

**ALTRONIC, INC.
712 TRUMBULL AVE.
GIRARD, OHIO 44420**

**ALTRONIC II-CPU IGNITION SYSTEM
"D" VERSION
INCLUDING 281 550-2 24 VDC CONVERTER**

IMPORTANT SAFETY NOTICE

PROPER INSTALLATION, MAINTENANCE, REPAIR AND OPERATION OF THIS EQUIPMENT IS ESSENTIAL. THE RECOMMENDED PRACTICES CONTAINED HEREIN SHOULD BE FOLLOWED WITHOUT DEVIATION. AN IMPROPERLY INSTALLED OR OPERATING IGNITION SYSTEM COULD CAUSE PERSONAL INJURY TO OPERATORS OR OTHER NEARBY PERSONNEL.

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1.0 ALTRONIC II-CPU - SYSTEM DESCRIPTION

The Altronic II-CPU ignition system is a microcircuit-based, capacitor discharge system. The system requires two signals from external magnetic pick-ups: (1) counts from a crankshaft-mounted gear or drilled holes in the engine flywheel; (2) a reset pulse once per revolution.

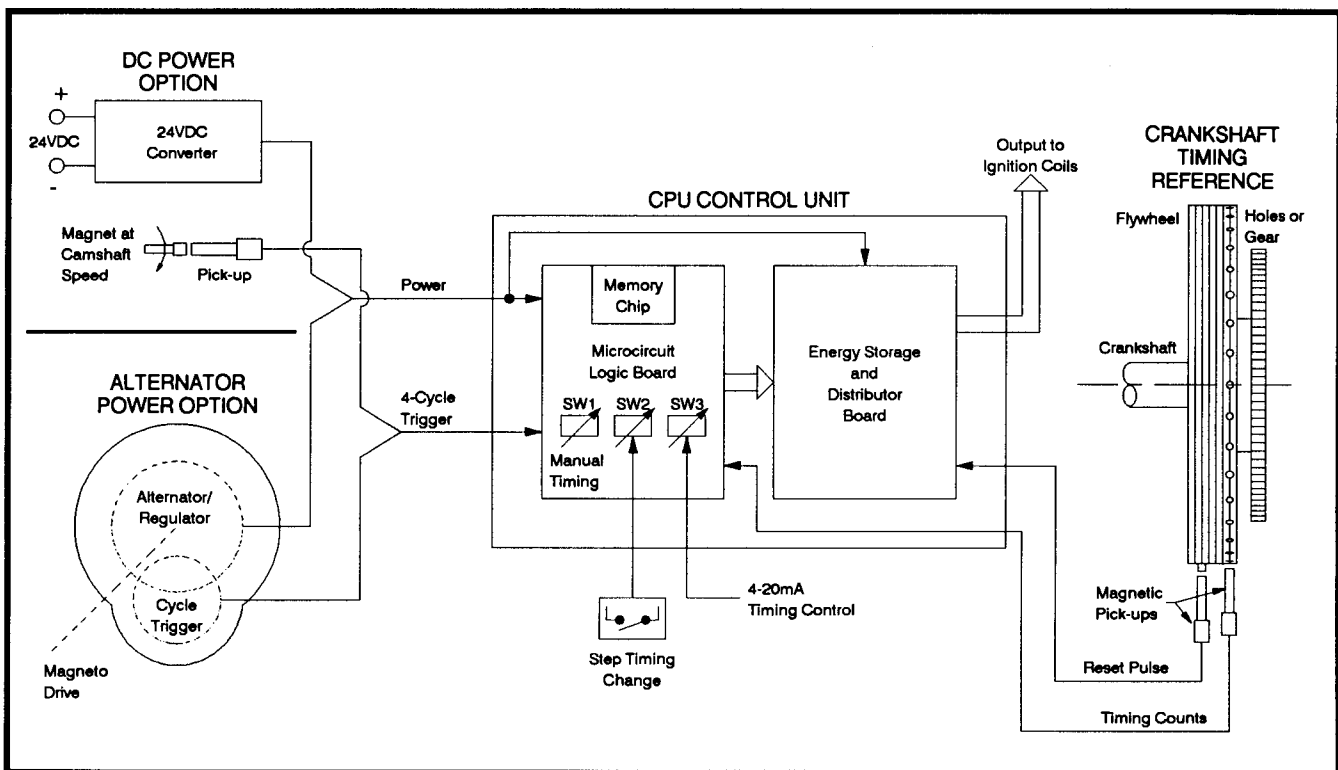
Referring to the diagram below, the system consists of a power source unit (either an Alternator or 24 VDC Converter) which provides power for the basic operation of the CPU Control Unit and charges the energy storage capacitors. The Alternator consists of a 12-pole permanent-magnet alternator, a transistor regulator and a cycle trigger to reference the compression stroke on 4-cycle applications. When the DC Converter is used, a separate Hall-effect pick-up with a camshaft-referenced magnet is required on 4-cycle installations.

The CPU Control Unit consists of a microcircuit logic board and an energy storage/distributor board. The memory chip is programmed with the engine firing angle sequence and the number of reference teeth or holes. The logic board outputs precisely timed trigger pulses to the solid state distributor board which routes the stored primary energy to the ignition coils in sequence.

The Altronic II-CPU system implements timing changes by counting pulses from the reference holes or teeth. The timing change increment is equal to $360/2N$ where N = the number of reference teeth or holes. With 180 teeth as recommended for test purposes, the timing change increment is one degree.

Three ways are provided to vary ignition timing:

- Manual timing adjustment with SW1, an internal 16-position switch;
- Step-change timing adjustment set with SW2, a second 16-position switch;
- Control from an external 4-20 ma current loop signal.



