 12" black lead
191 003-36	Pick-up module, 36" black lead
191 003-72	Pick-up module, 72" black lead
501 061	Ignition coil, unshielded
593 017-2	Harness

\* Replaces prior part no. 181 003.

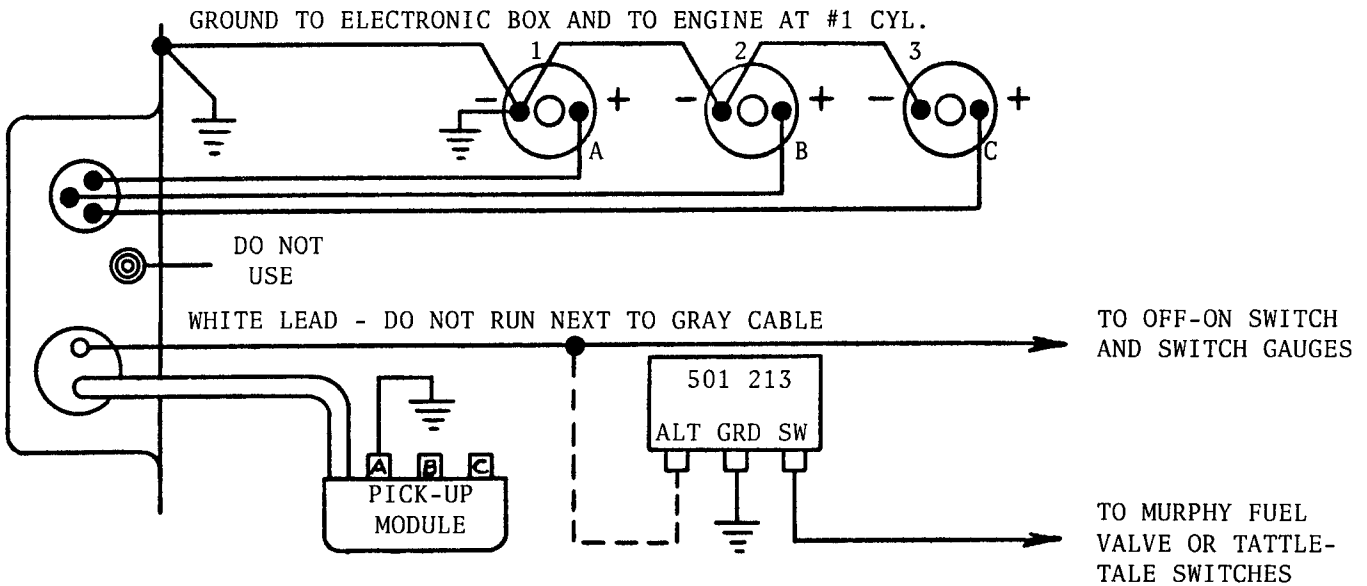
\*\* Replaces prior part no. 181 003-X.



