

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 CD1 ignition system consists of these basic components:
1. CD1 Unit
 2. Magnetic Pick-up Sensor
 3. Harness
 4. Multi-tower Coil Module or Individual Coils (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 709 150). The CD1 unit steps up the DC supply voltage to charge an energy storage capacitor and contains microcircuit logic and SCR switching devices to release the stored energy to the ignition coils in programmed, timed sequence according to the application. Holes drilled in the engine flywheel (or other disc running at either camshaft or engine speed) signal the position of the engine crankshaft to the logic circuitry in the CD1 unit. One additional hole trails 20-30 degrees after the last cylinder hole; the unit recognizes this as the index signal that another revolution has started.
- 1.3 The CD1 system can operate as a single-firing or double-firing (firing on exhaust stroke) system.

2.0 CD1 UNIT

- 2.1 Select a location for the CD1 unit that will be at least 24 inches (600 mm) away from the ignition coils and spark plug leads. In addition, the mounting location must be relatively cool, preferably one benefiting from the engine fan stream (if any); the outside case temperature of the CD1 unit should not exceed 195° F. (90° C.) in operation. NOTE: Plastic-case CD1 units have a maximum case temperature of 150° F. (65° C.).
- 2.2 Secure the CD1 unit to a suitable mounting bracket with four 1/4 inch (6 mm) screws.

3.0 PICK-UP SENSOR – FLYWHEEL HOLES (UNITS 791 010-3, 791 010-4)

- 3.1 Locate a suitable mounting position for the pick-up sensor so that it may sense either the outside diameter (preferable) or the side face of the engine's flywheel (acceptable).
IMPORTANT: Rotate the flywheel an entire revolution to be sure that there are no holes or interruptions of ANY kind in the path that will pass under the pick-up.
- 3.2 Set the engine with no. 1 cylinder in the most advanced timing position. Mark the point on the flywheel that will be directly opposite the pick-up. A 3/8" (10 mm) diameter hole must be drilled at this point - see drawing 709 151.
- 3.3 Drill the remaining holes spaced as shown in the appropriate wiring diagram in these instructions and noting the direction of rotation of the flywheel. Referencing the first drilled hole as 0 degrees, the pattern required is:
- 1, 2 or 4 cylinder engine: 0° - 180° - 210°*
 - 3 or 6 cylinder engine: 0° - 120° - 240° - 260°* * Indicates index hole.
 - 8 cylinder engine: 0° - 90° - 180° - 270° - 290°*
- NOTE: The angular spacing is extremely important as this establishes the basic timing accuracy of the system. In addition, make sure each hole is drilled so that its center passes directly in line with the center of the pick-up.
- 3.4 Secure the pick-up sensor to a rigid bracket or surface to maintain an air gap not exceeding .030" ± .010" (0.75 mm ± 0.25 mm). The center of the pick-up face must line up with the center of the drilled holes as the engine is rotated. Refer to drawing 709 151.
- 3.5 Plug the 2-pin pick-up connector fully into its mating receptacle connected to the CD1 unit.
NOTE: Keep the pick-up sensor wires at least 2 inches (50 mm) away from the coil primary wires and at least 8 inches (200 mm) away from the spark plug leads.

4.0 PICK-UP SENSOR – CAMSHAFT DISC (UNIT 791 010-6)

- 4.1 A disc with the appropriate hole pattern must be prepared for mounting at CAMSHAFT speed. The disc must be of magnetic material and 4.0" (100 mm) diameter or larger. Drawing 709 198 details the hole spacing depending on the number of engine cylinders. Note the direction of rotation of the disc. The angular spacing is extremely important as this establishes the basic timing accuracy of the system.
- 4.2 Locate a suitable mounting position for the pick-up sensor in order to sense the holes in the rotating disc. Secure the pick-up to a rigid bracket or surface. Pick-up sensor dimensions are shown on drawing 709 151.
- 4.3 Set the engine with no. 1 cylinder in the most advanced timing position. Noting the direction of rotation, set the drilled disc opposite the pick-up in the position shown in drawing 709 198.
- 4.4 Adjust the tightening nut holding the pick-up sensor to maintain an air gap not exceeding .020" \pm .005" (0.50 mm \pm 0.12 mm). The center of the pick-up face must line up with the center of each drilled hole as the disc rotates - refer to drawing 709 198.
- 4.5 Plug the 2-pin pick-up connector fully into its mating receptacle connected to the CD1 unit.
- NOTE: Keep the pick-up sensor wires at least 2 inches (50 mm) away from the coil primary wires and at least 8 inches (200 mm) away from the spark plug leads.

5.0 IGNITION COILS

- 5.1 Special multi-tower coils have been developed for the CD1 double-firing system:
- 791 020 4-tower coil
 - 791 030 6-tower coil
- NOTE: The multi-tower coils MUST be used with resistor spark plugs and/or resistance spark plug wires.
- Individual coils may also be used for each cylinder (see wiring diagrams):
- 591 040 coil, plastic case
 - 501 061 coil, blue epoxy
 - 591 010 coil, red epoxy
- 5.2 Mount the ignition coils as close to the spark plugs as possible keeping the high-tension lead length to a minimum but also keeping temperatures below 200° F. (95° C.) during operation.

6.0 PRIMARY WIRING

- 6.1 The CD1 system requires a battery or other DC power source providing 12-28 VDC for running and a minimum of 8 volts for engine starting. Refer to drawing 709 150 for details of the connection to the DC power source.
- 6.2 Drawings are provided for 2, 3, 4, 6 and 8-cylinder hook-ups. For 1-cylinder hook-up, refer to the 2-cylinder diagram and use only the coil connected to lead "A".
- 709 152 2-cylinder engine, CD1 unit 791 010-3
 - 709 153 3-cylinder engine, CD1 unit 791 010-3
 - 709 154 4-cylinder engine, CD1 unit 791 010-3
 - 709 155 4-cylinder engine with coil module, CD1 unit 791 010-3
 - 709 156 6-cylinder engine, CD1 unit 791 010-3
 - 709 157 6-cylinder engine with coil module, CD1 unit 790 010-3
 - 709 174 Ford V8 engine, CD1 unit 791 010-4
 - 709 175 Chrysler, GM, I-H V8 engine, CD1 unit 791 010-4
 - 709 176 I-H 446 V8 engine, CD1 unit 791 010-4
 - 709 198 3-6 cylinder engine, CD1 unit 791 010-6
- 6.3 Plug the multi-pin harness connector fully into its mating receptacle connected to the CD1 unit.
- 6.4 All connections should be made using ring type terminals specified for 16 AWG (1.5 sq. mm) wire and #10 (5 mm) stud size. Terminals should either be soldered to the wire or attached with an appropriate staking tool. Protect primary wiring from physical damage, vibration and temperatures in excess of 200° F. (95° C.).
- NOTE: Keep the primary wiring at least 2 inches (50 mm) away from the spark plug leads.