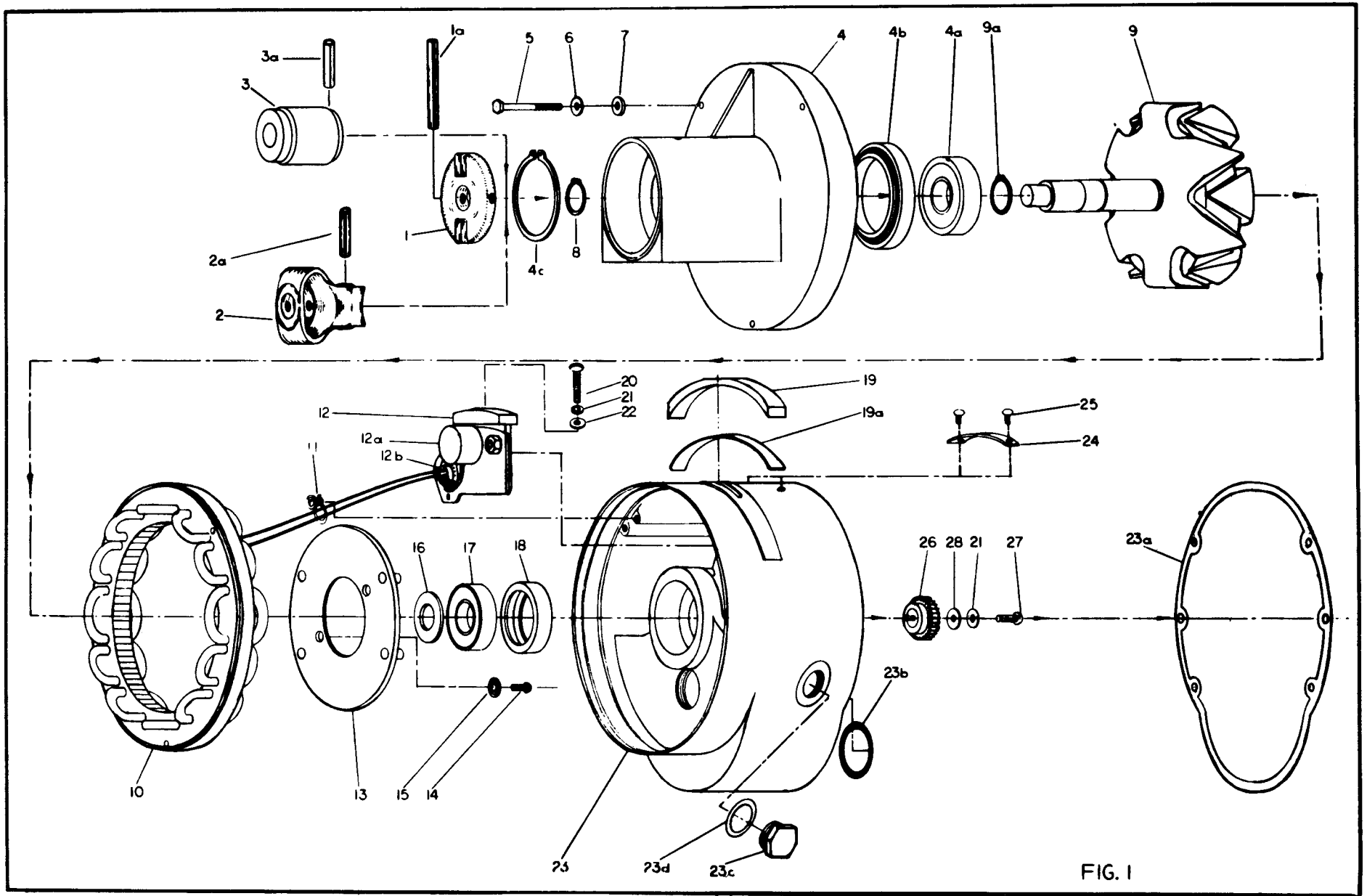


FIG. 1

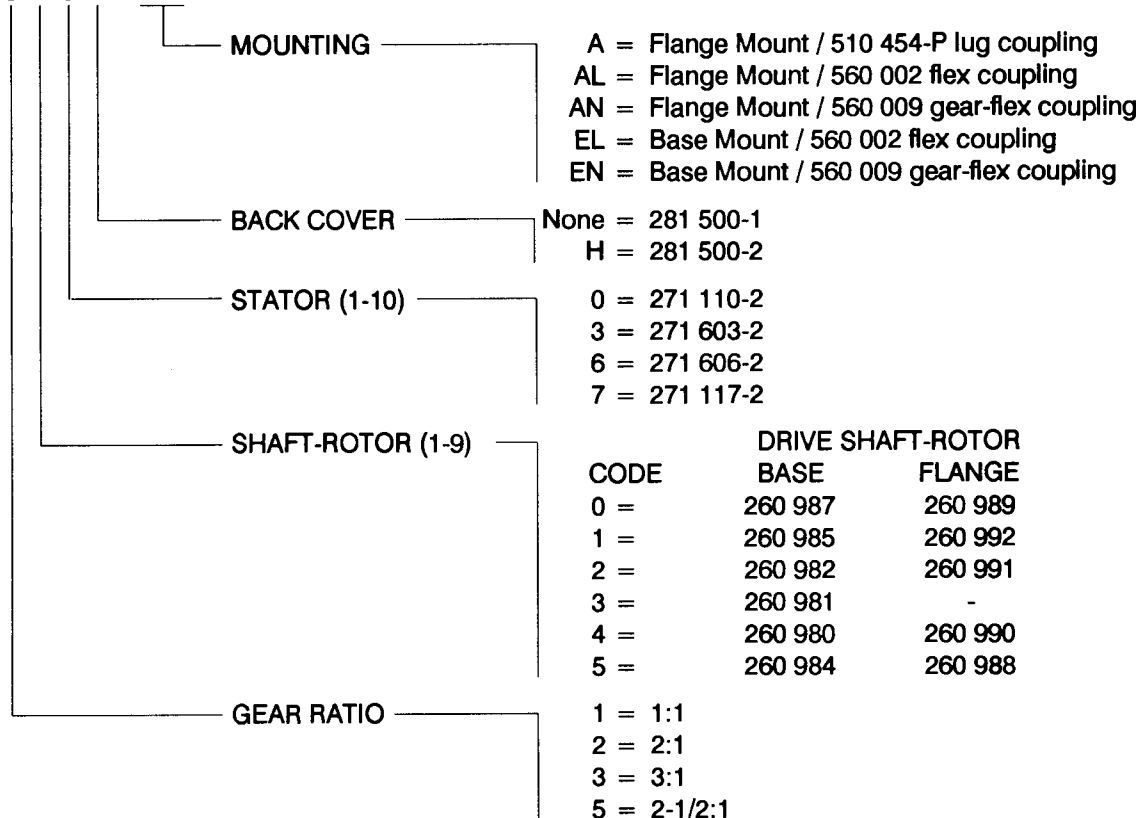
2.0 PARTS IDENTIFICATION AND SPECIFICATION

2.1 PARTS LIST - ALTRONIC II-CPU ALTERNATOR: 290 xxx-x

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|----------|-----------|------------------------|----------|-----------|----------------------|
| 1-1 | 510 454-P | Coupling w/pin | -15 | 900 427 | Lockwasher #10 |
| -1a | 902 478 | Spring pin 2-1/8" lg. | -16 | 210 495 | Spacer |
| -2 | 560 002 | Flex coupling w/pin | -17 | 510 452 | Bearing |
| -2a | 902 475 | Spring pin 1-1/8" lg. | -18 | 510 459 | Bearing cover |
| -3 | 560 009 | Gear coupling w/pin | -19 | 260 003 | Slide bar w/gasket |
| -3a | 902 475 | Spring pin 1-1/8" lg. | -19a | 210 266 | Gasket - slide bar |
| -4 | 260 002 | Front housing - base | -20 | 902 453 | Screw - 1/4"-20 |
| | 260 010 | Front housing - flange | -21 | 901 008 | Lockwasher 1/4" |
| -4a | 210 282 | Bearing | -22 | 901 344 | Washer |
| -5 | 902 457 | Screw 10-24 | -23 | 260 005-3 | Intermediate housing |
| -6 | 901 004 | Lockwasher #10 | -23a | 210 265 | Gasket - housing |
| -7 | 504 073 | Washer - fibre | -23b | 210 284 | O-ring |
| -8 | 902 485 | Snap ring | -23c | 210 274 | Plug |
| -9 | See below | Shaft-rotor ass'y. | -23d | 210 275 | Seal |
| -9a | 902 485 | Snap ring | -24 | 202 003 | Nameplate |
| -10 | See below | Stator | -25 | 902 456 | Drive pin |
| -11 | 264 001 | Wire guide ass'y. | -26 | 210 148 | Drive gear 2:1 |
| -12 | 261 400 | Socket arm assembly | | 210 171 | Drive gear 1:1 |
| -12a | -- | Not used in CPU system | | 210 173 | Drive gear 2.5:1 |
| -12b | 204 601 | Connector socket | | 210 175 | Drive gear 3:1 |
| -13 | -- | Not used in CPU system | -27 | 902 440 | Screw 1/4"-20 |
| -14 | 902 439 | Screw 10-32 | -28 | 901 332 | Washer |

2.1.1 PART NO. DESIGNATION

2 9 0 0 2 6 H - E N



NOTE: For service of Alternator, see Altronic II service manual form All SM.