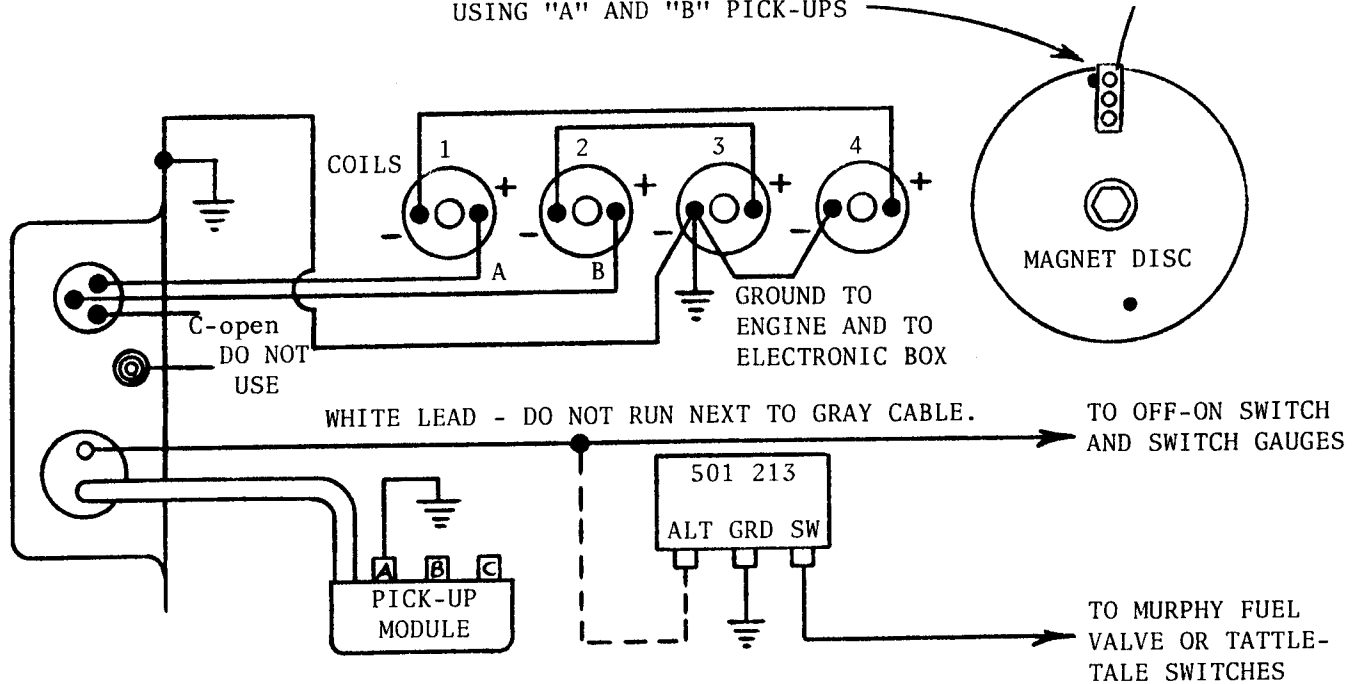
**ALTRONIC I-6 WIRING DIAGRAM - 2 CYLINDER, 4-CYCLE**



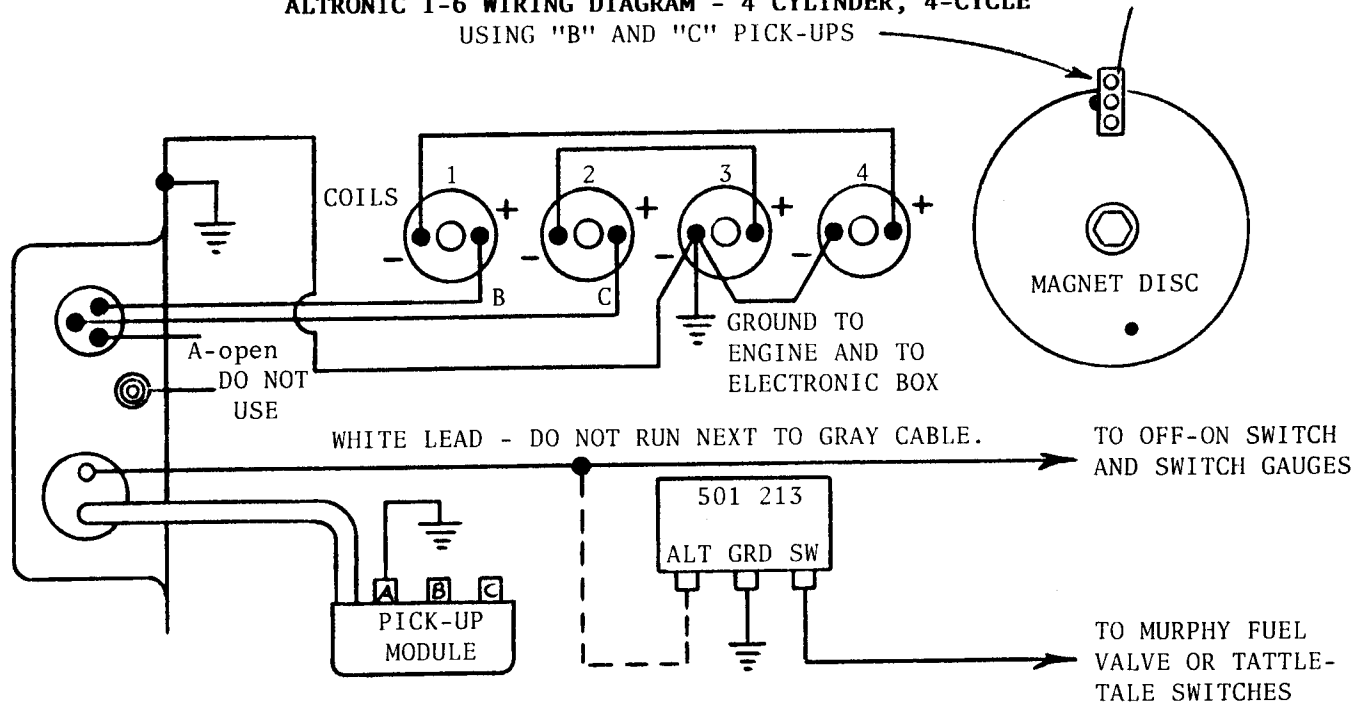
**ALTRONIC I-6 WIRING DIAGRAM - 3 CYLINDER, 4-CYCLE  
FIRING ORDER 1-3-2**