7.0 SHUTDOWN WIRING

7.1 The CD1 system can be shut-off in two ways:

- A. **OPTION 1** - Interrupt the DC power to the unit; use a switch or relay with contacts rated 24 VDC, 10 amps - refer to drawing 709 150. **DO NOT** run the input power line through a series of normally closed switches.
- B. **OPTION 2** (UNITS 791 010-4 AND 791 010-6) - Ground the appropriate harness lead (see wiring diagrams). This option may be used if the shutdown panel (1) was powered from an Altronic I, III or V ignition system and (2) utilizes Altronic instruments if electronic instrumentation is used. When the shutdown lead is grounded, the CD1 unit will draw about 0.1 amp from the power source. **NOTE:** If desired, the shutdown lead may be used to power Altronic display instruments in the panel and **OPTION 1** used to shut-off the ignition.

NOTE: CD1 unit 791 010-3 does not have a shutdown lead and can be shut-off only using **OPTION 1**. Unit 791 010-4 can be substituted for 791 010-3 in any application if the use of **OPTION 2** is desired.

8.0 SECONDARY WIRING

- 8.1 If using **INDIVIDUAL COILS**, the spark plug leads should be fabricated from 7 mm, silicone insulated, tinned copper conductor with suitable terminals and silicone spark plug boot.
- 8.2 If using **MULTI-TOWER COILS**, the spark plug leads should be fabricated from 7 mm, silicone insulated, automotive resistance cable with suitable terminals and silicone spark plug boot. The finished lead should have a resistance of at least 5,000 ohms.
- 8.3 Keep spark plug leads as short as possible and 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.
- 8.4 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.

9.0 OPERATION

9.1 The CD1 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 magnetic pick-up. The pick-up senses one hole for every firing of the engine; each firing occurs a programmed number of degrees after the hole is sensed. This delay in degrees is adjustable - see section 9.2. There is one additional index hole 20-30 engine degrees after the last cylinder hole to indicate that another revolution has started.

9.2 The CD1 unit has a timing switch located under a white plastic cap at one end of the box. The timing range available is:

- 1, 2 or 4 cylinder engine: 2.8 degrees per switch interval = 20 degrees total
- 3 or 6 cylinder engine: 1.9 degrees per switch interval = 13 degrees total
- 8 cylinder engine: 1.4 degrees per switch interval = 10 degrees total

Switch position 7 gives the most advanced timing. The timing retards as indicated above for each switch position as the switch is moved to position 6, 5, 4, 3, 2, 1, 0. Switch position 0 is full retard.

CAUTION: **DO NOT** switch from position 7 to 0, or 0 to 7 while the engine is running. The large timing change may cause the engine to shutdown or be damaged.

NOTE: Using a timing light, set the timing to the desired position with the engine running at **NORMAL OPERATING SPEED**. Replace the white cap over the timing switches once the proper timing setting is set.

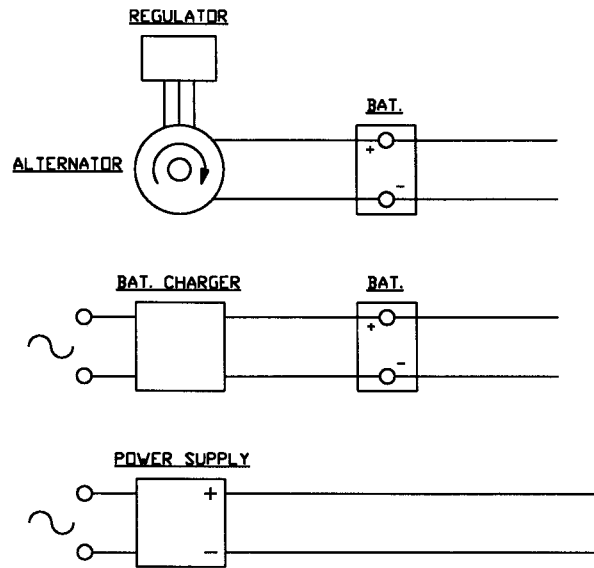
9.3 Two LED indicators on either side of the timing switch give an indication of proper operation of the magnetic pick-up (left LED) and the output circuits of the CD1 unit (right LED). See Section 10.0 for troubleshooting procedures.

10.0 TROUBLESHOOTING CHART – CD1 IGNITION SYSTEM

- 10.1 **NORMAL OPERATION** - Check the two LED indicators next to the timing switch:
- After power is turned on to the CD1 unit, the output indicator will turn on.
 - When the engine is cranked, both indicators will blink at the same rate.
 - At normal running speeds, both indicators glow continuously.
 - If engine is stopped with power left on, the output indicator will turn off for a few seconds and then stay on continuously.
- 10.2 **TROUBLESHOOTING** - Check the two LED indicators next to the timing switch:
- If the engine will not start or run correctly, crank engine with fuel turned off and check per the chart below:

INDICATION AND CHECKS	REMEDY
<p>Both Indicators Off:</p> <ol style="list-style-type: none"> 1. Check 12-24 VDC power to CD1 unit. 2. If above check is OK: 	<p>Must be in range of 12-28 VDC.</p> <p>Replace CD1 unit.</p>
<p>Pick-up Indicator Off / Output Indicator On:</p> <ol style="list-style-type: none"> 1. Check gap between pick-up and sensed surface - must be greater than .020" (0,5 mm) and less than .040" (1,0 mm). 2. Check connections between CD1 unit and the pick-up sensor. 3. Un-plug connection to pick-up and measure resistance between the two pick-up leads: 2,700 - 3,300 ohms. 4. If above checks are OK: 	<p>Correct gap.</p> <p>Correct connections.</p> <p>Replace pick-up.</p> <p>Replace CD1 unit.</p>
<p>Pick-up Indicator OK / Output Indicator Off or Blinks at Slower Rate:</p> <ol style="list-style-type: none"> 1. Check connections between CD1 unit and coil module or coils. 2. If above check is OK: 	<p>Correct connections.</p> <p>Replace CD1 unit.</p>
<p>Both Indicators Blink at the Same Rate:</p> <ol style="list-style-type: none"> 1. Indicates proper operation of CD1 unit and magnetic pickup. 	<p>Check or replace ignition coil(s).</p> <p>Check other items such as fuel supply.</p>

D.C. POWER SOURCE

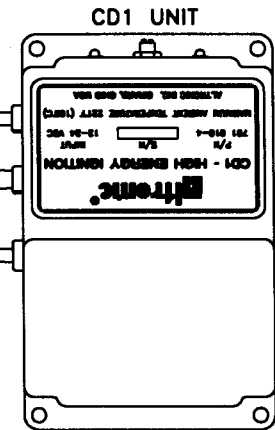
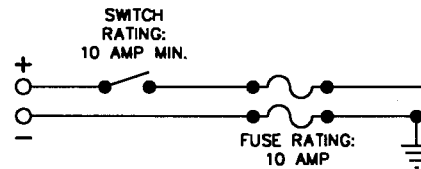


POWER SUPPLY SPECS: 25 AMP PEAK PULSES, 5 AMP CONTINUOUS.

OPERATING VOLTAGE REQUIREMENT:

STARTING: 8 VDC MINIMUM
 RUNNING: 12-28 VDC (32 VDC MAX.)

