

ALTRONIC®, INC.
712 TRUMBULL AVENUE
GIRARD, OHIO 44420

ALTRONIC D.I.S. IGNITION SYSTEM

INSTALLATION INSTRUCTIONS FORM DIS II 5-88

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

I.1 The Altronic D.I.S. ignition system consists of these basic components:

1. D.I.S. Unit
2. Hall-effect Pick-up Sensor
5. Magnet Disc or Threaded Magnet Assemblies
4. Cable Assembly - Pick-up Sensor
5. Wiring Harness
6. Ignition Coils - 291 001 (one per cylinder)

1.2 The system requires a battery or a suitable power supply with a nominal 12 VDC or 24 VDC (see drawing 709 050). The D.I.S. unit steps up the DC supply voltage to charge an energy storage capacitor and contains micro-circuit logic and SCR switching devices to release the stored energy to the ignition coils in programmed, timed sequence according to the application. The only attachment to a rotating part of the engine is the timing magnets. The magnets signal the position of the engine crankshaft to the logic circuitry in the D.I.S. unit. One additional magnet trails 15 degrees after the no. 1 cylinder magnet; the D.I.S. unit recognizes this as the index signal that another revolution has started.

1.3 For 4-cycle engines, the D.I.S. system is available in two configurations:

- Single-firing system: each cylinder is fired individually on the compression stroke only. The magnet disc must mount to the camshaft or other shaft operating at one-half crankshaft speed.
- Dual-firing system: each cylinder is fired every revolution (on the exhaust stroke as well as compression stroke). The magnets are mounted to the front crankshaft pulley or other crankshaft speed location.

2.0 D.I.S. UNIT

2.1 Install the D.I.S. unit in a relatively cool location, preferably one benefiting from the engine fan stream (if any). The outside case temperature of the D.I.S. unit should not exceed 65°C. (150°F.) in operation.

2.2 Mount the D.I.S. unit securely with four (4) suitable screws. Use shock mounts if mounting the unit directly to the engine. The metal case should be grounded to the engine; a grounding stud is provided on the mounting bracket of the unit for this purpose.

3.0 MAGNET DISC/PICK-UP SENSOR

3.1 At the time the system was ordered, it was specified to be either a Single-firing system or a Double-firing system (exhaust stroke firing). Follow the instructions for the appropriate system below and refer to the specific 709 XXX drawing for the particular installation.

5.2 SINGLE-FIRING SYSTEM - see drawing 709 102.

- A. The D.I.S. unit should have a part no. ending in "-X04". Each cylinder is fired individually on the compression stroke only. The magnet disc must mount to the camshaft or other shaft operating at one-half crankshaft speed.
- B. Set the engine with no. I cylinder as follows:
16 crankshaft degrees ahead of the most advanced desired timing point. This is the point where the Hall-effect pick-up must line-up with the no. I cylinder magnet - see drawing 709 102.
- C. Mount the Hall-effect pick-up sensor securely to a rigid bracket or surface to maintain an air gap not exceeding 1.0mm (.040"). The center of the pick-up face must also line up with the center of the magnet as it rotates - see drawing 709 102.

5.3 DOUBLE-FIRING SYSTEM - see drawing 709 103.

- A. The D.I.S. unit should have a part no. ending in "-X02". For 4-cycle engines, each cylinder is fired every revolution (on both the compression and exhaust strokes). The trigger magnets must rotate at engine crankshaft speed. Magnet discs (790 IXX-X) usually are mounted to the front crankshaft pulley. Individual threaded magnets (720 002) usually are inserted in the engine flywheel; contact Altronic for specifications regarding the specific application.
- B. Set the engine with no. I cylinder as follows:
8.5 crankshaft degrees ahead of the most advanced desired timing point. This is the point where the Hall-effect pick-up must line-up with the no. I cylinder magnet - see drawing 709 103.
- C. Mount the Hall-effect pick-up sensor securely to a rigid bracket or surface to maintain an air gap not exceeding 1.0mm (.040"). The center of the pick-up face must also line up with the center of the magnet as it rotates - see drawing 709 103.

4.0 IGNITION COILS

4.1 Mount the 291 001 ignition coils as close to the spark plugs as possible keeping the high-tension lead length to a minimum but also keeping temperatures below 95°C. (200°F.) during operation.