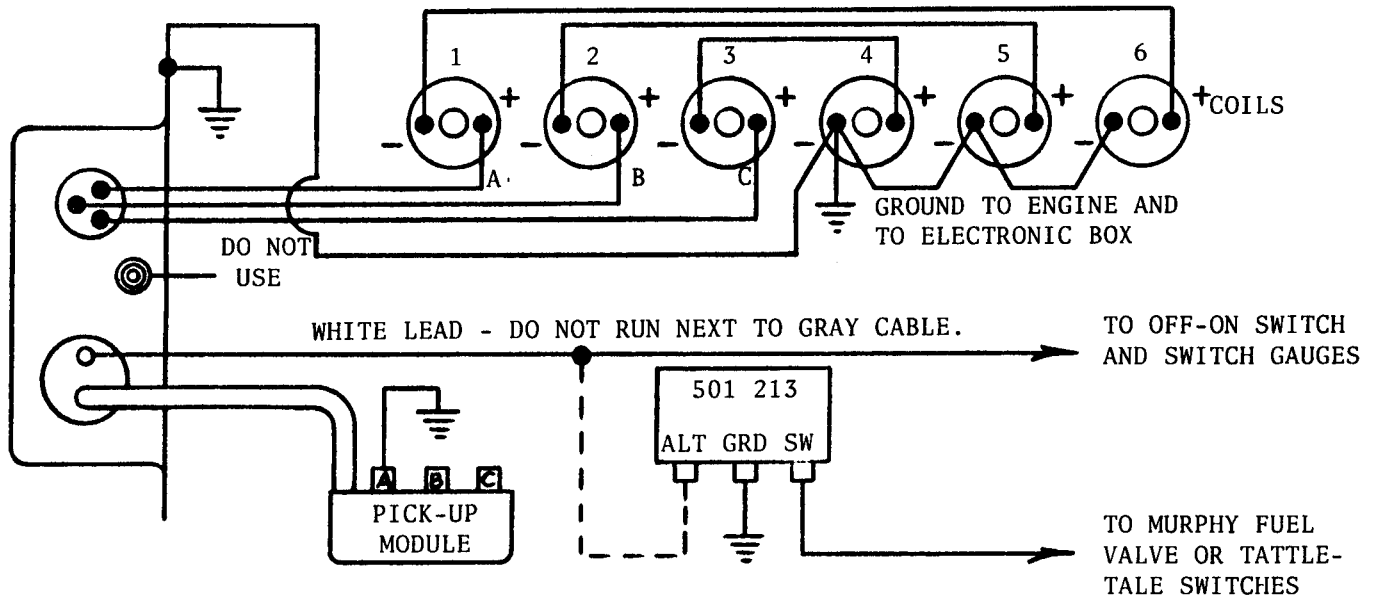
**ALTRONIC I-6 WIRING DIAGRAM - 4 CYLINDER, 4-CYCLE  
USING "A" AND "B" PICK-UPS**