WIRE SIZE: 16 GA. (1.5 SQ. MM) MINIMUM



AVERAGE CURRENT = I_{AV}

NOTE:

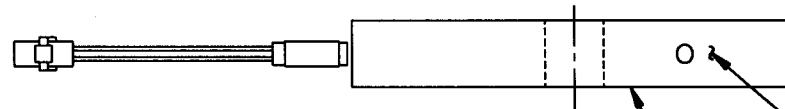
INFORMATION IS PER ONE (1) CDI SYSTEM.
 FOR MULTIPLE SYSTEMS, MULTIPLY REQUIREMENTS
 BY NUMBER OF SYSTEMS.

CDI UNIT	GENERAL FORMULA	EXAMPLE: 6-CYL. ENGINE, 1800 RPM
12VDC UNIT	$I_{AV} = \frac{N \times RPM}{5,000}$	$I_{AV} = \frac{3 \times 1800}{5,000} = 1.08 \text{ AMPS}$
24VDC UNIT	$I_{AV} = \frac{N \times RPM}{10,000}$	$I_{AV} = \frac{3 \times 1800}{10,000} = 0.54 \text{ AMPS}$

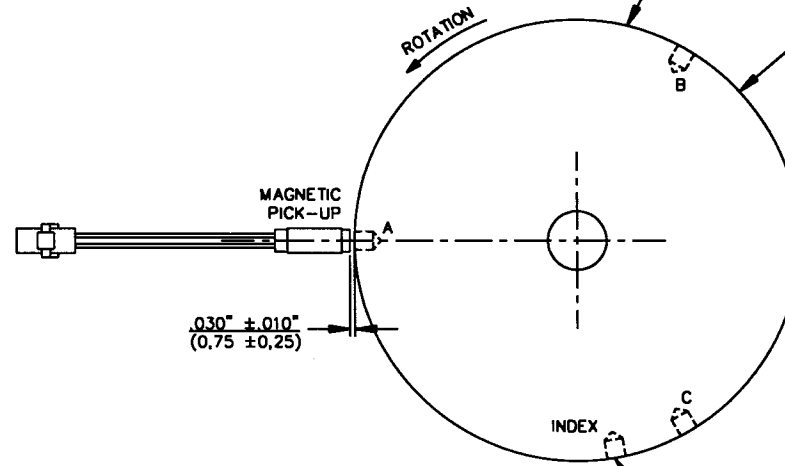
N = NO. FIRINGS PER ENGINE REVOLUTION.

REVISIONS				TOLERANCES (EXCEPT AS NOTED)		ALTRONIC INC.		
NO.	DATE	BY	DESCRIPTION	DECIMAL	FRACTIONAL	TITLE		PART NUMBER
1	1-29-91	DEB	ADDED SECOND FUSE	.XXX - 4.005		D.C. POWER HOOKUP CDI SYSTEM		709 150
2	5-16-91	WTP	GROUND WAS LEFT OF FUSE	.XX - 3.010		DRAWN BY	SCALE NONE	
3	7-26-93	WTP	CDI UNIT REVISED			CHECKED BY	DATE 12-18-90	
4						APPROVED BY		
5								

NOTE: THIS DRAWING APPLIES TO UNITS 791 010-3 AND 791 010-4.



NOTE: MUST BE SMOOTH SURFACE OTHER THAN FOR DRILLED HOLES.

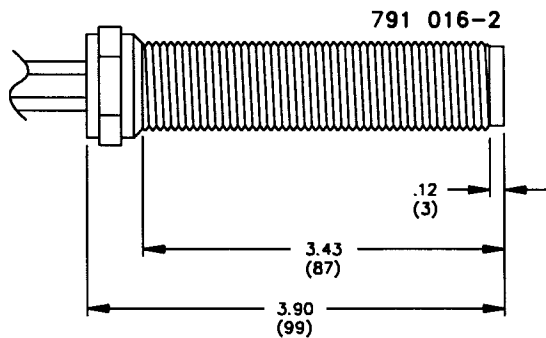
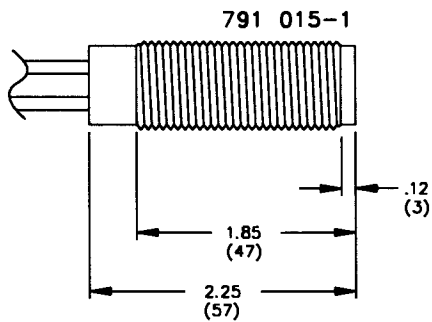


NO. CYLS.	HOLE PATTERN
1,2,4	0°-180°-210°
3,6	0°-120°-240°-260°
V8	0°-90°-180°-270°-290°

NOTE: 3,6 CYLINDER PATTERN SHOWN.

HOLE DIA. = 3/8" (10 mm)
DEPTH = 3/8" (10 mm)

MAGNETIC PICK-UP SENSOR
3/4-16 THREAD



REVISIONS

NO.	DATE	BY	DESCRIPTION
1	5-10-91	WTP	ADDED PICK-UP SENSOR 791 016-2
2	2-17-92	WTP	ADDED 1, V8 CYLINDERS TO CHART
3	7-26-93	WTP	UPDATED
4			
5			

TOLERANCES
(EXCEPT AS NOTED)