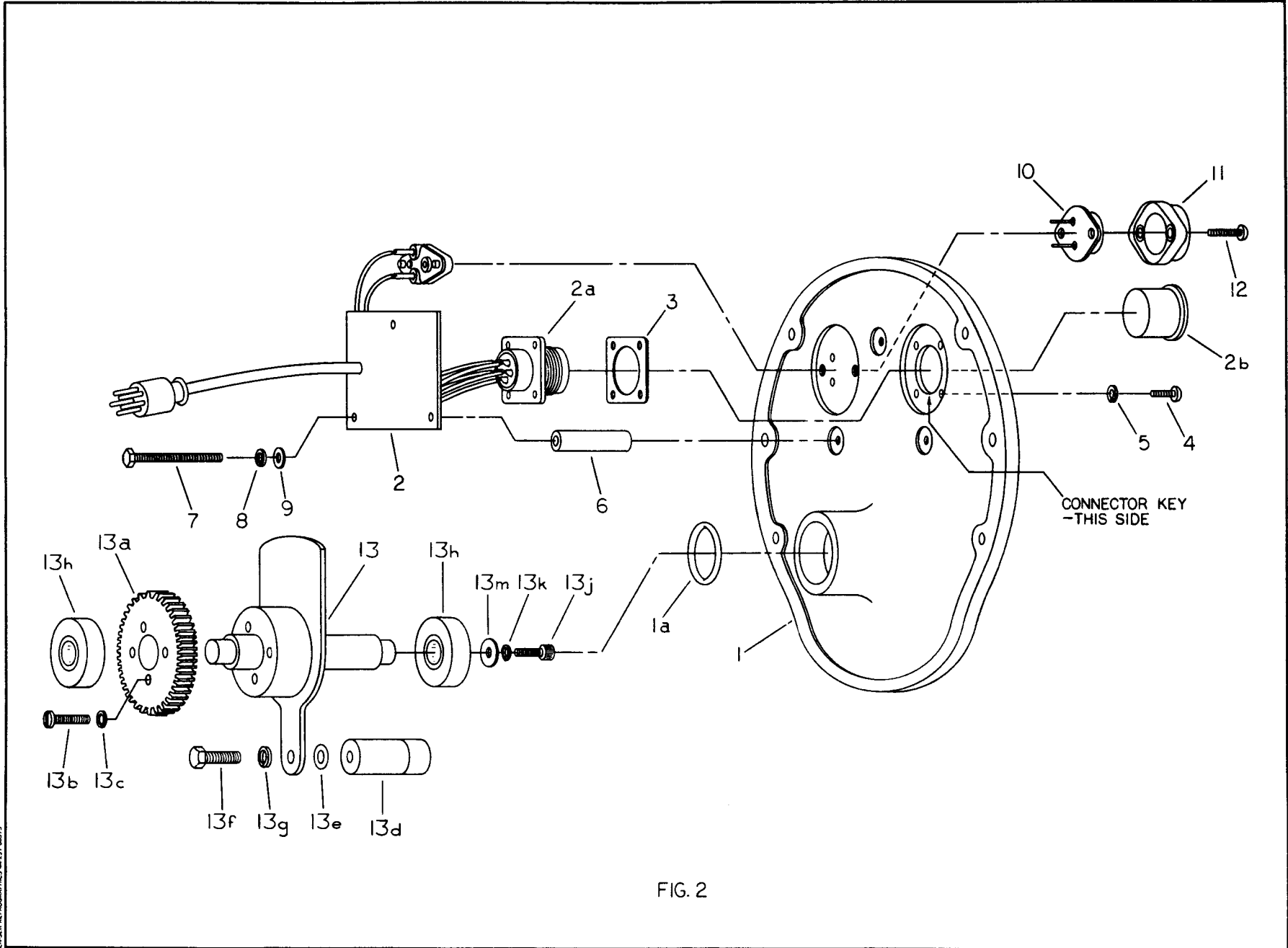


FIG. 2

2.2 PARTS LIST - CPU BACK COVER: 281 500-1, 281 500-2

| FIGURE & REF. NO. | QTY. | PART NO. | DESCRIPTION |
|----------------------|------|-----------|-----------------------------------------|
| 2-1 | 1 | 210 621 | Cover casting |
| -1a | 1 | 210 612 | O-ring |
| -2 | 1 | 272 500-1 | Circuit board ass'y. (281 500-1) |
| | | 272 500-2 | Circuit board ass'y. (281 500-2) |
| -2a | 1 | 504 150 | Connector |
| -2b | 1 | 510 540 | Cap - connector |
| -3 | 1 | 501 335 | Gasket |
| -4 | 4 | 902 064 | Screw 6-32 |
| -5 | 4 | 901 000 | Lockwasher #6 |
| -6 | 3 | 510 634 | Spacer |
| -7 | 3 | 902 581 | Screw 8-32 |
| -8 | 3 | 900 944 | Lockwasher #8 |
| -9 | 3 | 902 562 | Washer |
| -10 | 1 | 601 347 | Transistor |
| -11 | 1 | 610 163 | Cover - transistor |
| -12 | 2 | 902 073 | Screw 6-32 |
| -13 | 1 | 280 601-1 | Distributor shaft assembly - 1:1 gear |
| | | 280 601-2 | Distributor shaft assembly - 2:1 gear |
| | | 280 601-3 | Distributor shaft assembly - 3:1 gear |
| | | 280 601-5 | Distributor shaft assembly - 2.5:1 gear |
| | | 510 477 | Driven gear 1:1 |
| -13a | 1 | 510 358 | Driven gear 2:1 |
| | | 510 360 | Driven gear 3:1 |
| | | 510 446 | Driven gear 2.5:1 |
| | | 902 500 | Screw 6-32 |
| -13b | 4 | 902 500 | Screw 6-32 |
| -13c | 4 | 901 000 | Lockwasher #6 |
| -13d | 1 | 260 602 | Magnet assembly |
| -13e | AR | 902 521 | Washer-shim |
| -13f | 1 | 902 472 | Screw 10-24 |
| -13g | 1 | 901 004 | Lockwasher #10 |
| -13h | 2 | 210 283 | Bearing |
| -13j | 1 | 902 465 | Screw 8-32 |
| -13k | 1 | 900 944 | Lockwasher #8 |
| -13m | 1 | 901 326 | Washer #8 |

NOTE: To change transistor (-10), remove only screws (-12). To change circuit board assembly (-2), remove screws (-4), (-7) and (-12). For service of distributor shaft assembly (-13), see Altronic II service manual form All SM.