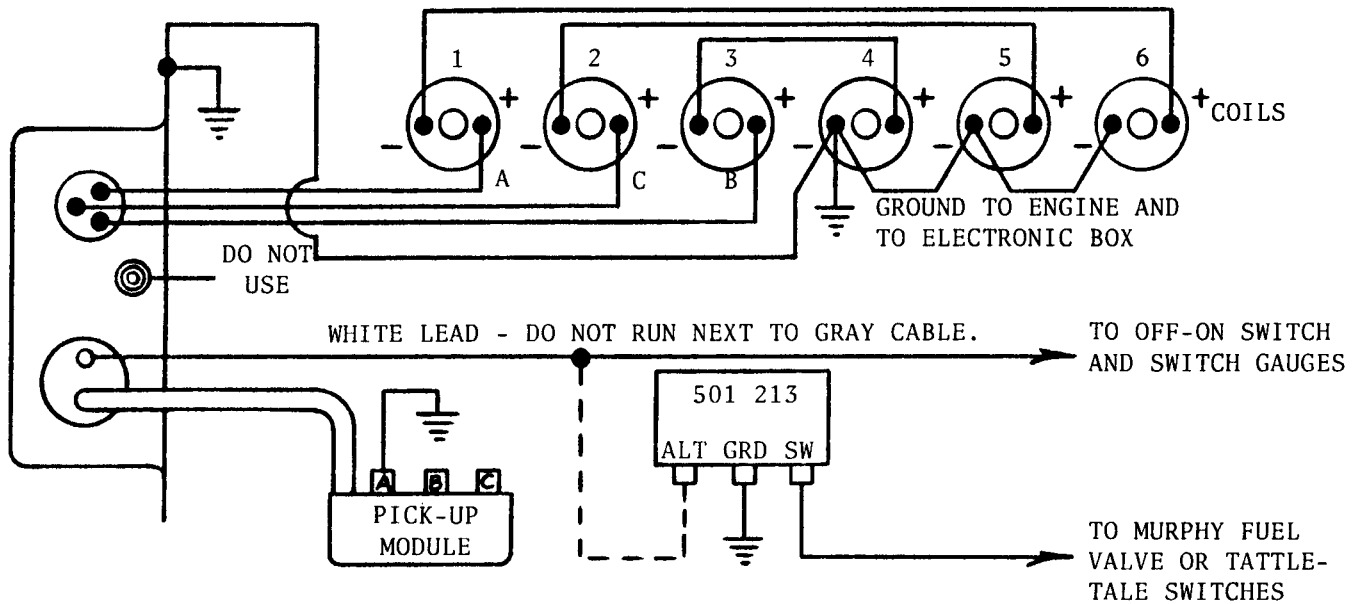
**ALTRONIC I-6 WIRING DIAGRAM - 4 CYLINDER, 4-CYCLE  
USING "B" AND "C" PICK-UPS**