DECIMAL
.XXX - ±.005
.XX - ±.010

FRACTIONAL

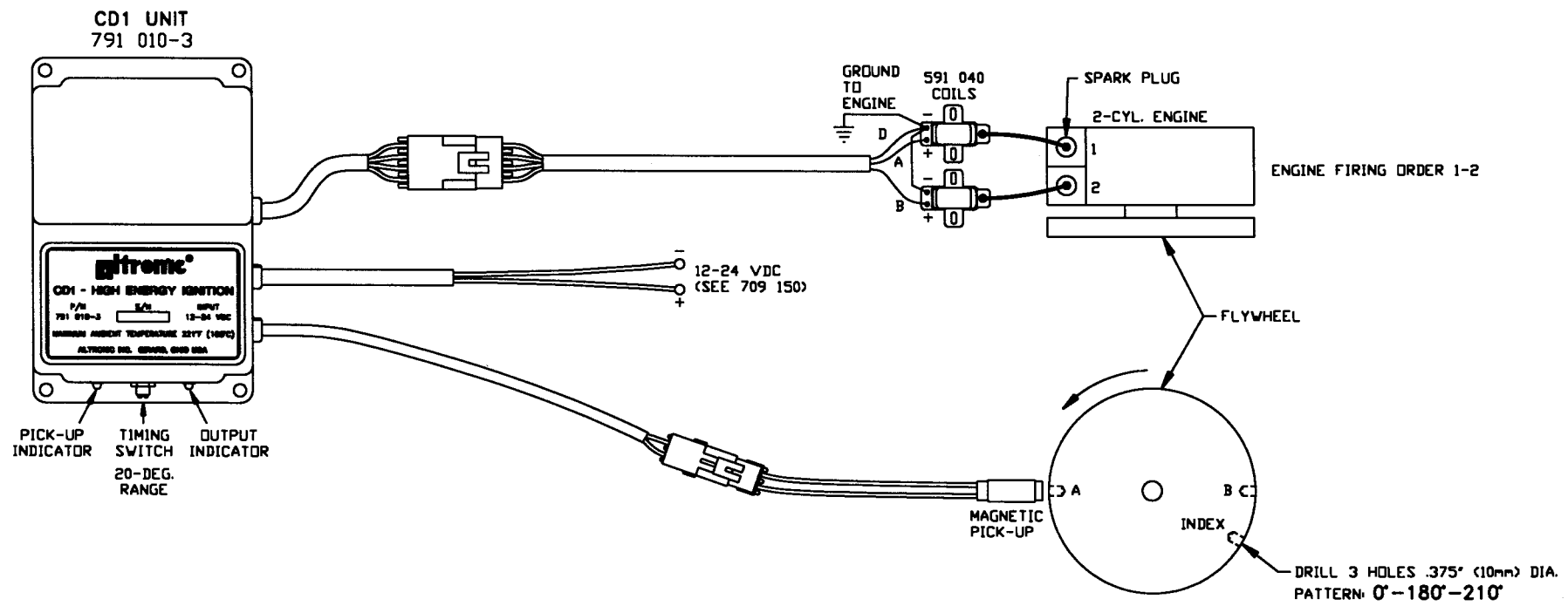
MATERIAL

ALTRONIC INC.

TITLE
CD1 IGNITION SYSTEM
PICK-UP AND FLYWHEEL HOLE DETAIL

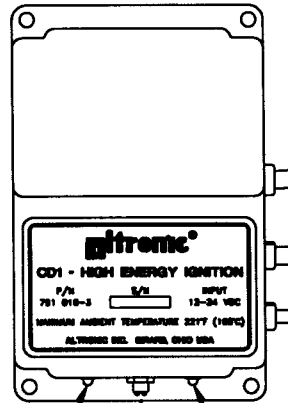
DRAWN BY	WTP	SCALE	NONE	PART NUMBER
CHECKED BY		DATE	2-4-91	709 151
APPROVED BY				

709 151



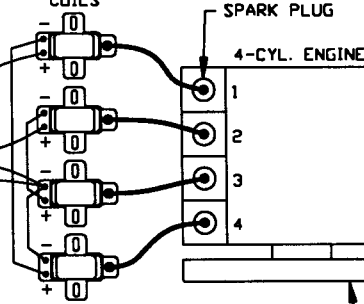
REVISIONS				TOLERANCES (EXCEPT AS NOTED)	ALTRONIC INC.		
NO.	DATE	BY	DESCRIPTION		DECIMAL .XXX - ±.005 .XX - ±.010	TITLE	
1	7-26-93	WTP	CD1 UNIT REVISED	FRACTIONAL	ALTRONIC CD1 - KIT CD102 IGNITION SYSTEM 2-CYLINDER		PART NUMBER 709 152
2				MATERIAL	DRAWN BY	WTP	
3					CHECKED BY	SCALE NONE	DATE 2-17-92
4					APPROVED BY		
5							

CD1 UNIT
791 010-3



PICK-UP INDICATOR
TIMING SWITCH
20-DEG. RANGE
OUTPUT INDICATOR

591 040 COILS



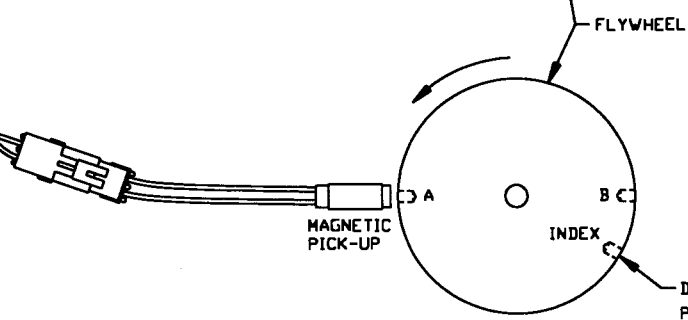
SPARK PLUG

4-CYL. ENGINE

CONNECTION CHART

COIL	+	-
1	LEAD A	COIL 4+
2	LEAD B	COIL 3+
3	COIL 2-	LEAD D, GND., COIL 4-
4	COIL 1-	COIL 3-

12-24 VDC
(SEE 709 150)



DRILL 3 HOLES .375" (10mm) DIA.
PATTERN: 0°-180°-210°

REVISIONS

NO.	DATE	BY	DESCRIPTION
1	7-26-93	WTP	CD1 UNIT REVISED
2			
3			
4			
5			

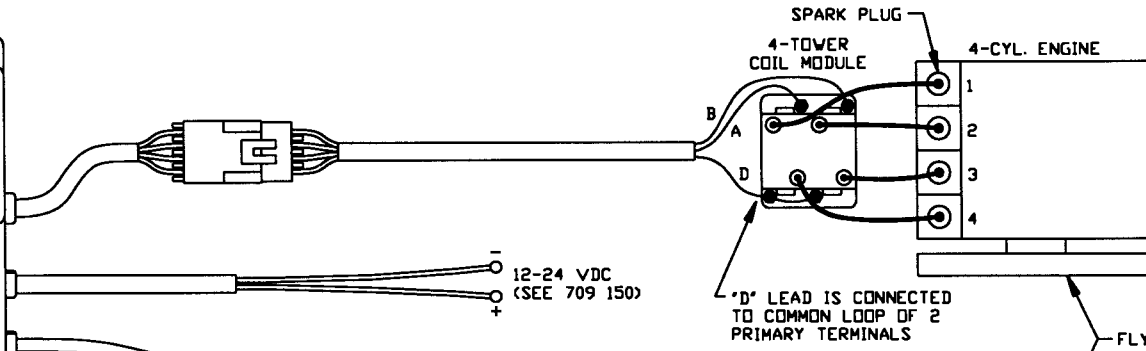
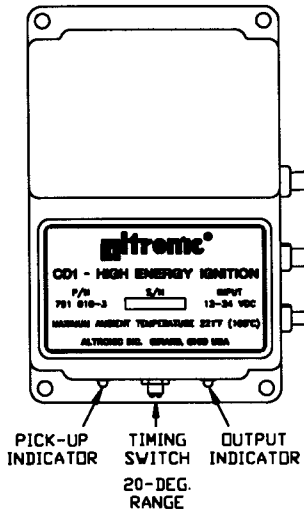
TOLERANCES (EXCEPT AS NOTED)
DECIMAL .XXX - ±.005 .XX - ±.010
FRACTIONAL
MATERIAL

ALTRONIC INC.