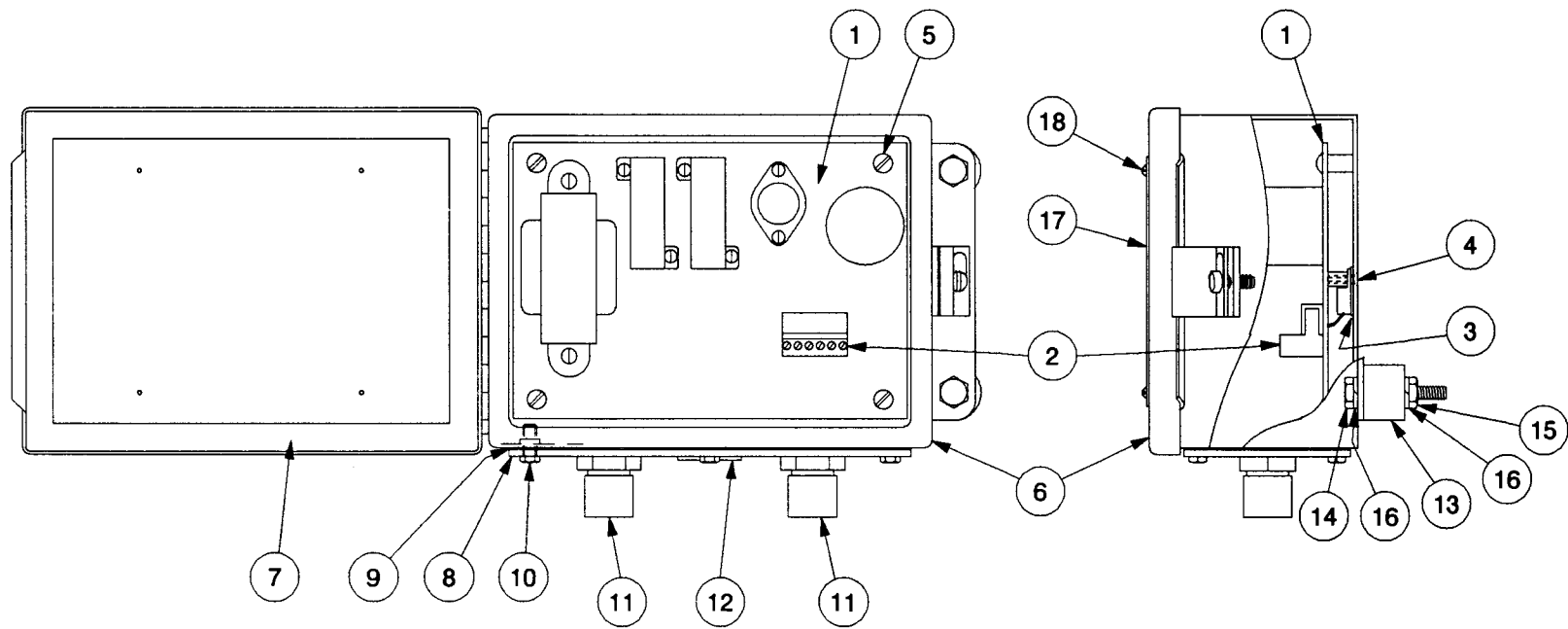


FIG. 3

2.3 PARTS LIST - DC CONVERTER: 281 550-2

| FIGURE & REF. NO. | QTY. | PART NO. | DESCRIPTION |
|----------------------|------|----------|----------------------|
| 3-1 | 1 | 272 002 | Circuit board ass'y. |
| -2 | 1 | 204 015 | Socket - 6-pin |
| -3 | 1 | 610 193 | Insulator |
| -4 | 1 | 902 595 | Screw 6-32 - plastic |
| -5 | 4 | 902 439 | Screw 10-32 |
| -6 | 1 | 210 627 | Enclosure |
| -7 | 1 | 610 516 | Gasket - cover |
| -8 | 1 | 210 622 | Plate - entry |
| -9 | 1 | 210 625 | Gasket - plate |
| -10 | 6 | 902 599 | Screw 10-24 |
| -11 | 2 | 510 527 | Conduit fitting |
| -12 | 1 | 310 416 | Plug |
| -13 | 4 | 610 165 | Shock mount |
| -14 | 4 | 902 593 | Bolt 5/16-18 |
| -15 | 4 | 902 469 | Nut 5/16-18 |
| -16 | 8 | 901 010 | Lockwasher 5/16 |
| -17 | 1 | 202 120A | Nameplate |
| -18 | 4 | 902 578 | Screw 4-40 |

NOTE: To change circuit board assembly (-1), remove plastic screw (-4) and four screws (-5). Check the condition of insulator (-3), gaskets (-7), (-9) and shock mounts (-13); replace if necessary. Install new hardware where needed.

