INSTALLATION INSTRUCTIONS

CPU-95
DIGITAL IGNITION SYSTEM
MODELS 791950-8/16/18, 791952-18, 791958-16

FORM CPU-95 II 4-08

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

1.0 SYSTEM DESCRIPTION

1.1 The Altronic **CPU-95**, DC-powered ignition system is a microprocessor-based capacitor discharge system designed for application on natural gas fueled engines. The system features crankshaft-triggered timing accuracy and the capability to vary timing electronically by several means, including an external **4-20 mA** control signal connected to the optional Display Module. The system is field-programmable and offers a variety of advanced control methods, emissions reduction, primary and spark diagnostics, self diagnostics, serial communications and engine protection features. The system consists of two main parts: an engine mounted Ignition Module and an optional user interface Display Module.

1.2 Various models of the Ignition Module are available:

791950-8	**8-outputs, standard**
791950-16	**16-outputs, standard**
791950-18	**18-outputs, standard**
791952-18	**18-outputs, dual capacitor**
791958-16	**16-outputs, Varispark™ extended duration**

1.3 The optional Display Module has a graphical, back-lit LCD display that shows the operating status, engine RPM, energy level, single or double-striking mode, current loop input value and ignition timing. Additional display screens show set-up and diagnostic information.

1.4 To allow for a simple and economical upgrade of existing Altronic **CPU-90** installations, the **CPU-95** utilizes the same ignition box mounting layout, existing Altronic coils, magnetic pickups, Hall-effect pickup and trigger magnet, pickup cables, primary wiring harness and junction box(es).

1.5 Power requirement is **24 Vdc, 5 ampere** nominal for typical applications. For Ignition Module **791958-16**, use a supply rated for **24 Vdc, 10 amperes.** **SEE SECTION 9.2 FOR DETAILS.**

WARNING: THE IGNITION SYSTEM MUST BE CONFIGURED PRIOR TO USE ON AN ENGINE. REFER TO SECTION 9.7 TO VIEW THE CURRENT CONFIGURATION. REFERENCE FORM CPU-95 PI FOR INSTRUCTIONS DESCRIBING HOW TO CONFIGURE THE IGNITION SYSTEM. VERIFY EEPROM PROGRAMMING PRIOR TO STARTING ENGINE.

2.0 SYSTEM COMPONENTS

2.1 The system consists of an Ignition Module, a Display Module, wiring harnesses, **(2)** magnetic pickups and cables, a Hall-effect pickup and trigger magnet **(4-cycle engines only),** and an ignition coil for each spark plug; **SEE FIGURE 4** for a complete system overview.

2.2 Use one of the following Altronic ignition coils:

- **Unshielded coils 501061 or 591010***
- **Shielded coils 501061-S or 591010-S***
- **Flange coils 591018 or 591012***
- **Integral coils 591007, 591011A or 591011B**

Refer to the Application List **(form CPU-95 AL)** for requirement details and **SEE FIGURE 6** (unshielded) and **FIGURE 7** (shielded).

NOTE: If using Ignition Module 791958-16, use one of the red coil options: 591010, 591010-S or 591012.

3.0 MOUNTING THE CPU-95 IGNITION MODULE

3.1 **SEE FIGURE 17** for physical dimension details. Select a mounting location meeting the following requirements:

- **On the engine.**
- **Within 50 ft. of the Display Module.**
- **Within 7 ft. of the primary junction box.**
- **The front door of the Ignition Module should be easily accessible and free to swing open.**
- **The maximum ambient temperature must not exceed 150°F (65°C).**

3.2 The Ignition Module enclosure should be fastened securely to a rigid engine bracket using the shock mounts provided.

3.3 When replacing an existing Altronic **CPU-90** system, the **CPU-95** Ignition Module can be mounted in place of the **CPU-90** unit; the mounting footprint is identical to facilitate the changeover.

NOTE: The enclosure width is 1 inch larger than the CPU-90 unit, ½ inch on each side.