TITLE ALTRONIC CD1 - KIT CD104 IGNITION SYSTEM 4-CYLINDER			
DRAWN BY WTP	SCALE NONE	PART NUMBER	
CHECKED BY	DATE 2-17-92	709 154	
APPROVED BY			

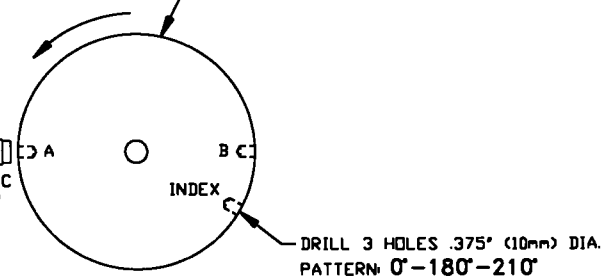
709 154

CD1 UNIT
791 010-3



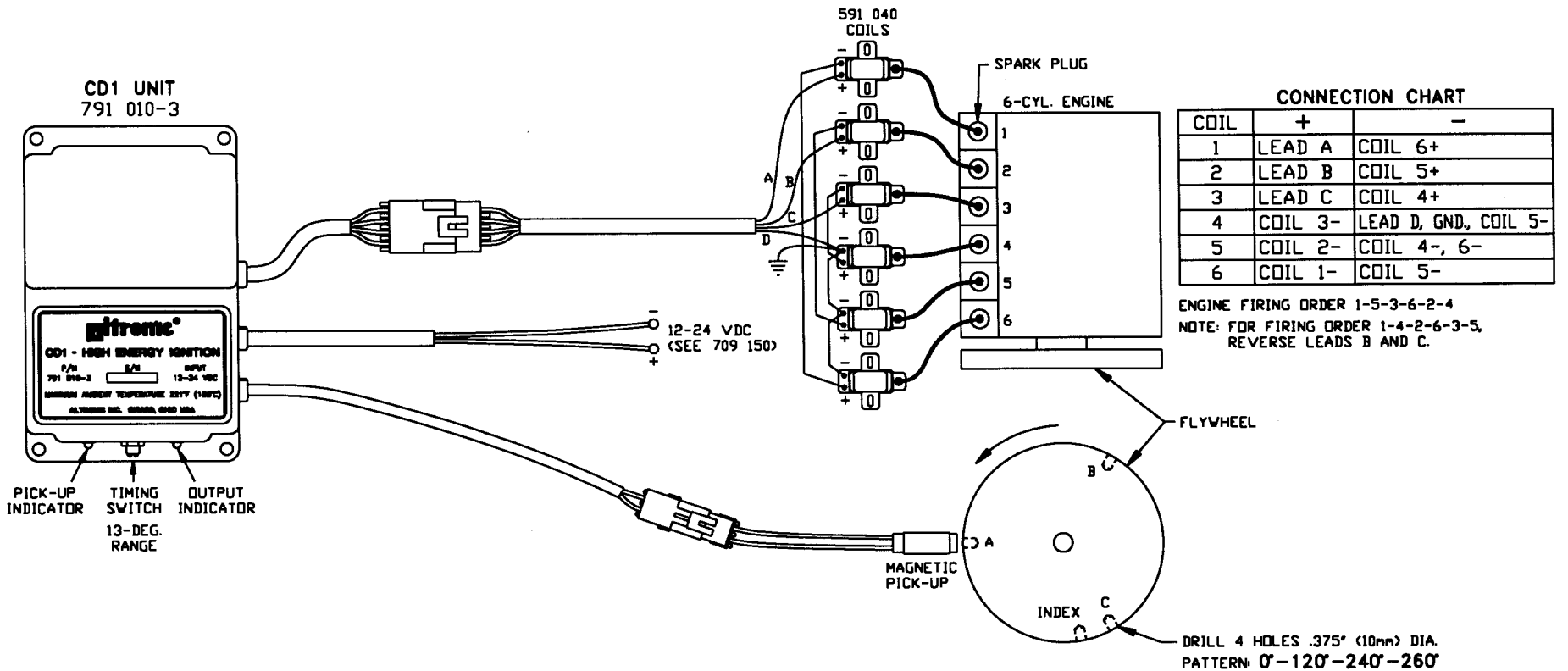
CONNECTION CHART

CD1 LEAD	CYLINDERS
A	1, 4
B	2, 3



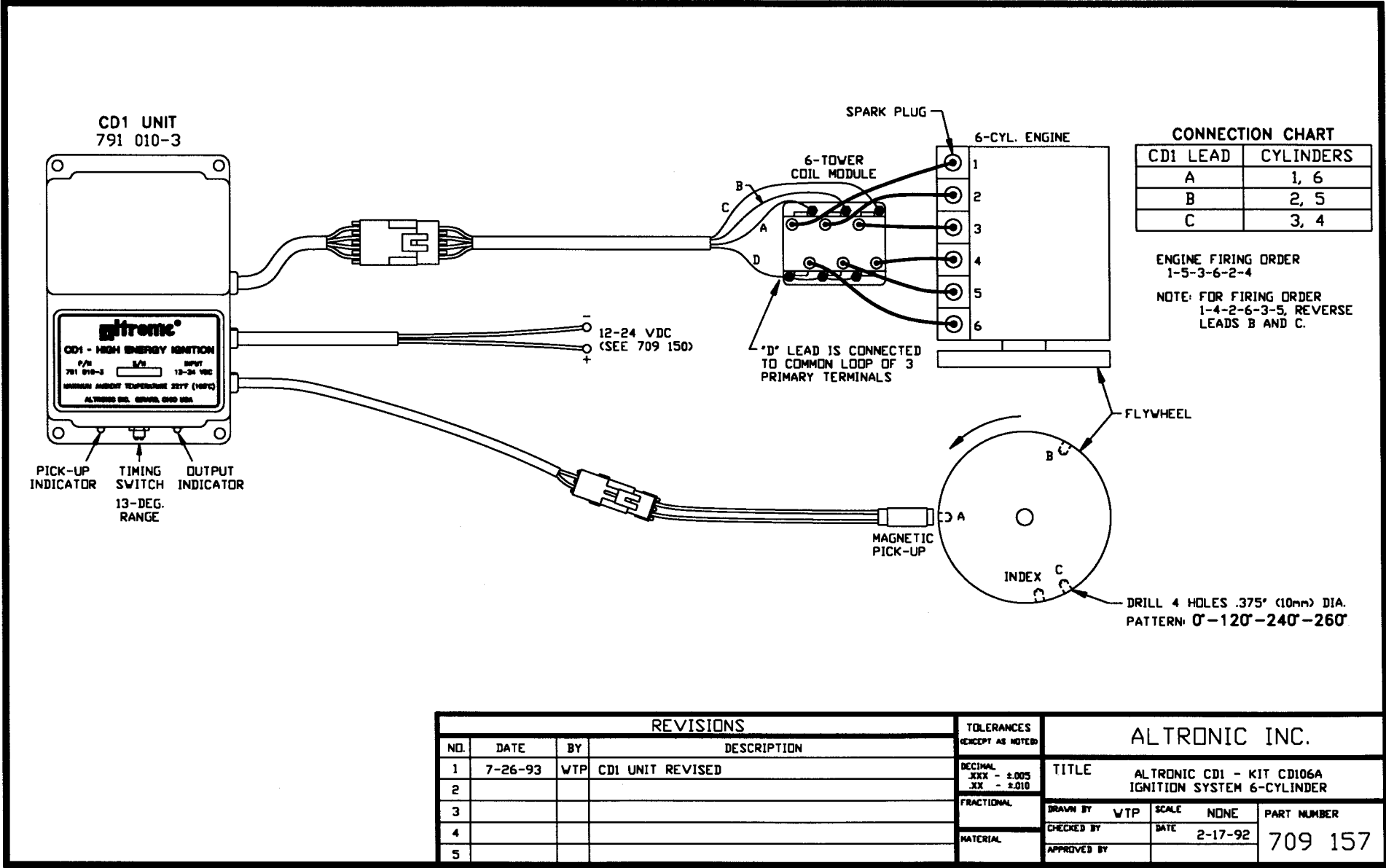
REVISIONS				TOLERANCES (EXCEPT AS NOTED)		ALTRONIC INC.		
NO.	DATE	BY	DESCRIPTION	DECIMAL	TITLE	DRAWN BY	SCALE	PART NUMBER
1	7-26-93	WTP	CD1 UNIT REVISED	.XXX - ±.005	ALTRONIC CD1 - KIT CD104A IGNITION SYSTEM 4-CYLINDER	WTP	NONE	709 155
2				.XX - ±.010				
3				FRACTIONAL	CHECKED BY	DATE		
4				MATERIAL	APPROVED BY	2-17-92		
5								