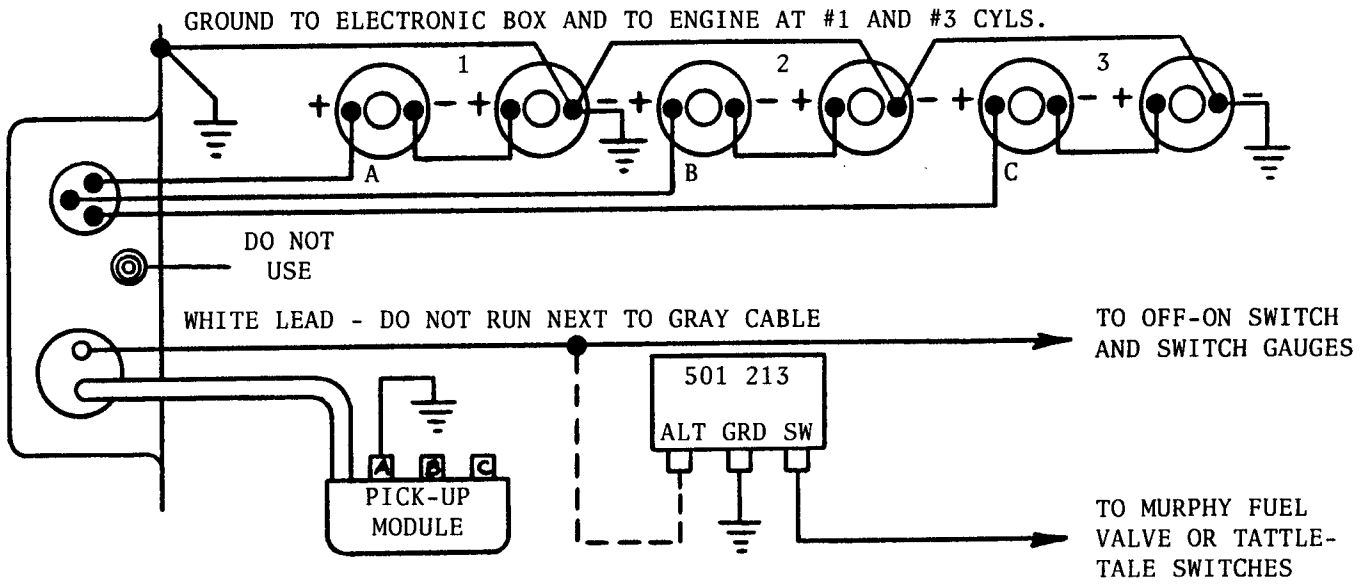
**ALTRONIC I-6 WIRING DIAGRAM - 6 CYLINDER, 4-CYCLE**  
**FIRING ORDER 1-5-3-6-2-4**