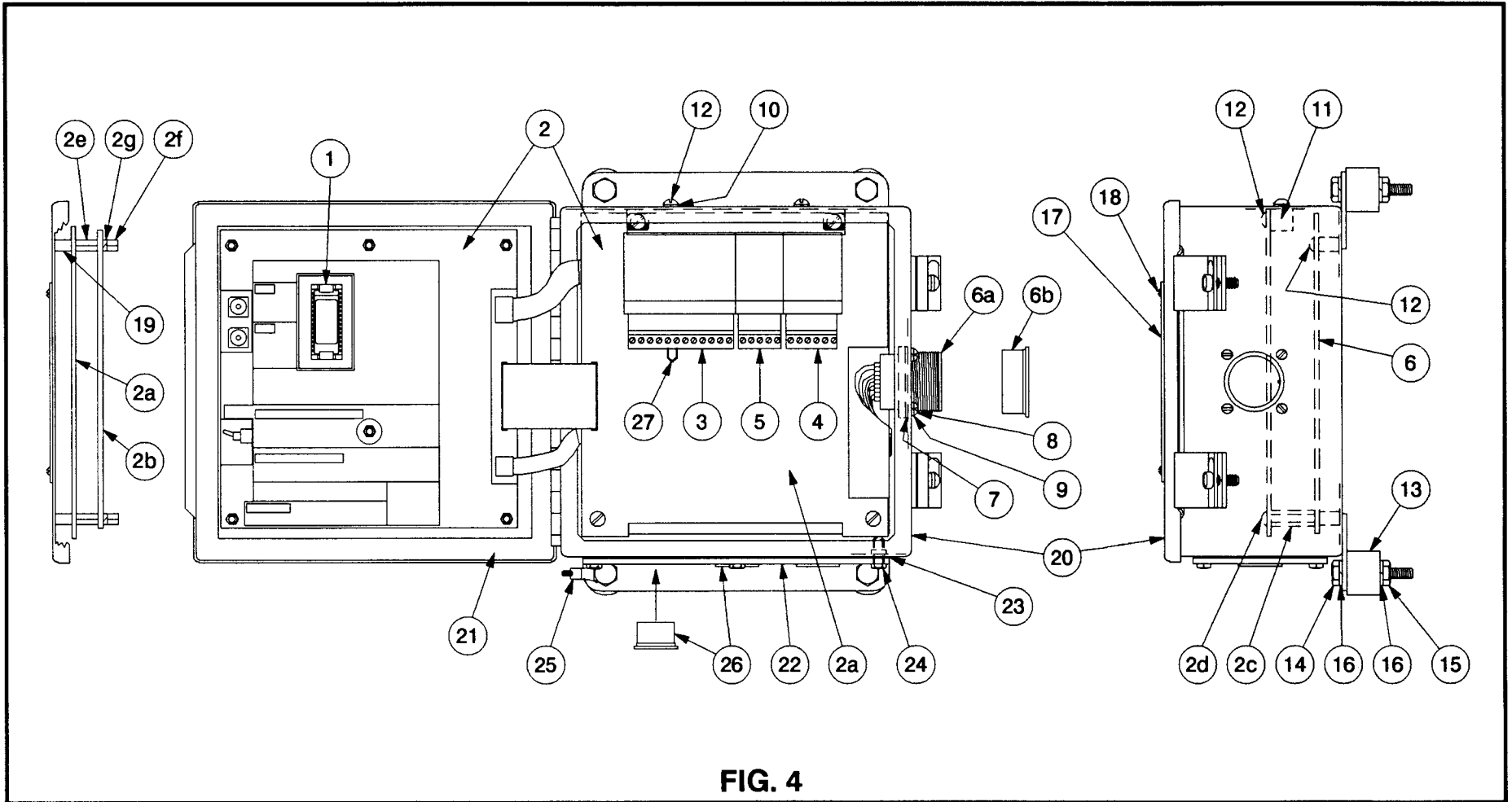


FIG. 4

2.4 PARTS LIST - CPU CONTROL UNIT: 281 508-x, 281 512-x, 281 516-x

| FIGURE & REF. NO. | QTY. | PART NO. | DESCRIPTION |
|----------------------|------|------------|--------------------------------------------|
| 4-1 | 1 | 601 507 | Memory chip |
| | | 601 507-S | Memory chip - non-standard |
| -2 | 1 | 272 502R | Logic board retrofit assembly |
| -2a | 1 | 272 502 | Logic board assembly |
| -2b | 1 | 202 501 | Shield board ass'y. |
| -2c | 2 | 210 631 | Standoff 10-32 |
| -2d | 2 | 902 439 | Screw 10-32 |
| -2e | 6 | 210 630 | Standoff 8-32 |
| -2f | 6 | 610 075 | Nut 8-32 |
| -2g | 6 | 900 944 | Lockwasher #8 |
| -3 | 1 | 204 014 | Socket - 12-pin |
| -4 | 1 | 204 015 | Socket - 6-pin |
| -5 | 1 | 204 016 | Socket - 5-pin |
| -6 | 1 | 272 508-2 | Distributor board ass'y. (281 508-2 unit) |
| | | 272 508-2A | Distributor board ass'y. (281 508-2A unit) |
| | | 272 512-2 | Distributor board ass'y. (281 512-2 unit) |
| | | 272 512-2A | Distributor board ass'y. (281 512-2A unit) |
| | | 272 516-2 | Distributor board ass'y. (281 516-2 unit) |
| | | 272 516-2A | Distributor board ass'y. (281 516-2A unit) |
| -6a | 1 | 504 055-T | Connector |
| -6b | 1 | 510 517 | Cap - connector |
| -7 | 1 | 501 222 | Gasket - connector |
| -8 | 4 | 902 064 | Screw 6-32 |
| -9 | 4 | 901 000 | Lockwasher #6 |
| -10 | 2 | 901 004 | Lockwasher #10 |
| -11 | 1 | 210 623 | Mounting bar |
| -12 | 6 | 902 439 | Screw 10-32 |
| -13 | 4 | 610 165 | Shock mount |
| -14 | 4 | 902 593 | Bolt 5/16-18 |
| -15 | 4 | 902 469 | Nut 5/16-18 |
| -16 | 8 | 901 010 | Lockwasher 5/16 |
| -17 | 1 | 202 113A | Nameplate |
| -18 | 4 | 902 578 | Screw 4-40 |
| -19 | 6 | 610 041 | Spacer |
| -20 | 1 | 210 624 | Enclosure |
| -21 | 1 | 610 512 | Gasket - cover |
| -22 | 1 | 210 622 | Plate - entry |
| -23 | 1 | 210 625 | Gasket - plate |
| -24 | 6 | 902 599 | Screw 10-24 |
| -25 | 1 | 610 386 | Ground strap assembly |
| -26 | 3 | 510 540 | Cap |
| -27 | 1 | 503 242 | Lead - jumper |