709 155



REVISIONS				TOLERANCES (EXCEPT AS NOTED)		ALTRONIC INC.			
NO.	DATE	BY	DESCRIPTION	DECIMAL		TITLE		PART NUMBER	
1	7-26-93	WTP	CDI UNIT REVISED	.XXX	±.005	ALTRONIC CDI - KIT CD106 IGNITION SYSTEM 6-CYLINDER		DRAWN BY	SCALE
2				.XX	±.010			WTP	NONE
3				FRACTIONAL		CHECKED BY	DATE	709 156	
4				MATERIAL			2-17-92		
5						APPROVED BY			

709 156



CONNECTION CHART

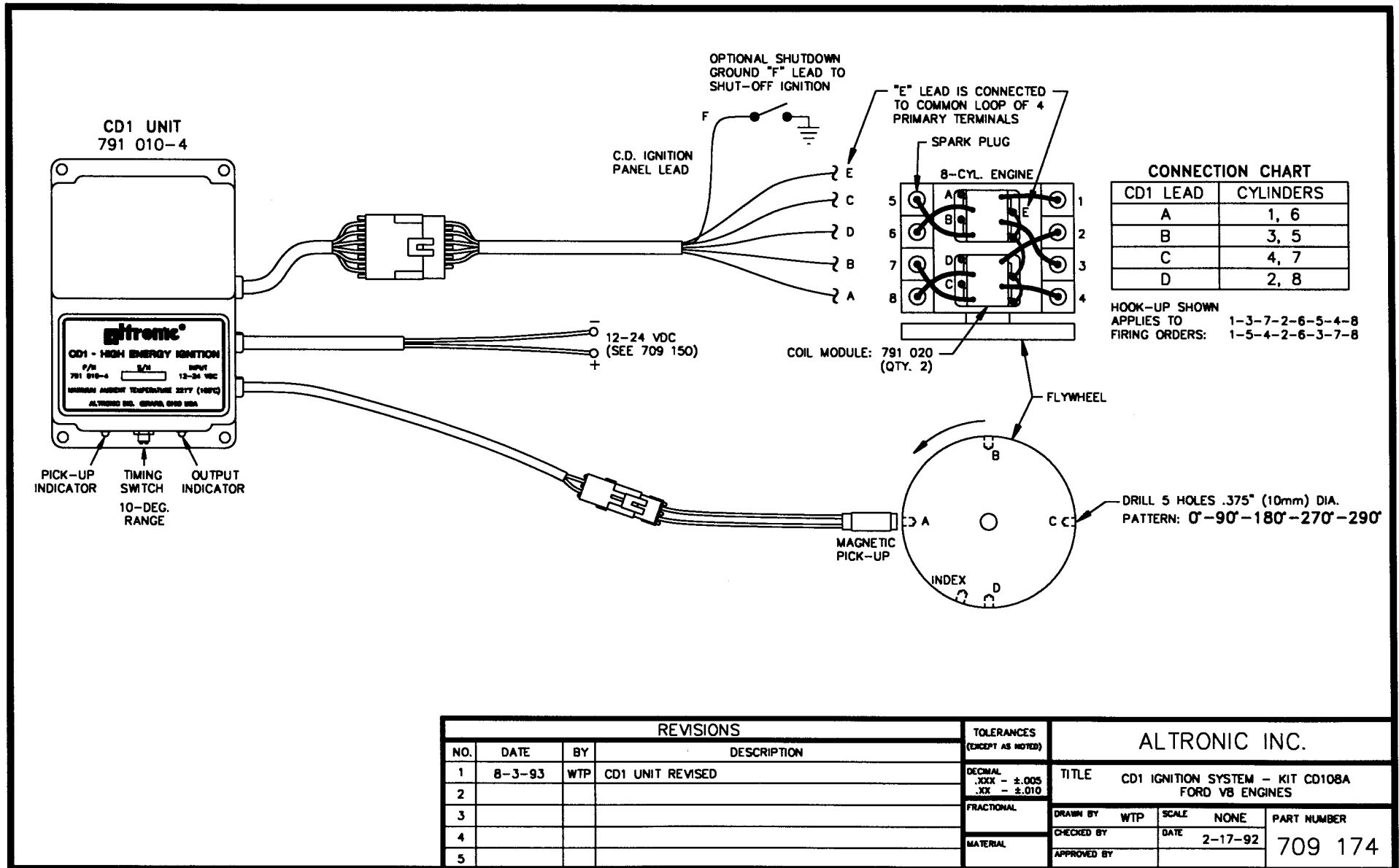
CD1 LEAD	CYLINDERS
A	1, 6
B	2, 5
C	3, 4

ENGINE FIRING ORDER
1-5-3-6-2-4

NOTE: FOR FIRING ORDER
1-4-2-6-3-5, REVERSE
LEADS B AND C.