**ALTRONIC I-6 WIRING DIAGRAM - 6 CYLINDER, 4-CYCLE**  
**FIRING ORDER 1-4-2-6-3-5**



ALTRONIC I-6 WIRING DIAGRAM - 3 CYLINDER, 2-CYCLE

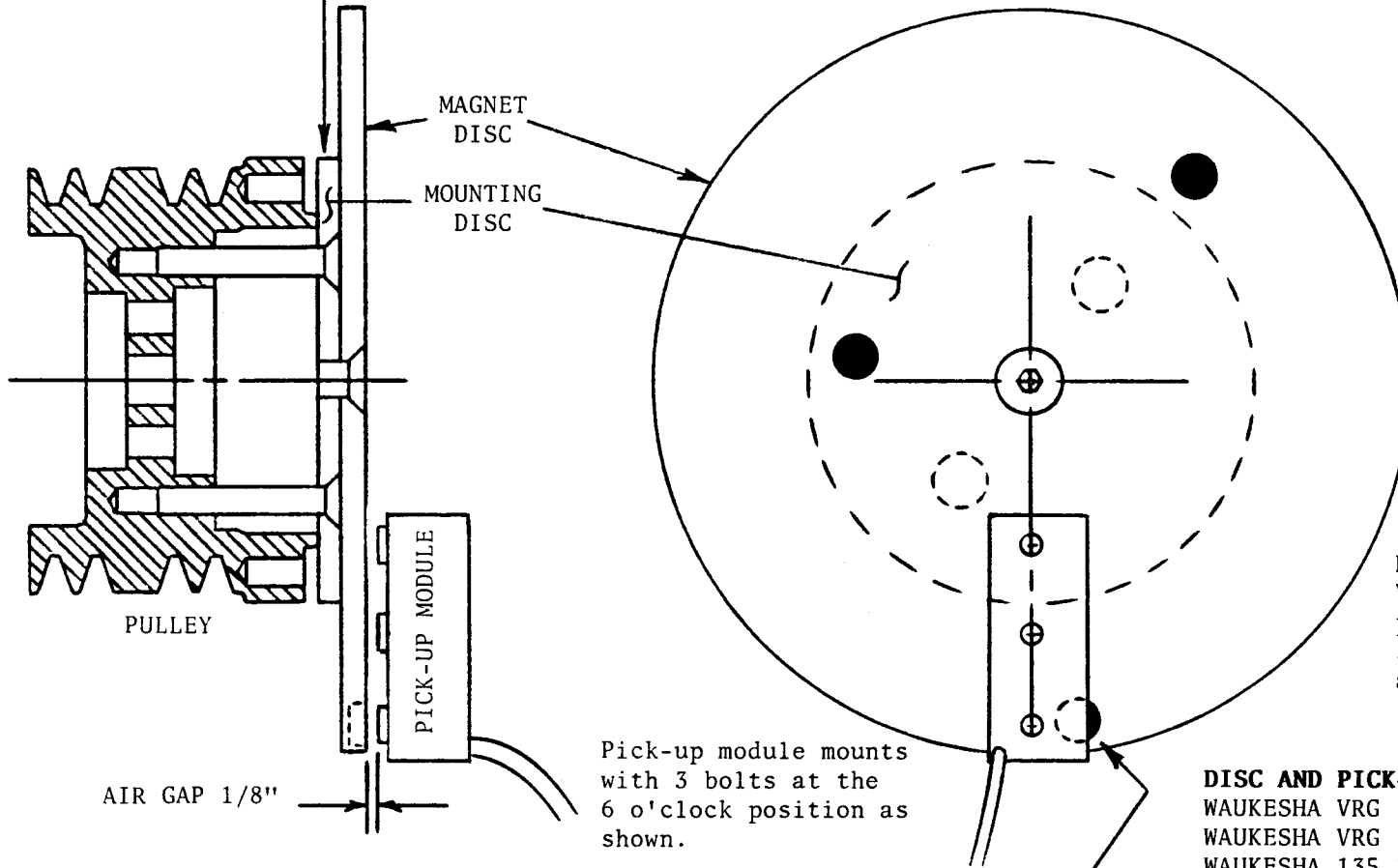


VRG ONLY

Mount small disc against pulley face with 2 3/8"-16 flat head screws provided. Adjust so that the disc O.D. is true with the pulley O.D. Then secure magnet disc to smaller disc with 1/2"-20 X 3/4" flat head screw provided.

OTHER THAN VRG

Mount magnet disc directly to the appropriate mounting adaptor using the 1/2"-20 x 3/4" flat head screw provided.



NOTE: On 4-cylinder VRG engine, mount pick-up module as shown; pick-ups A and B only are used.