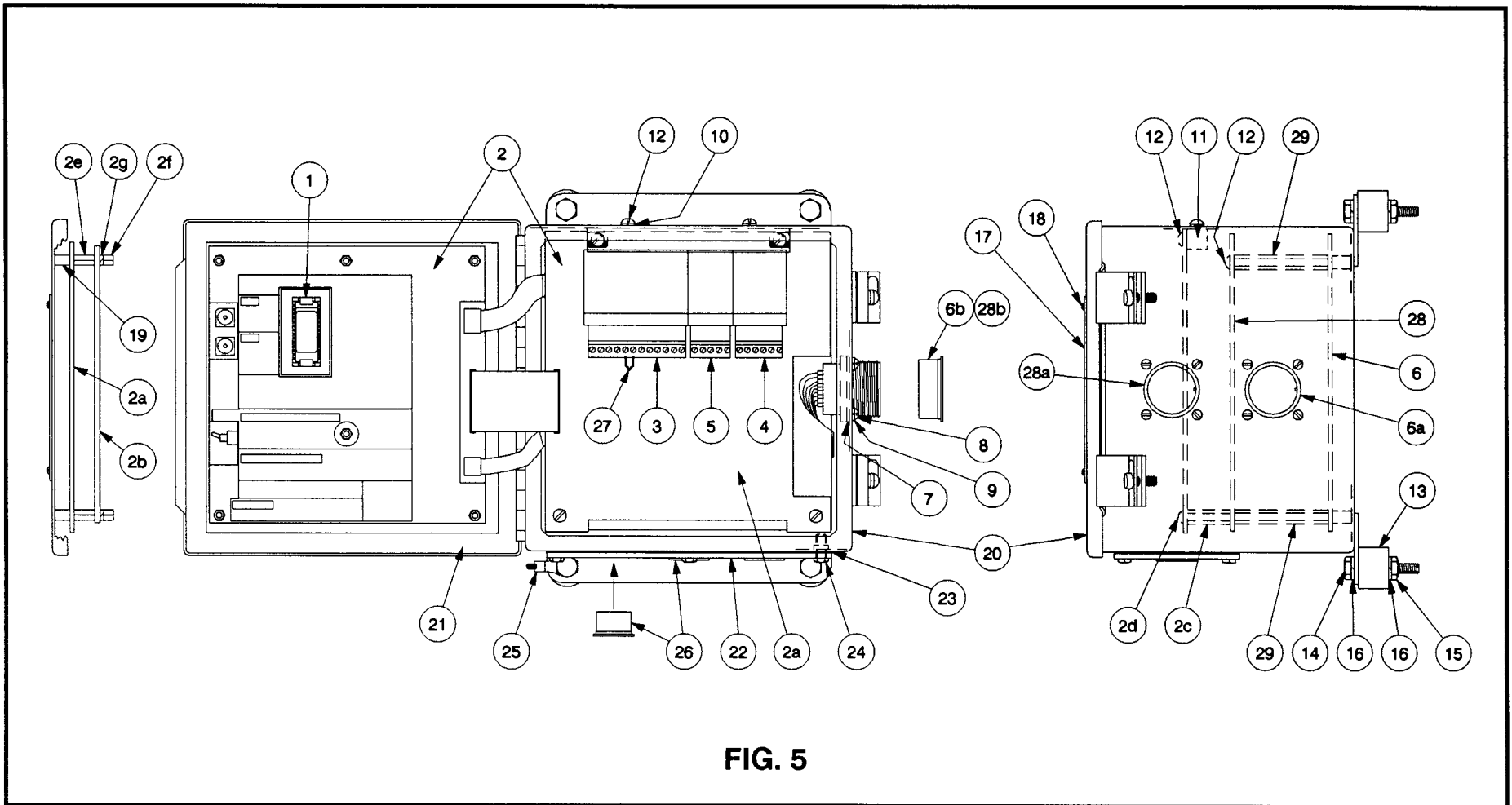


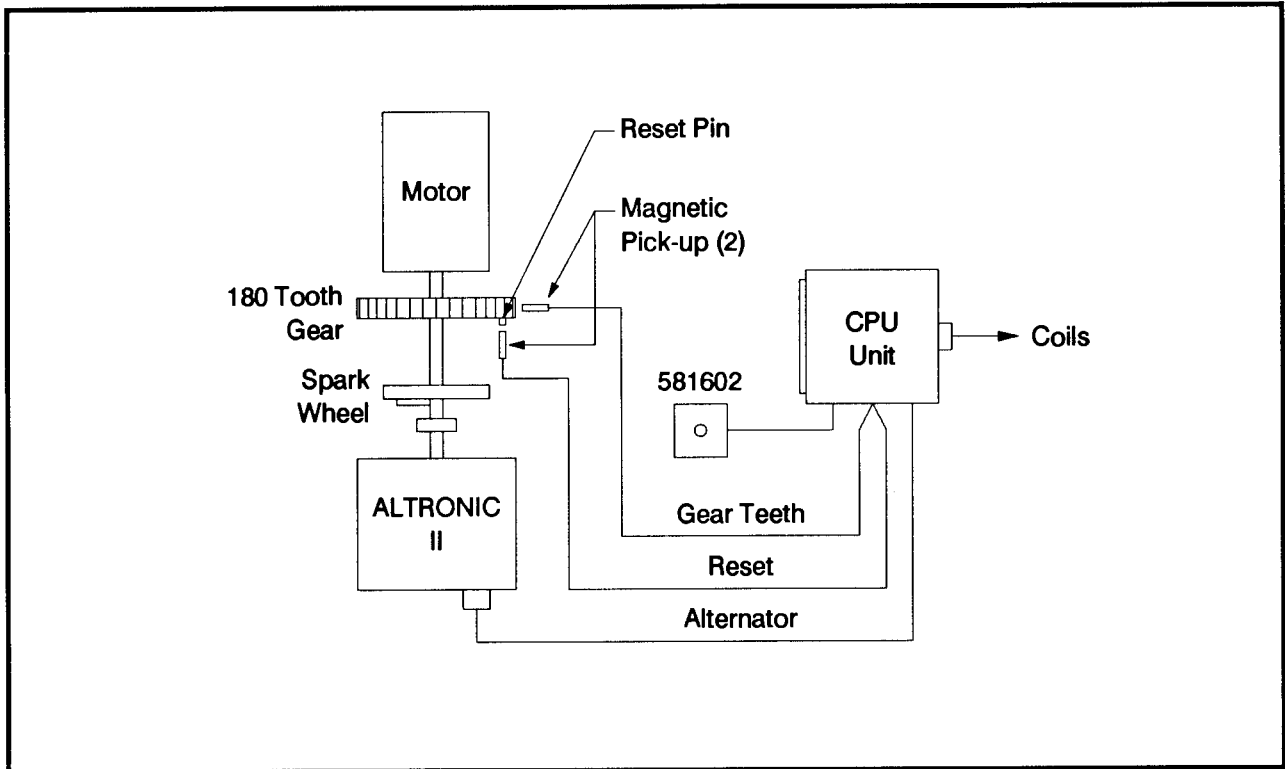
FIG. 5

2.5 PARTS LIST - CPU CONTROL UNIT: 281 624-x, 281 632-x

| FIGURE & REF. NO. | QTY. | PART NO. | DESCRIPTION |
|----------------------|------|------------|--------------------------------------------------|
| 5-1 | 1 | 601 507 | Memory chip |
| | | 601 507-S | Memory chip - non-standard |
| -2 | 1 | 272 502RA | Logic board retrofit assembly |
| -2a | 1 | 272 502 | Logic board assembly |
| -2b | 1 | 202 501 | Shield board assembly |
| -2c | 2 | 210 637-2 | Standoff 10-32 |
| -2d | 2 | 902 439 | Screw 10-32 |
| -2e | 6 | 210 630 | Standoff 8-32 |
| -2f | 6 | 610 075 | Nut 8-32 |
| -2g | 6 | 900 944 | Lockwasher #8 |
| -3 | 1 | 204 014 | Socket - 12-pin |
| -4 | 1 | 204 015 | Socket - 6-pin |
| -5 | 1 | 204 016 | Socket - 5-pin |
| -6 | 1 | 272 512-2 | Lower distributor board ass'y. (281 624-2 unit) |
| | | 272 512-2A | Lower distributor board ass'y. (281 624-2A unit) |
| | | 272 516-2 | Lower distributor board ass'y. (281 632-2 unit) |
| | | 272 516-2A | Lower distributor board ass'y. (281 632-2A unit) |
| -6a | 1 | 504 055-T | Connector |
| -6b | 1 | 510 517 | Cap - connector |
| -7 | 2 | 501 222 | Gasket - connector |
| -8 | 8 | 902 064 | Screw 6-32 |
| -9 | 8 | 901 000 | Lockwasher #6 |
| -10 | 2 | 901 004 | Lockwasher #10 |
| -11 | 1 | 210 623 | Mounting bar |
| -12 | 6 | 902 439 | Screw 10-32 |
| -13 | 4 | 610 165 | Shock mount |
| -14 | 4 | 902 593 | Bolt 5/16-18 |
| -15 | 4 | 902 469 | Nut 5/16-18 |
| -16 | 8 | 901 010 | Lockwasher 5/16 |
| -17 | 1 | 202 113A | Nameplate |
| -18 | 4 | 902 578 | Screw 4-40 |
| -19 | 6 | 610 041 | Spacer |
| -20 | 1 | 210 635 | Enclosure |
| -21 | 1 | 610 512 | Gasket - cover |
| -22 | 1 | 210 622 | Plate - entry |
| -23 | 1 | 210 625 | Gasket - plate |
| -24 | 6 | 902 599 | Screw 10-24 |
| -25 | 1 | 610 386 | Ground strap assembly |
| -26 | 3 | 510 540 | Cap |
| -27 | 1 | 503 242 | Lead - jumper |
| -28 | 1 | 272 521-2 | Upper distributor board ass'y. (281 624-2 unit) |
| | | 272 521-2A | Upper distributor board ass'y. (281 624-2A unit) |
| | | 272 522-2 | Upper distributor board ass'y. (281 632-2 unit) |
| | | 272 522-2A | Upper distributor board ass'y. (281 632-2A unit) |
| -28a | 1 | 504 055-T | Connector |
| -28b | 1 | 510 517 | Cap - connector |
| -29 | 4 | 210 637-1 | Standoff 10-32 |

3.0 TEST STAND REQUIREMENTS

- 3.1 In order to test an Altronic II-CPU ignition system, a special test stand is required. Such a stand can be built starting with the elements of an ignition test stand suitable for a standard Altronic II system.
- 3.2 A standard ignition test stand includes these items:
- A. A variable speed motor of 0.5 HP or greater, capable of rotating 1,500 RPM.
 - B. Mounting adaptation to both base and flange mount configurations.
 - C. A spark degree wheel graduated in 360 increments with the indicator attached to the shaft driving the Altronic II unit.
 - D. Sixteen (16) ignition coils 291 001 connected to suitable, adjustable spark gaps.
- 3.3 The following items are additionally required to test the Altronic II-CPU system:
- A. A source of gear tooth pulses mechanically connected to the Altronic II unit drive; a 180 tooth gear is suggested.
 - B. A single reset pin (6-32 machine screw suggested) mounted to the face of the gear.
 - C. Magnetic pick-ups mounted to sense the gear teeth (A.) and reset pin (B.).
 - D. A primary wiring harness connecting the ignition coils to the CPU Control Unit. This requires connector MS3108A-22-14S - Altronic part no. 504 056.
 - E. A 581 602 manual control loop unit to simulate the 4-20ma control signal.
 - F. A DC power source capable of supplying 12-24VDC, 5 amps.
 - G. An Altronic II-CPU Alternator; part no. 290 213H is recommended. A distributor shaft assembly with 2:1 gear is required to properly test 4-cycle CPU Control Units. The rotating magnet on the distributor shaft assembly must be over the Hall-effect switch when the reset pin on the test stand is opposite its magnetic pick-up.
 - H. An Altronic II-CPU Back Cover assembly 281 500-1 or -2.
 - I. A set of Altronic II-CPU test memory chips. This consists of several test chips programmed with the number of teeth used on the test stand (usually 180).
 - J. A means to elevate the CPU Control Unit to a controlled temperature of 150° F. (65° C.).



4.0 TESTING PROCEDURE - BACK COVER ASSEMBLY: 281 500-1, 281 500-2; DC CONVERTER: 281 550-2

- 4.1 VOLTAGE OUTPUT TEST, ALTERNATOR - Operate the Alternator at 300 RPM with the 5-pin connector harness disconnected. The voltage between the "B" pin (-) and "A" pin (+) should be:
 281 500-1 Back Cover - 330 +/- 15 VDC
 281 500-2 Back Cover - 400 +/- 20 VDC
- 4.2 VOLTAGE OUTPUT TEST, DC CONVERTER - Connect the DC Converter to a source of 24 VDC with the output terminals disconnected. The voltage between the H.V.OUT (-) and the GND (+) output terminals should be:
 281 550-2 Converter - 400 +/- 20 VDC

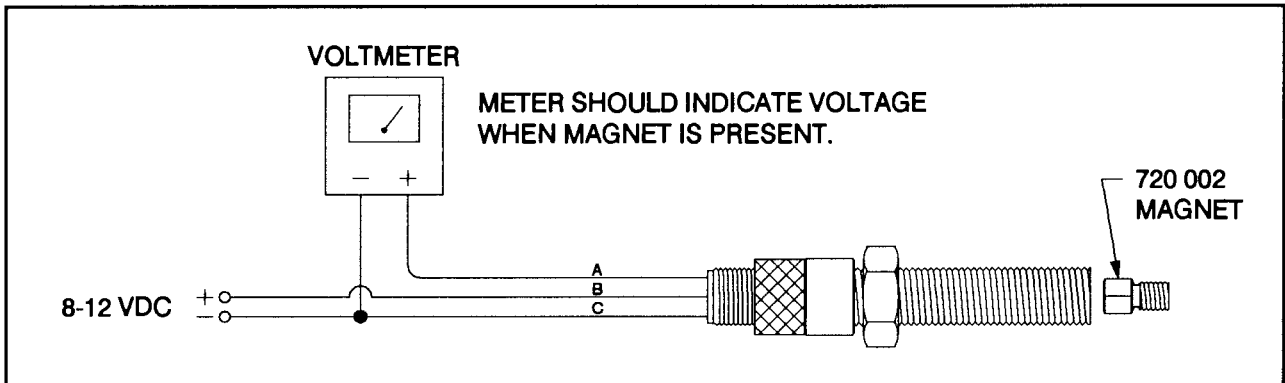
5.0 TESTING PROCEDURE - CPU CONTROL UNIT: 281 5xx-x, 281 6xx-x