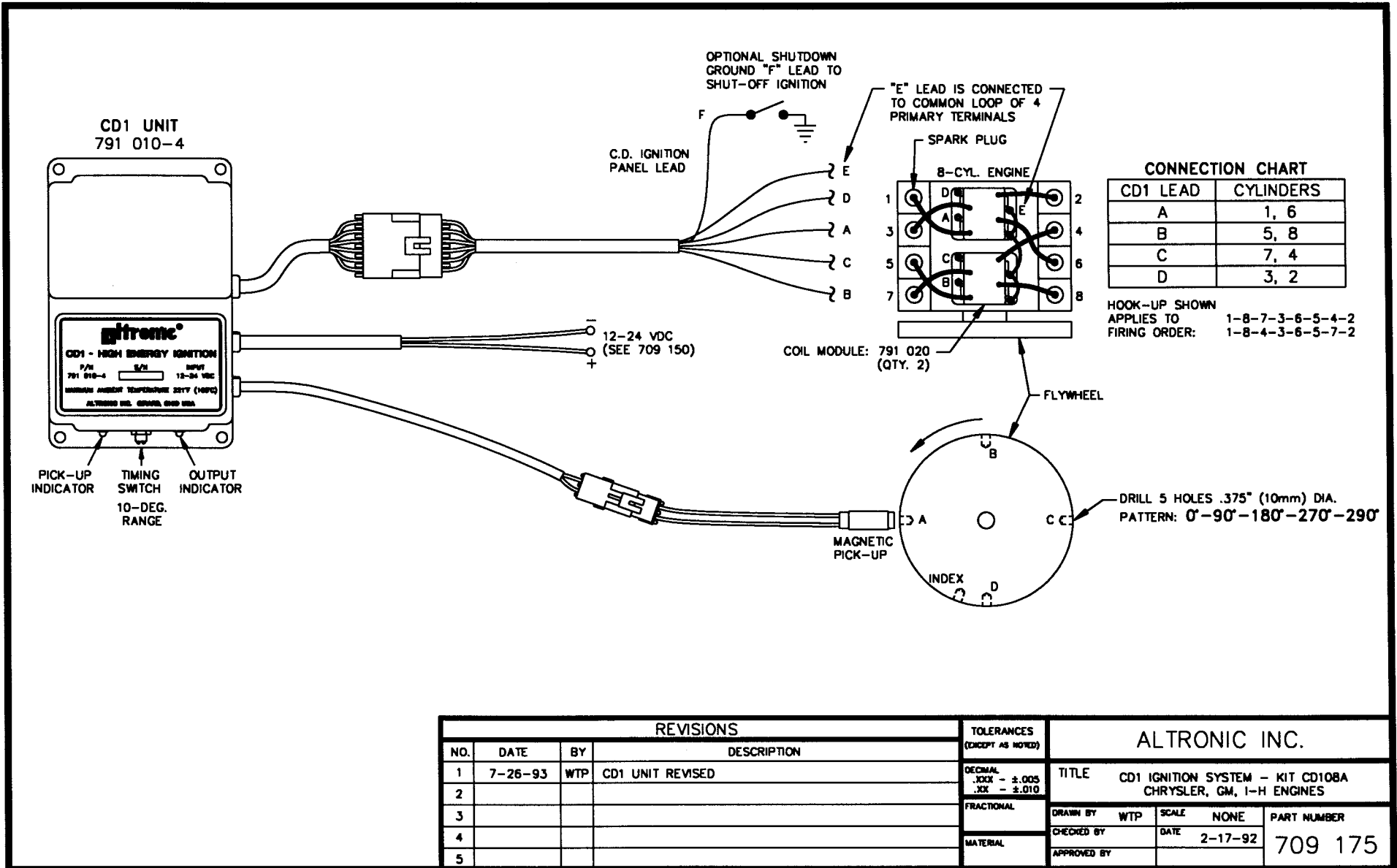
709 157

REVISIONS				TOLERANCES (EXCEPT AS NOTED)	ALTRONIC INC.		
NO.	DATE	BY	DESCRIPTION	DECIMAL .XXX - ±.005 .XX - ±.010	TITLE ALTRONIC CDI - KIT CD106A IGNITION SYSTEM 6-CYLINDER		
1	7-26-93	WTP	CD1 UNIT REVISED	FRACTIONAL	DRAWN BY	SCALE	PART NUMBER
2				MATERIAL	WTP	NONE	709 157
3					CHECKED BY	DATE	
4						2-17-92	
5					APPROVED BY		



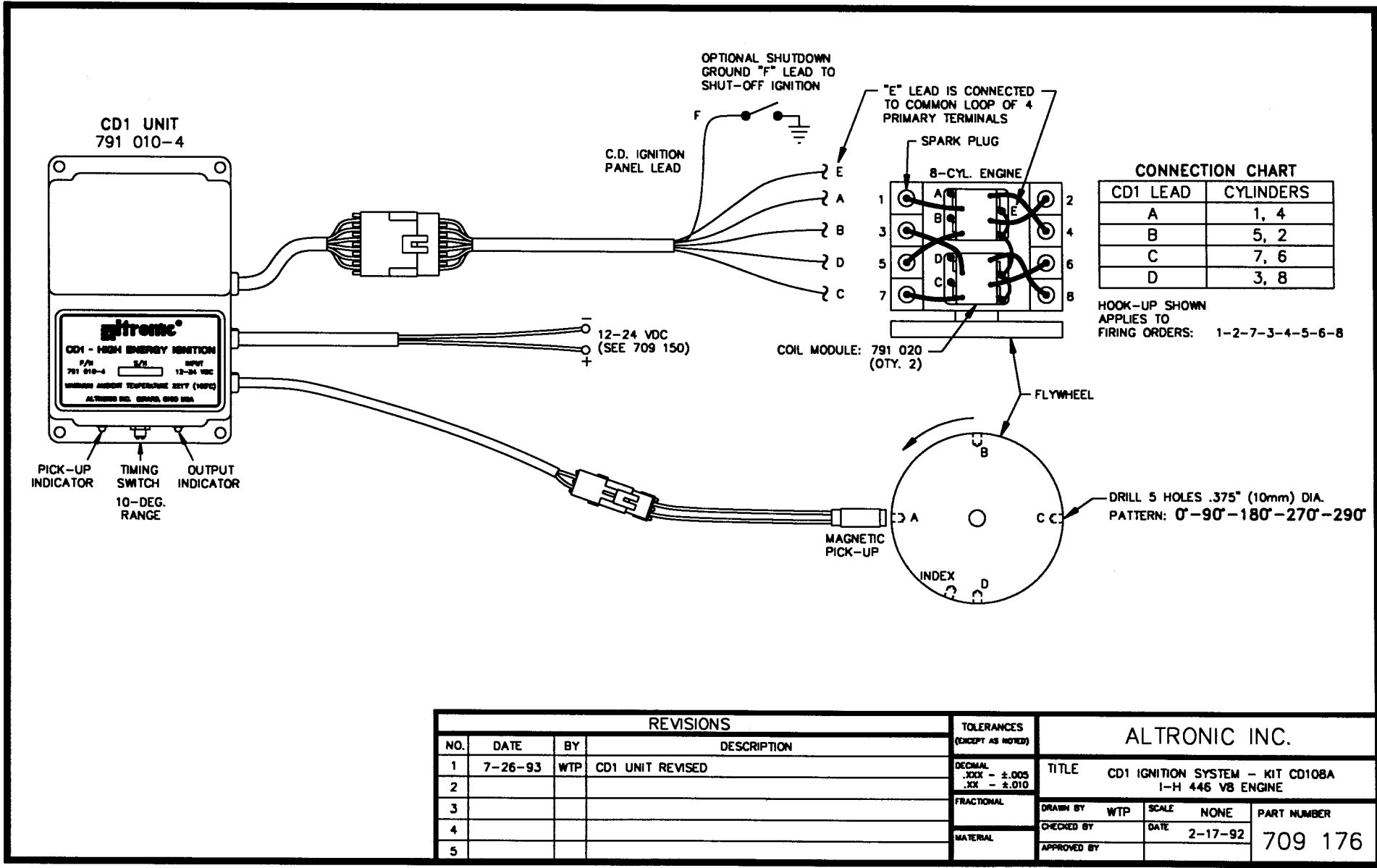
709 174

REVISIONS				TOLERANCES (EXCEPT AS NOTED)		ALTRONIC INC.		
NO.	DATE	BY	DESCRIPTION	DECIMAL		TITLE		PART NUMBER
1	8-3-93	WTP	CD1 UNIT REVISED	.XXX	±.005	CD1 IGNITION SYSTEM - KIT CD108A		709 174
2				.XX	±.010	FORD V8 ENGINES		
3				FRACTIONAL		DRAWN BY	WTP	
4				MATERIAL		CHECKED BY	DATE	
5						APPROVED BY	2-17-92	