5.0 PRIMARY WIRING

5.1 The D.I.S. system requires a battery or other DC power source as follows:

D.I.S. unit 791 50X-XXX - 20-30 VDC running; 10 VDC min. starting

D.I.S. unit 791 51X-XXX - 10-15 VDC running; 7 VDC min. starting

Refer to drawing 709 050 for details of the connection to the DC power source.

5.2 Typical drawings 709 104 (Single-firing system - V8) and 709 105 (Double-firing system - 6-cyl.) are attached. Altronic furnishes a specific wiring diagram for most applications. In all cases, the "J" lead in the wiring harness is the common coil ground lead.

- 5.3 All connections should be made using ring type terminals specified for 1.5 sq.mm (16 AWG) wire and 5mm (#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 95°C. (200°F.).

6.0 SHUTDOWN WIRING

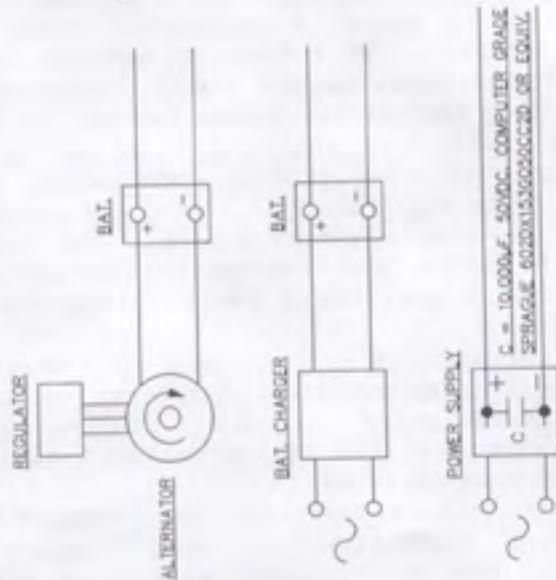
- 6.1 The D.I.S. system is shut-off by interrupting the DC power to the unit. Use a single switch or relay with contacts rated 24 VDC, 10 amps - refer to the drawing 709 050. DO NOT run the input power line through a series of normally closed switches.

7.0 SECONDARY WIRING

- 7.1 The spark plug leads should be fabricated from 7mm, 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 500mm (20"). Spark plug leads should be kept at least 50mm (2") 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-200, 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 OPERATION

- 8.1 The D.I.S. unit steps up the DC supply voltage to charge an energy storage capacitor. SCR switching devices release this stored energy in response to signals from the unit's logic circuitry which processes signals from the rotating trigger magnets. Even-firing units have one magnet for every firing of the engine; each firing occurs a programmed number of degrees after the magnet signal is received. This delay in degrees is adjustable - see section 8.2 One additional index magnet trails 15 degrees after no. 1 cylinder magnet to indicate that another revolution has started.
- 8.2 The D.I.S. unit has two timing switches located under white plastic caps at one end of the box. For 4-cycle engines:
- A. Switch position 7 gives the most advanced timing. The timing retards two (2) degrees for each switch position as the switch is moved to position 6, 5, ... 0. Switch position 0 (full retard) is 14 degrees retarded from switch position 7.
- CAUTION: DO NOT switch from position 7 to 0, or 0 to 7 while the engine is running. The 14 degree timing change may cause the engine to shut down or be damaged.
- NOTE: Replace the white caps over the timing switches once the proper timing settings have been selected.
- B. Grounding lead "D" in the pick-up cable (6-pin connector) gives the timing selected by Switch A; open-circuiting lead "D" gives the timing selected by Switch B. This feature gives the ability to switch between two timing settings for differences in fuel, load, temperature, etc. The differential can be set in 2 degree increments from a minimum of 2 degrees to a maximum of 14 degrees.

D.C. POWER SOURCE

POWER SUPPLY SPECS. 25 AMP PEAK PULSES, 5 AMP CONTINUOUS.