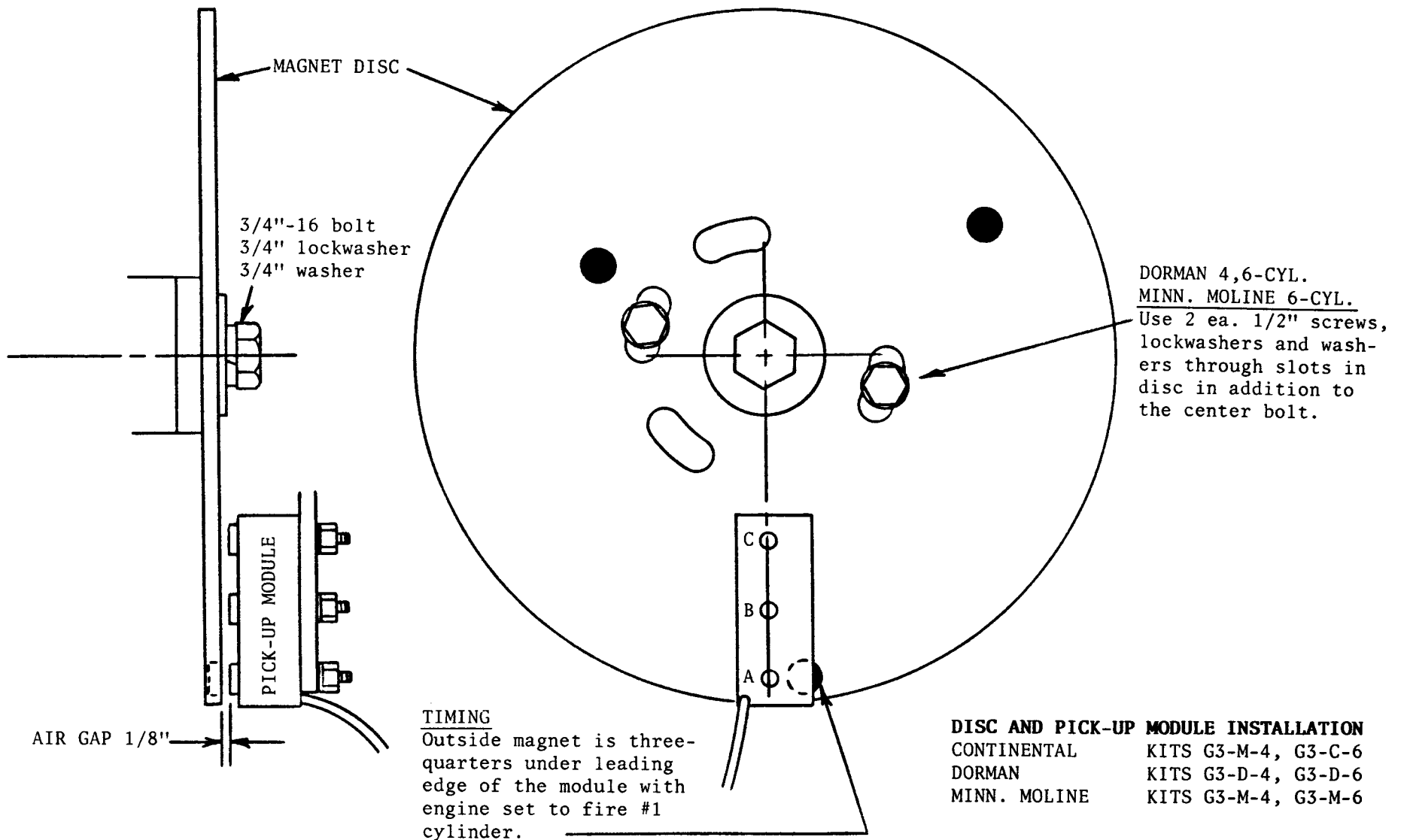
Pick-up module mounts with 3 bolts at the 6 o'clock position as shown.