4.0 MOUNTING THE CPU-95 DISPLAY MODULE

4.1 Mount the **CPU-95** Display Module inside a control panel or to a suitable flat surface preferably off the engine in such a manner as to minimize exposure to vibration. The Display Module should be mounted so that the display is at a convenient viewing height. **SEE FIGURE 18** for mounting dimensions. A **NEMA 3R** housing **(720004-1)** is also available as an alternative mounting option for the Display Module **(FIGURE 19)**.

4.2 The Display Module should be mounted within **50 feet (15 m)** of the Ignition Module which is to be mounted on the engine.

4.3 Operating temperature range is **–40°F to 158°F (–40°C to 70°C)**. Humidity specification is **0-95%**, non-condensing. Housed in an aluminum weatherproof enclosure, the **CPU-95** Display Module is splash resistant; however, the mounting site should provide as much protection from inclement weather as is practical. Avoid mounting the LCD display and keypad in direct sunlight.

5.0 MOUNTING FLYWHEEL GEAR/DRILLING FLYWHEEL HOLES

5.1 The Altronic **CPU-95** system requires a source of angular position pulses from the engine crankshaft. This can be a flywheel ring gear, a separately provided gear mounted on the crankshaft or specially drilled holes in the flywheel. The source of position pulses must meet the following requirements:

- **Must be ferrous material**
- **Diameter of 18" or greater**
- **No. of teeth or holes of 180 or greater**
- **Maximum run-out referenced to the pickup of .007"**

REFER TO FIGURE 2 and **FIGURE 3** for further details.

6.0 MOUNTING THE MAGNETIC PICKUPS

6.1 The system requires two magnetic pickup signals; the angular position pulses from the gear or drilled holes and a reset pulse six **(6)** degrees ahead of the most advanced firing position desired for **no. 1 cylinder** **(SEE SECTION 7.0)**. The pickups must be mounted to rigid brackets to maintain an air gap of **.015" ± .005"** with respect to the rotating gear or flywheel. It is also important for maximum signal efficiency that the centerline of the rotating part pass through the center of the pickup - **SEE FIGURE 2** for mounting details and **FIGURE 16** for magnetic pickup dimensions.

7.0 MOUNTING THE FLYWHEEL RESET PIN

7.1 Set the engine with **no. 1 cylinder** six **(6)** degrees ahead of the most advanced firing point. Mark a point on the flywheel directly opposite the pole piece of the reset magnetic pickup; then rotate the engine to a position convenient for drilling and tapping the flywheel at the point marked above. The reset pin should be made from a steel (magnetic) **¼"-20** bolt or stud. **SEE FIGURE 2** for details.

7.2 Rotate the engine so that the reset pin and magnetic pickup are in-line and adjust the air gap between the end of the reset pin and the magnetic pickup at **.010"** using a feeler gauge.

8.0 MOUNTING THE CYCLE TRIGGER (4-CYCLE ENGINE ONLY)

8.1 The trigger magnet **(260604 or 720002)** must be mounted on the engine camshaft or other accessory drive operating at camshaft speed. An **M8 (8 mm)** tapped hole, **0.5 inches (13 mm)** deep is required — SEE FIGURE 17 or FIGURE 14 for details. For proper operation the magnet **MUST** rotate on a diameter **NOT EXCEEDING**: **6 inches (150 mm)** for magnet **720002**, or **15 inches (375 mm)** for magnet **260604**.

8.2 Set the engine on the **COMPRESSION** stroke of **no. 1 cylinder** with the reset pin **LINED-UP** with the reset pickup. The Hall-effect pickup **(591014-x)** must be mounted **LINED-UP** with the trigger magnet **(SEE SECTION 8.1)** coincident with the reset pickup and pin being lined-up; SEE FIGURE 4.

The Hall-effect pickup dimensions are shown on FIGURE 15. The air gap between the Hall-effect pickup and trigger magnet must not exceed **.040" (1.0mm)**.

NOTE: The Hall-effect signal and the reset pickup signal must occur at the same time for the system to function.

9.0 IGNITION MODULE ELECTRICAL HOOKUP

(REFER TO FIGURE 10)

9.1 **GENERAL:** The power connections to the **CPU-95** must be in accordance with the National Electrical Code. The **CPU-95** is suitable for installation in **Class I, Division 2, Group D** locations.