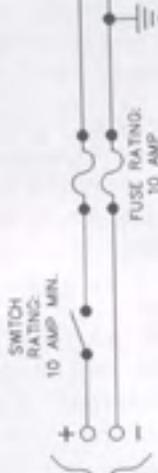
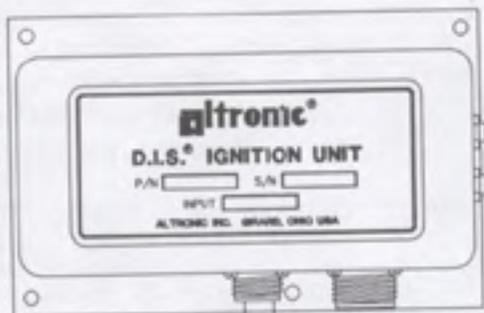
CURRENT DRAW OF D.I.S. UNITNOTE:

ABOVE INFORMATION IS PER ONE (1) D.I.S. SYSTEM. FOR MULTIPLE SYSTEMS, MULTIPLY REQUIREMENTS BY NUMBER OF SYSTEMS.

OPERATING VOLTAGE REQUIREMENT:

D.I.S. UNIT	STARTING	RUNNING
12 VDC UNIT	7-15 VDC	10-15 VDC
24 VDC UNIT	10-30 VDC	20-30 VDC

WIRE SIZE: 14 GA. (2.5 SO. MM) MINIMUM

D.I.S. UNIT
500 SERIES

$$\text{AVERAGE CURRENT} = I_{AV}$$

D.I.S. UNIT	GENERAL FORMULA	EXAMPLE: V12 ENGINE, 1800 RPM
12VDC UNIT	$I_{AV} = N \times \frac{REM}{5,000}$	$I_{AV} = 6 \times \frac{1800}{5,000} = 2.16 \text{ AMPS}$
24VDC UNIT	$I_{AV} = N \times \frac{REM}{10,000}$	$I_{AV} = 6 \times \frac{1800}{10,000} = 1.08 \text{ AMPS}$

N = NO. FIRINGS PER ENGINE REVOLUTION.

REVISIONS

NO.	DATE	BY	DESCRIPTION
1	1-27-87	DEB	ADDED FUSE AND FUSE RATING NOTE.
2	6-15-89	WTP	ADDED 'N' = NO. FIRINGS PER ENGINE REVOLUTION. *
3	12-26-90	WTP	ADDED JUNCTION BOX
4	1-29-91	DEB	ADDED SECOND FUSE
5	5-16-91	WTP	GROUND WAS LEFT OF FUSE

TOLERANCES UNLESS NOTED

FRACTIONAL

DECIMAL

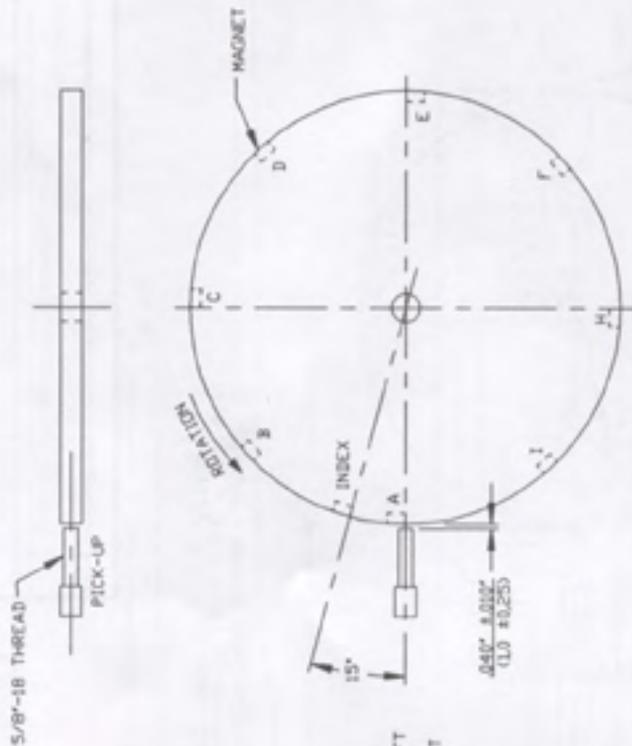
XXX - 8,000

XX - 8,000

X - 8,000

ALTRONIC INC.