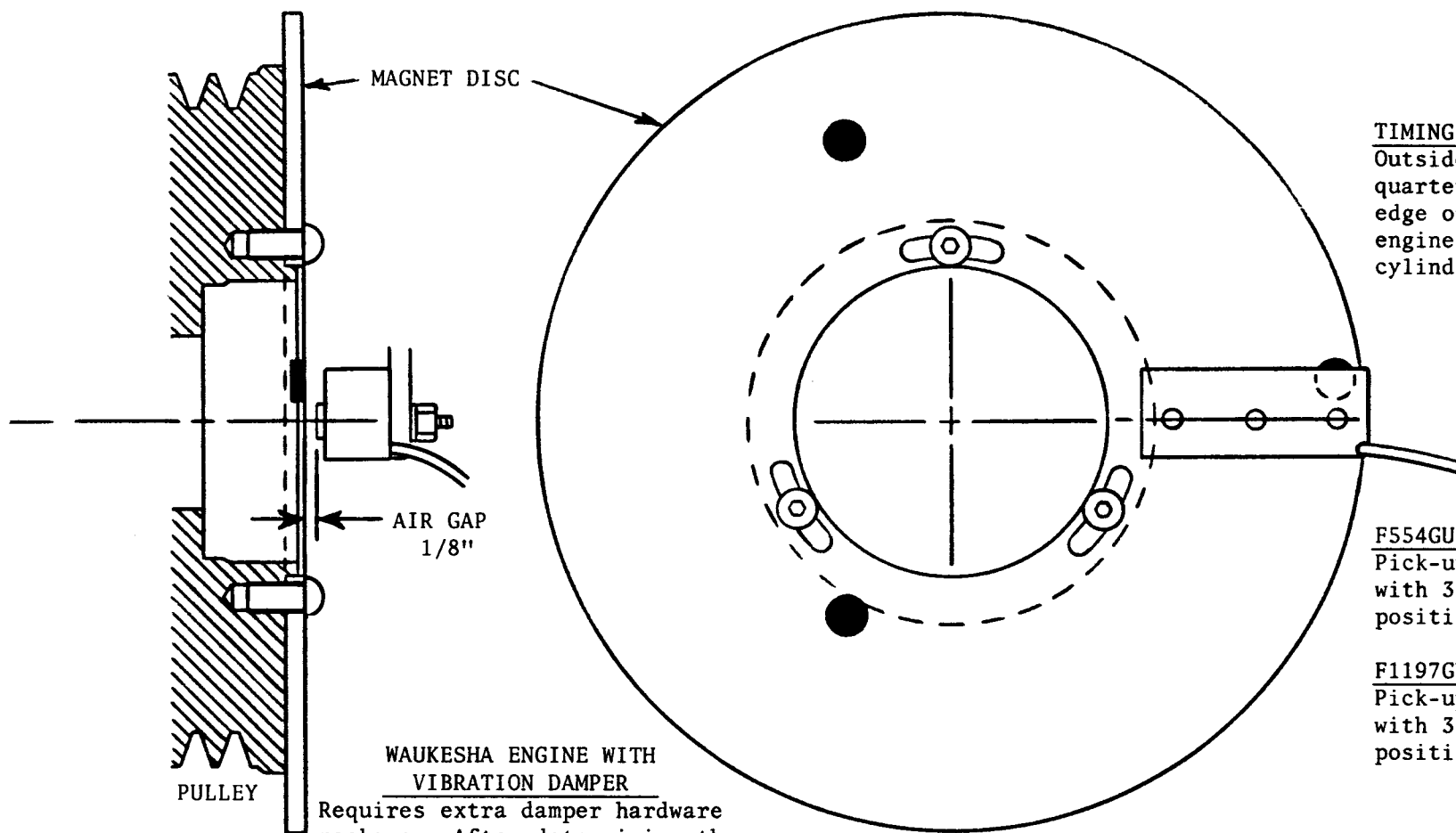
TIMING

Outside magnet is three-quarters under leading edge of module with engine set to fire #1 cylinder.

**DISC AND PICK-UP MODULE INSTALLATION**

WAUKESHA VRG	KITS C3-V-4, C3-V-6
WAUKESHA VRG	KITS W3-V-4, W3-V-6
WAUKESHA 135,190,195	KIT W3-E-6
WAUKESHA 140,145	KIT G3-Z-6
FORD 6-CYL.	KIT C3-F-6





TIMING

Outside magnet is three-quarters under leading edge of the module with engine set to fire #1 cylinder.

F554GU, F817GU

Pick-up module mounts with 3 bolts at 3 o'clock position as shown.

F1197GU

Pick-up module mounts with 3 bolts at 3 o'clock position as shown.

WAUKESHA ENGINE WITH VIBRATION DAMPER

Requires extra damper hardware package. After determining the disc mounting position and slot locations, remove the respective three bolts holding damper to pulley. Screw in long end of stud against stop. Retain existing washers and screw on long spacer nuts and tighten securely. Then mount the disc against the spacer nut ends using regular disc hardware supplied with kit.

**DISC AND PICK-UP MODULE INSTALLATION**

CATERPILLAR	KITS G3-T-4, G3-T-6
WAUKESHA F554GU, F817GU	KIT G3-W-6
WAUKESHA F1197GU	KIT G3-K-6

PICK-UP MODULE - 191 003 SERIES