9.2 **POWER SOURCE:** REFER TO FIGURE 5, power may be supplied as follows:

- **A. 24-volt battery and charger with 5 amps minimum output (10 amps when using Ignition Module 791958-16).**
- **B. DC power supply capable of furnishing 24-28 Vdc, 5 amps (10 amps when using Ignition Module 791958-16).**

WARNING: ALTHOUGH THE DEVICE HAS INTERNAL PROTECTIVE FUSES, TWO EXTERNAL 10 AMP FUSES NEAR THE POWER SOURCE ARE RECOMMENDED FOR THE PROTECTION OF ENGINE AND BUILDING WIRING. THIS WILL REDUCE THE POSSIBILITY OF A FIRE OCCURRING IN THE EVENT OF A SHORT CIRCUIT IN THE WIRING. SEE DRAWING 709 961.

IMPORTANT: For proper operation of the **CPU-95** system, voltage and current supplied must be sufficient during all selected modes of operation. **FIGURE 5** provides these details regarding the DC power hookup:

1. **CURRENT DRAW PER SYSTEM:**
   Formula varies depending on number of outputs used, engine cycle and RPM, and use of the multi-strike feature.
2. **MINIMUM WIRE GAUGE REQUIREMENTS:**
   CHART 1 OF FIGURE 5 gives the requirement vs. the length of run between the power source and the **CPU-95** Ignition Module.
3. **MULTIPLE ENGINE INSTALLATIONS:**
   Multiply current required per system by the number of engines. Where more than one engine is powered from a common power source, see **CHART 2 OF FIGURE 5** for the minimum wire size required.

9.3 WIRING SEPARATION:

Power wiring and signal wiring (pickups and communications) must be in separate conduits and conduit entries into the Ignition Module to avoid undesired electrical interaction. All conduit entries are sized for a **½"-14 NPT** male conduit fitting. Separate as follows:

RIGHT CONDUIT ENTRY	**Input power wires**
CENTER CONDUIT ENTRY	**Magnetic pickups and Hall-effect pickup**
LEFT CONDUIT ENTRY	**Control inputs, alarm outputs, serial communications and power feed to Display Module**

NOTE: Engines using positive ground DC accessories or starter motors will require a separate dedicated power supply for the CPU-95. A separate power supply is required because the CPU-95 system is a negative ground system and the minus must be grounded.

9.4 RIGHT ENTRY:

Input power supply wires **(16 AWG minimum)** should enter the right conduit entry and connect to the **POWER (24 VDC + and GROUND –)** terminals of the terminal block. **SEE FIGURE 10**.

9.5 CENTER ENTRY:

Run a separate conduit to the center entry for the two **(2)** magnetic pickup cable assemblies. These should terminate per description on the cover label in the Ignition Module which is **SEE FIGURE 10**.

4-CYCLE ENGINE ONLY: The cable from the Hall-effect pickup must also enter through the center hole and be connected as shown.

9.6 LEFT ENTRY:

Run a separate conduit to the left entry for all connections to the user interface terminal strips in the Ignition Module. Use **24 AWG, UL style 1015** wire or shielded cable for these connections; the **24 AWG** wire is available from Altronic under part number **603102** (black) or **603103** (white).

A. SHUTDOWN INPUT (terminal 1):

This input is open for normal operation of the ignition system and is connected to engine ground for shutdown. Use a normally-open dry contact that closes to engine ground to inhibit ignition firings for engine shutdown.

NOTE: This is a 5-volt low level signal.

B. MISCELLANEOUS INPUT (terminal 2):

The miscellaneous input is a normally open input that when grounded provides the ability to activate various user selected features. The default feature is the one-step retard. The other available features are the multi-strike and max. energy level; any number of the three features can be used, but must first be configured through a PC (personal computer) using the terminal program. For programming and operating details, refer to the **CPU-95** Operating Instructions form **CPU-95 OI** and Terminal Program user instructions form **CPU-95 PI**.