- 5.1 OPERATIONAL TEST - With the system completely connected, operate the test stand (180-tooth gear) at the speed indicated for each step. When testing 24 or 32-output units, the output connectors may be connected one at a time to the test stand coils. NOTE: It is recommended that these tests be performed with the CPU Control Unit heated to a temperature of 150° F. (65° C.).

| 180 TOOTH GEAR RPM | TEST |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 75 RPM | All outputs fire a 7mm gap. |
| 300 RPM | All outputs fire a 15mm gap. |
| 300 RPM | <p>Each cylinder fires consistently in sequence; timing as follows starting with output "A" and proceeding in alphabetical sequence A-B-C-D-E-F-G-H-J-K-L-M-R-S-T-U.</p> <p>Unit 281 508-2; Memory H4A180.DA: 0-90-180-270-0-90-180-270</p> <p>Unit 281 508-2A; Memory H2N180.DA: 0-0-60-60-180-180-240-240</p> <p>Unit 281 512-2; Memory L4A180.DA: 0-60-120-180-240-300-0-60-120-180-240-300</p> <p>Unit 281 512-2A; Memory L2R180.DA: 0-0-60-60-120-120-180-180-240-240-300-300</p> <p>Unit 281 516-2; Memory P4A180.DA: 0-45-90-135-180-225-270-315-0-45-90-135-180-225-270-315</p> <p>Unit 281 516-2A; Memory P2N180.DA: 0-0-40-40-90-90-130-130-180-180-220-220-270-270-310-310</p> <p>Unit 281 624-2; Memory X4L180.DA: 0-36-120-156-240-276-0-36-120-156-240-276 (upper connector) 4-40-124-160-244-280-4-40-124-160-244-280 (lower connector)</p> <p>Unit 281 632-2; Memory Z4L180.DA: 0-36-90-126-180-216-270-306-0-36-90-126-180-216-270-306 (upper connector) 4-40-94-130-184-220-274-310-4-40-94-130-184-220-274-310 (lower connector)</p> |
| 300 RPM | <p>Check timing change on output "A".</p> <p>Timing switch SW1: 1 degree per switch step = 15 degrees total span</p> <p>Timing switch SW2: 1 degree per switch step = 15 degrees total span</p> <p>Current loop timing control (SW3 open): 48 degrees change from 4-20 ma (1-5 VDC) input</p> |

6.0 TESTING PROCEDURE - HALL-EFFECT PICK-UP: 591 014-x

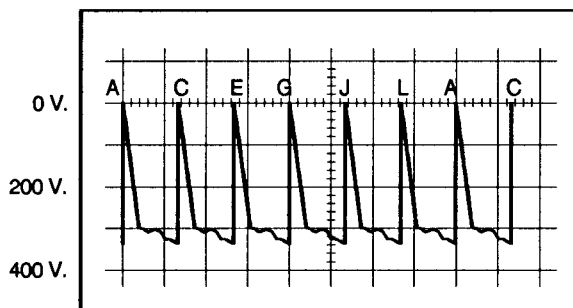
- 6.1 OPERATIONAL TEST - A source of 8-12 volts DC is required in addition to an ohmmeter. The DC source may be a small battery or a commercial power supply. Use one of the trigger magnets 260 604 or 720 002 and follow the test hook-up shown below.



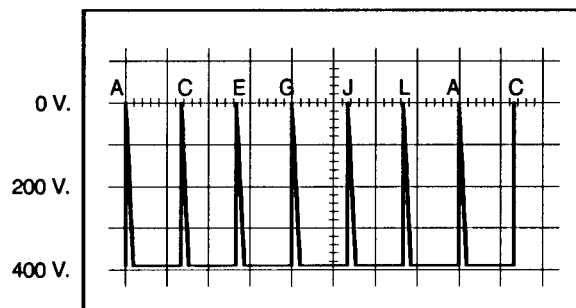
7.0 OSCILLOSCOPE TESTING

- 7.1 TEST SET-UP - Two 100:1 oscilloscope probes are required. NOTE: The signals being monitored are 300-400 volts, negative polarity. The system should be completely connected with the test stand (180-tooth gear) operating at 300 RPM. It is recommended that these tests be performed with the CPU Control Unit heated to a temperature of 150° F. (65° C.).
- 7.2 STORAGE CAPACITOR VOLTAGE PATTERN
- The trigger input of the oscilloscope should be connected to the "A" primary coil lead. NOTE: This is a 300 volt, negative polarity signal.
 - Connect the oscilloscope reading probe to the "N" lead of the output connector. All Altronic II-CPU systems have dual storage capacitors. Therefore, half the outputs (A, C, E, etc.) appear on the "N" pin; the other half (B, D, F, etc.) on the "V" pin. Normal capacitor patterns are shown below for both alternator and DC converter powered systems.

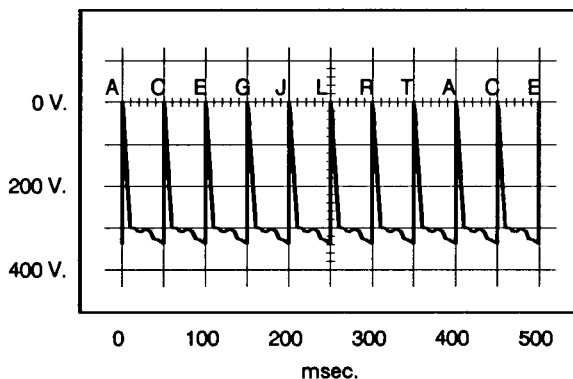
ALTERNATOR - 330V. OUTPUT SHOWN
12-CYL. MEMORY L4A180.DA



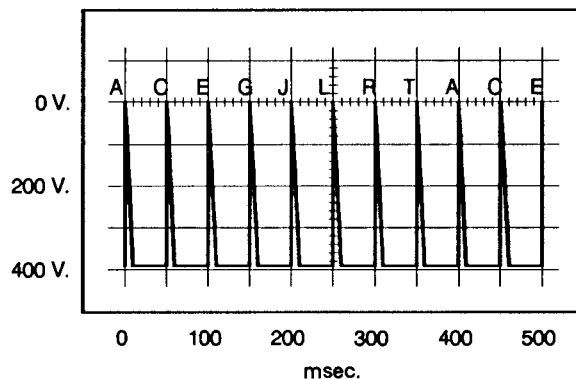
DC CONVERTER - 390V. OUTPUT
12-CYL. MEMORY L4A180.DA