TITLE
D.C. POWER HOOKUP
D.I.S. SYSTEMDRAWN BY
WTPCHECKED BY
DATEAPPROVED BY
DATESCALE
NONEPART NUMBER
709 050



16° CRANKSHAFT
16° DISC
PRIOR TO MOST
ADVANCED
TIMING POINT

NOTE: (8 + 1) MAGNET DISC SHOWN

EXAMPLE:

MOST ADVANCED TIMING SETTING = 24° BTDC
ENGINE SETTING FOR ABOVE LINE-UP = 40° BTDC
ADJUSTABLE TIMING RANGE = 10°-24° BTDC

REVISIONS

NO.	DATE	BY	DESCRIPTION
1	12-27-90	DEB	ADD PICK-UP THREAD NOTE
2			
3			
4			
5			

TOLERANCES
EXCEPT AS NOTED

FINISH:
XXX - 4.000
XX - 0.010

FRACTIONAL

DECIMAL

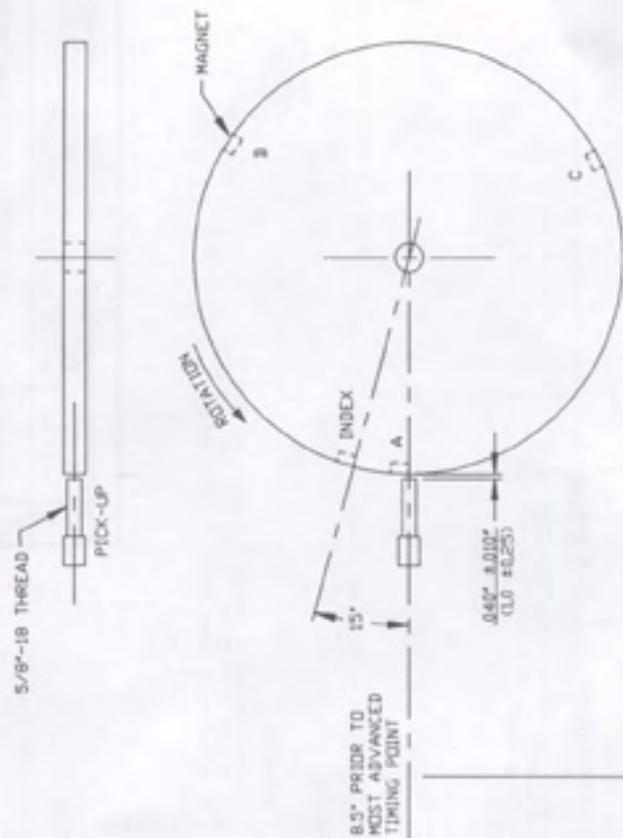
ALTRONIC INC.

TITLE D.I.S. SINGLE FIRING SYSTEM
INSTALLATION AT CAMSHAFT SPEED

DRAWN BY WTP SCALE NONE PART NUMBER

CHECKED BY DATE 4-29-88

APPROVED BY 709 102



NOTE: (3 + 1) MAGNET ARRANGEMENT SHOWN

EXAMPLE:

MOST ADVANCED TIMING SETTING = 24° BTDC
 ENGINE SETTING FOR ABOVE RANGE = 32.5° BTDC
 ADJUSTABLE TIMING RANGE = 10°-24° BTDC