C. ALARM OUT (terminal 3), FAULT OUT (terminal 4), FIRE CONFIRM OUT (terminal 5):

Three output switches are available for monitoring ignition system status. Each output consists of a solid state normally-closed switch that is referenced to one common return path, **COMMON OUT (terminal 6)** which is isolated from engine or power ground. A fault condition will cause each normally-closed output switch to turn off. The maximum rating of the switches is **100 Vdc, 75 mA**. The recommended hookup is shown on drawing 709 966. For further description, refer to the **CPU-95** Operating Instructions form **CPU-95 OI**.

NOTE: The shelf state (unpowered) of these switches is an open condition.

D. RS-485 SERIAL PORT:

The **RS-485** serial port is used for connection to either the optional Display Module or to a PC. If a permanent connection is made to the **RS-485** serial port, use a two conductor shielded cable of fine gauge stranded wire and connect the wires to the terminals marked **SERIAL RS485+, SERIAL RS485– and shield.**

10.0 DISPLAY MODULE ELECTRICAL HOOKUP SEE FIGURE 11

10.1 GENERAL:

Take care not to damage the wiring insulation and take precautions against damage from vibration, abrasion or liquids in conduits. In addition, **DO NOT** run low voltage power, current loop, or communications wires in the same conduit as the ignition wiring or other high energy wiring such as AC line power, etc. Keep wires at least **12 inches** away from all high voltage wiring.

10.2 POWER:

Power input must come from the Power Module to the Display Module and connect to **terminals 1 (+) and 2 (–)**, **SEE FIGURE 11**. **DO NOT** ground this device directly to the ignition system common coil ground.

IMPORTANT: To insure that both Power and Display Modules operate at the same ground potential, it is imperative to use the "daisy chain" hookup shown on **FIGURE 11**. Due to the much higher current requirement of the Power Module, this hookup eliminates the possibility of the Display Module operating at a higher voltage level. Altronic **4-conductor** shielded cable, part no. **503194-500**, is recommended as shown on **FIGURE 11**.

10.3 COMMUNICATIONS:

The Display Module communicates to the Ignition Module via the two serial **RS-485** communication wires. Use a shielded cable of fine gauge stranded wire for connection from the Display Module, **terminals 3 (+) and 4 (–)**, to the Ignition Module, **terminals 7 (+) and 8 (–)**. Connect **(+) to (+)** and **(–) to (–)**. Connect the shield to the terminal marked **SHIELD** in the Ignition Module only. In addition, the **791908-1** (Dual Port Display Module) and the **791909-1** (Enhanced Display Module) have an auxiliary Modbus RTU **RS-485** port for the customers use at terminals **6(+)** and **7(-)**.

IMPORTANT: Per **FIGURE 11**, use Altronic **4-conductor** shielded cable, part no. **503194-500**, to connect the power and **RS-485** communications wires between the Power and Display Modules.

10.4 MISCELLANEOUS INPUT:

The miscellaneous input in the Display Module **(terminal 8)** performs the same operations as in the Ignition Module. It is a normally open input that when grounded provides the ability to activate various user selected features. The default feature is the one-step retard. The other available features are the multi-strike and max. energy level; any of these features can be used, but must first be configured through a PC using the terminal program. For programming and operating details, refer to the **CPU-95** Operating Instructions, form **CPU-95 OI**, and Terminal Program User Instructions, form **CPU-95 PI**.

NOTE: This input is present on both the Ignition Module and Display Module; a grounded condition at either module takes precedence.

10.5 CURRENT LOOP INPUT:

The **4-20mA** timing control input, terminals **9 (+) and 10 (–)** accepts a **4-20 mA** loop current from various **2-wire or 3-wire** sources. The loop input is electrically isolated from all other terminals. Use **24 AWG, UL style 1015 wire**, Altronic part number **603102** (black) or **603103** (white), or equivalent for these connections. **SEE FIGURE 11** for connection details and timing curve **FIGURE 12**.