ALTERNATOR - 330V. OUTPUT SHOWN
16-CYL. MEMORY P4A180.DA



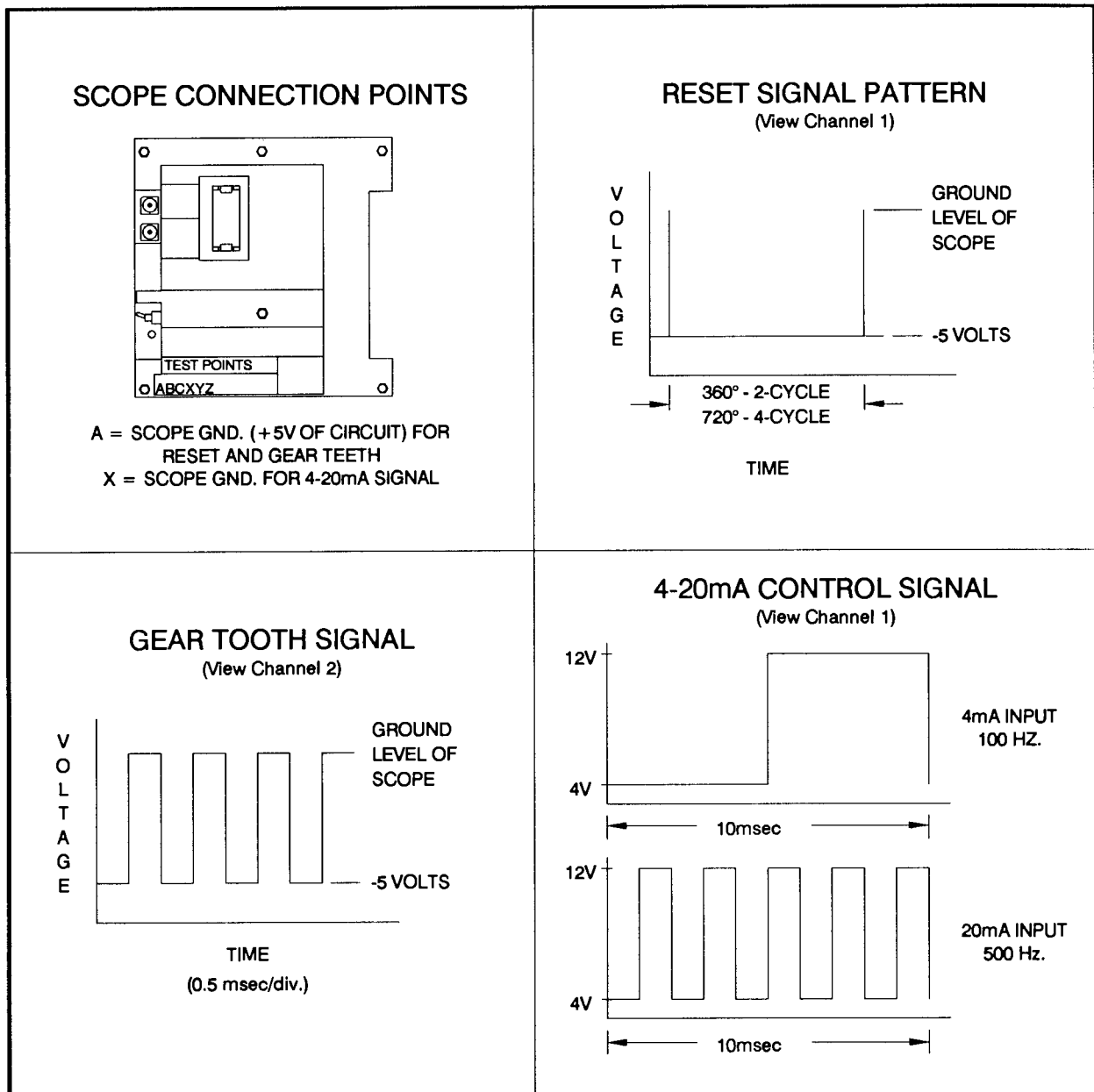
DC CONVERTER - 390V. OUTPUT
16-CYL. MEMORY L4A180.DA



7.3 OTHER TEST POINTS - The chart below gives the oscilloscope settings for the various system tests. A dual trace scope is required.

| TEST | CHANNEL 1 | CHANNEL 2 | SCOPE GRD. | TRIGGER |
|---------------|---------------------------|---------------------------|------------|---------------------|
| Reset | Point "B" 2 volts/div. | Not used | Point "A" | Channel 1 Normal |
| Gear teeth | Point "B" 2 volts/div. | Point "C" 2 volts/div. | Point "A" | Channel 1 Normal |
| 4-20ma signal | Point "Y" 2 volts/div. | Not used | Point "X" | Channel 1 Normal |

NOTE: If any pattern deviates from that shown below, change the logic board assembly (-2a). This assumes that the two pick-ups and loop power source are known to be good.



8.0 TROUBLESHOOTING

Perform all tests with the test stand operating at 300 RPM. The following chart assumes a properly functioning Alternator section and properly installed magnetic pick-ups.

| PROBLEM | TEST | TEST INDICATION | CORRECTIVE ACTION |
|------------------------------------------------------|-------------------------------|-------------------------------------|--------------------------------------------------------------------------|
| No output | Section 4.1 (Back Cover) | Low voltage | Replace transistor (2-10); Replace cover circuit board ass'y (2-2) |
| No output | Section 4.2 (DC Converter) | Low voltage | Replace circuit board ass'y (3-1) |
| No output | Section 7.2 (Alternator) | 300 + VDC | Check cycle trigger magnet arm line-up |
| No output | Section 7.2 (CPU Unit) | 0-50 VDC 300 + VDC | Replace distributor board ass'y. (-6) Replace logic board ass'y. (-2) |
| One output does not fire | Section 5.1 / 7.2 | Missing discharge on stand or scope | Replace distributor board ass'y. (-6) |
| Only one output fires or one output fires constantly | Section 5.1 / 7.2 | One spark gap only is firing | Replace distributor board ass'y. (-6) |
| Timing varies | Section 5.1 | Timing other than as shown | Replace logic board ass'y. (-2) |

9.0 BOARD REPLACEMENT PROCEDURE - CPU CONTROL UNIT

9.1 DISASSEMBLY PROCEDURE (refer to Fig. 4 or 5)

- A. Un-plug the 4-pin and 3-pin connectors at the right hand side of the cover.
- B. To remove the logic board assembly (-2), remove nut (-2f), shield board (-2b) and standoff (-2e). The logic board (-2a) on the cover can then be removed. Then remove screws (-2d) and two screws (-12) behind the terminal strip assemblies; this allows the connection board assembly (which is tied by ribbon cable to the component board) to be removed.
- C. Remove standoffs (-2c) and two screws (-12) directly securing the upper end of the distributor board.
- D. In 281 624 and 281 632 units only: To remove upper distributor board assembly (-28), remove four connector screws (-8) and push the connector (-28a) back inside the box. The upper distributor board assembly (-28) can then be removed from the box. Remove four standoffs (-29).
- E. To remove the distributor board assembly (-6), remove four connector screws (-8) and push the connector (-6a) back inside the box. The distributor board assembly (-6) can then be removed from the box.

9.2 ASSEMBLY PROCEDURE (refer to Fig. 4 or 5)

- A. Check the condition of gaskets (-7), (-21), (-23) and shock mounts (-13); replace if necessary. Install new hardware where needed.
- B. To install the distributor board assembly (-6), set the board into place in the box. Install connector gasket (-7) in place and insert connector (-6a) through the hole with the keyway facing the bottom of the box. Install screws (-8) and lockwashers (-9) and tighten securely.
- C. In 281 624 and 281 632 units only: Install and tighten four standoffs (-29). To install the upper distributor board assembly (-28), set the board into place in the box. Install connector gasket (-7) in place and insert connector (-28a) through the hole with the keyway facing the bottom of the box. Install screws (-8) and lockwashers (-9) and tighten securely.
- D. Install and tighten two screws (-12) and two standoffs (-2c) through the distributor board assembly.
- E. To install the logic board assembly (-2), install the logic board (-2a) onto the cover studs and install and tighten standoffs (-2e). Install the shield board (-2b), lockwashers (-2g) and nuts (-2f); tighten securely. Then install the connection board assembly into place over the distributor board in the box and secure with four screws (-12) and (-2d).
- F. Plug in the 4-pin and 3-pin connectors at the right hand side of the cover.
- G. Retest the completely assembled unit per sections 5.0 and 7.0 to insure correct operation.