REVISIONS

NO	DATE	BY	DESCRIPTION
1	12-27-90	DEC	ADD PICK-UP THREAD NOTE
2			
3			
4			
5			

TOLERANCES
EXCEPT AS NOTED

DECIMAL - AS SHOWN
 FRACTIONAL - AS SHOWN

UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED

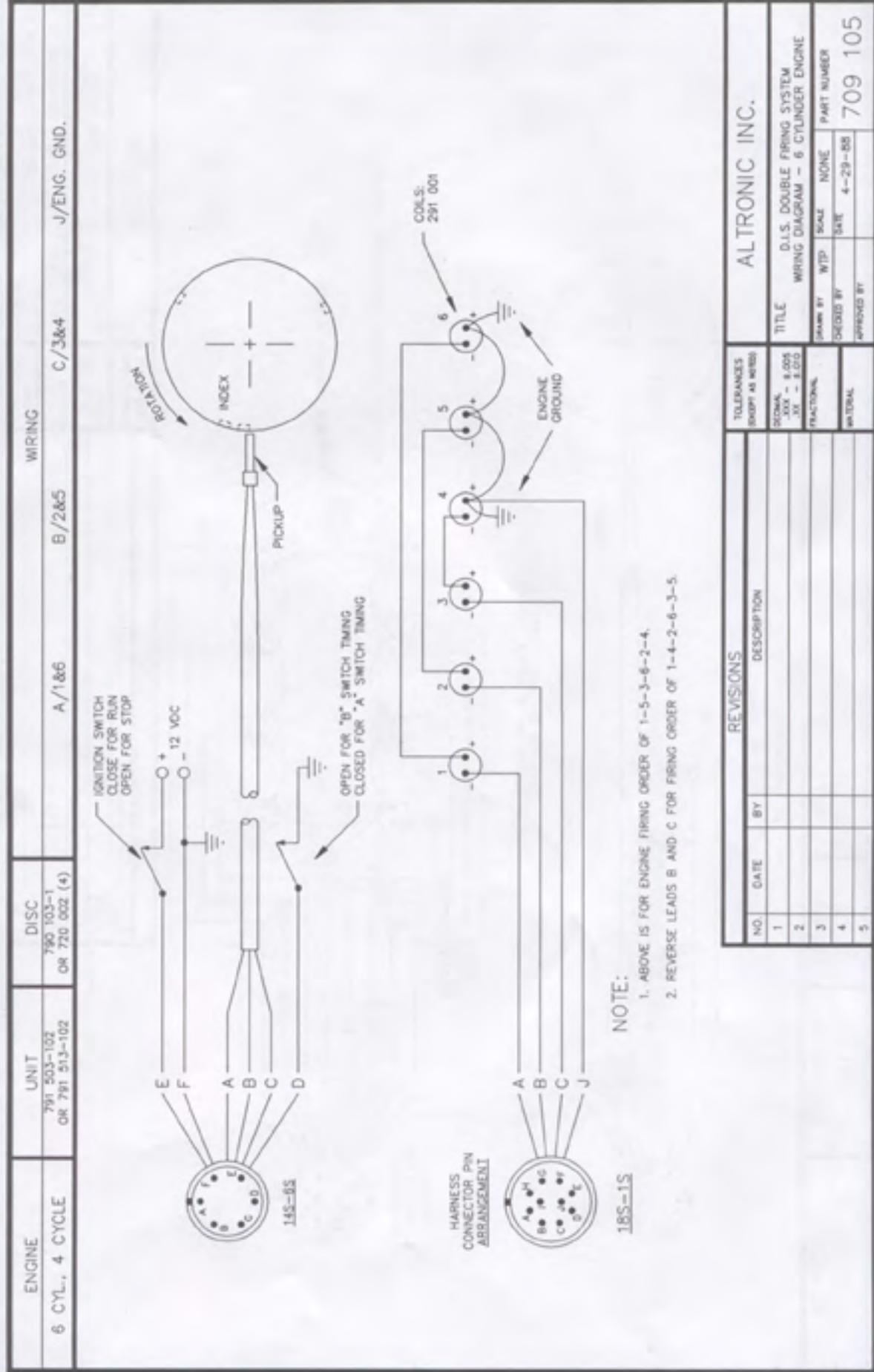
ALTRONIC INC.

TITLE DLS DOUBLE FIRING SYSTEM
 INSTALLATION AT CRANK-SHAFT SPEED

DRAWN BY VTP SCALE NONE PART NUMBER

CHECKED BY DATE 4-29-88

APPROVED BY 709 103



REVISIONS

NO.	DATE	BY	DESCRIPTION
1			
2			
3			
4			
5			

TOLERANCES
(EXCEPT AS NOTED)

DECIMAL

.XXX - .005

.XX - .010

FRACTIONAL

NONE

MINOR

ALTRONIC INC.

TITLE
D.L.S. DOUBLE FIRING SYSTEM
WIRING DIAGRAM - 6 CYLINDER ENGINE

DRAWN BY WTP SCALE NONE PART NUMBER

CHECKED BY SAKE DATE 4-29-68

APPROVED BY

709 105