709 175

REVISIONS				TOLERANCES (EXCEPT AS NOTED)		ALTRONIC INC.						
NO.	DATE	BY	DESCRIPTION	DECIMAL		TITLE						
1	7-26-93	WTP	CD1 UNIT REVISED	.XXX	±.005	CD1 IGNITION SYSTEM - KIT CD108A CHRYSLER, GM, I-H ENGINES						
2				.XX	±.010							
3								DRAWN BY	WTP	SCALE	NONE	PART NUMBER
4								CHECKED BY		DATE	2-17-92	709 175
5								APPROVED BY				



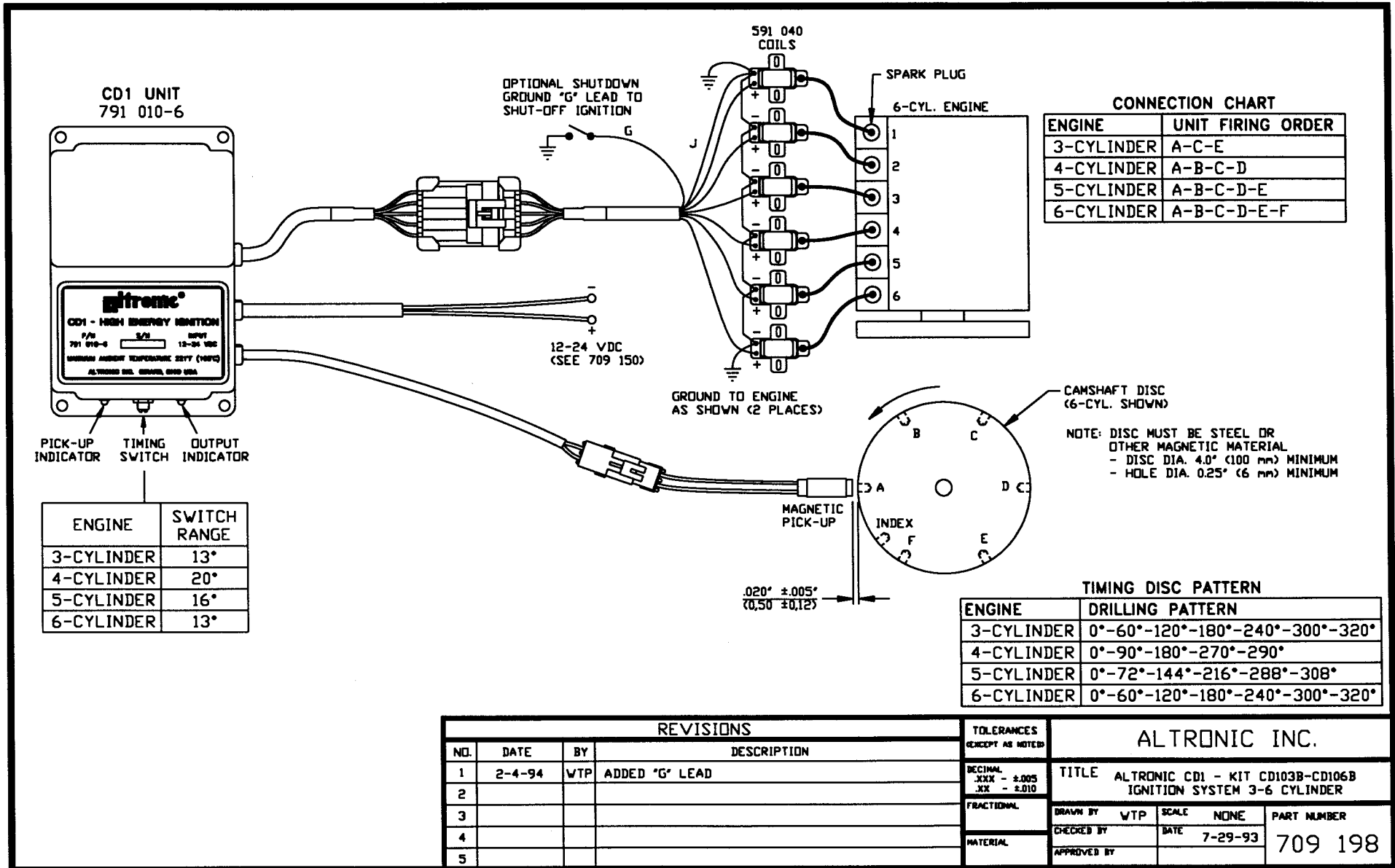
CONNECTION CHART

CD1 LEAD	CYLINDERS
A	1, 4
B	5, 2
C	7, 6
D	3, 8

HOOK-UP SHOWN APPLIES TO FIRING ORDERS: 1-2-7-3-4-5-6-8

REVISIONS				TOLERANCES (EXCEPT AS NOTED)		ALTRONIC INC.							
NO.	DATE	BY	DESCRIPTION	DECIMAL		TITLE							
1	7-26-93	WTP	CD1 UNIT REVISED	.XXX	±.005	CD1 IGNITION SYSTEM - KIT CD108A I-H 446 V8 ENGINE		DRAWN BY	WTP	SCALE	NONE	PART NUMBER	709 176
2				.XX	±.010			CHECKED BY		DATE	2-17-92		
3				FRACTIONAL		APPROVED BY							
4				MATERIAL									
5													

709 176



CONNECTION CHART

ENGINE	UNIT FIRING ORDER
3-CYLINDER	A-C-E
4-CYLINDER	A-B-C-D
5-CYLINDER	A-B-C-D-E
6-CYLINDER	A-B-C-D-E-F

ENGINE	SWITCH RANGE
3-CYLINDER	13°
4-CYLINDER	20°
5-CYLINDER	16°
6-CYLINDER	13°

TIMING DISC PATTERN

ENGINE	DRILLING PATTERN
3-CYLINDER	0°-60°-120°-180°-240°-300°-320°
4-CYLINDER	0°-90°-180°-270°-290°
5-CYLINDER	0°-72°-144°-216°-288°-308°
6-CYLINDER	0°-60°-120°-180°-240°-300°-320°

REVISIONS			
NO.	DATE	BY	DESCRIPTION
1	2-4-94	WTP	ADDED 'G' LEAD
2			
3			
4			
5			

TOLERANCES (EXCEPT AS NOTED)				ALTRONIC INC.			
DECIMAL .XXX - ±.005 .XX - ±.010							
FRACTIONAL				DRAWN BY WTP		SCALE NONE	
MATERIAL				CHECKED BY		DATE 7-29-93	
				APPROVED BY		PART NUMBER 709 198	

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