11.0 PRIMARY WIRING

11.1 The main wiring harness **(293023-x, 293026-x, 793012-x, 793015-x or 793022-x)** connects the Ignition Module to the engine junction box. Refer to **FIGURE 1** if it is desired to shorten the conduit length of the harness. Insert the connector into the Altronic **CPU-95** Ignition Module receptacle and tighten hand-tight; then carefully tighten an additional one-sixth turn with a wrench.

Referring to applicable **FIGURE 8** or **FIGURE 9**, write in the engine firing order below:

IGNITION MODULE 791950-8 (8 OUTPUT) SEE FIGURE 8

Lead	A	B	C	D	E	F	K	L
Cyl. No.								

IGNITION MODULE 791950-16 AND 791958-16 (16 OUTPUT) SEE FIGURE 8

Lead	A	B	C	D	E	F	K	L	M	N	P	R	S	T	U	V
Cyl. No.																

IGNITION MODULE 791950-18 AND 791952-18 (18 OUTPUT) SEE FIGURE 9

Lead	A	B	C	D	E	F	G	H	K	L	M	N	P	R	S	T	U	V
Cyl. No.																		

11.2 Connect the harness leads in the junction box in accordance with the engine's firing order. The leads from the junction box corresponding to the above system outputs connect to the ignition coil **positive (+) terminals**. The **"J"** lead and the common coil ground lead(s) connecting the **negative (–) terminals** of the ignition coils must be grounded to the engine in the junction box. Make each ground connection in the junction box to a separate bolt so that the ground connections are not stacked on top of each other. On V-engines, run a separate common ground lead for each bank. **SEE FIGURE 6** (unshielded) or **FIGURE 7** (shielded) for coil connection details.

11.3 Primary wire should be **no. 16 AWG** stranded, tinned copper wire. The insulation should have a minimum thickness of **.016"** and be rated **105°C** or higher. Irradiated PVC or polyolefin insulations are recommended. Altronic primary wire number **503188** meets these specifications. All primary wiring should be protected from physical damage and vibration.

11.4 If two ignition coils per cylinder connected to a common output are used, use **PARALLEL WIRING** as shown on **FIGURE 6** and **FIGURE 7**.

NOTE: Some secondary diagnostic features are limited with two ignition coils wired in parallel.

11.5 All unused primary wires should be individually taped so that they are insulated from ground and each other. The unused primary wires can then be tie-wrapped together for a clean installation.

12.0 SHUTDOWN WIRING

12.1 Two means are provided to shut off the DC-powered **CPU-95** Ignition system.

- **a low voltage SHUTDOWN INPUT (terminal 1) in the Ignition Module**
- **the output "G" lead (shutdown lead) in model 791950-16 only**

12.2 To initiate an ignition shutdown using the low voltage shutdown input, ground **terminal 1 (SHUTDOWN IN)** in the Ignition Module. This input is open for normal operation and is connected to engine ground for shutdown. Use a switch rated **24 Vdc, 0.5 amps** minimum.

12.3 In the **791950-16** model, a **"G"** lead is provided to stop the ignition and to power existing ignition powered instruments. This lead is open for normal operation and is connected to engine ground for shutdown. This lead can also be used for oscilloscope analysis.

WARNING: **PLEASE NOTE THE FOLLOWING APPLICATION LIMITATIONS BETWEEN THE CPU-95 IGNITION SYSTEM AND THESE ALTRONIC INSTRUMENTS:**

DO-3300
DTO-1010
DT/DTH/DTO/DTHO-1200
DT/DTH/DTO-3200
DTUO-4200

The above Altronic ignition-powered tachometers and overspeed devices will **NOT** function correctly with any **CPU-95** system operating in the Double-Strike mode.

NOTE: Tachometer and overspeed functions are provided by the CPU-95 Display Module; see sections 4.0 and 9.4 of operating instructions form CPU-95 OI. If a separate device is needed, Altronic models DSG-1201DU/DUP or DTO-1201P will function with all CPU-95 systems.

13.0 SECONDARY WIRING

13.1 Mount the ignition coils as close as possible to the engine spark plugs consistent with a secure mounting and avoidance of temperatures in excess of **185°F (85°C)**.

13.2 The spark plug leads should be fabricated from silicone insulated **7 mm** cable with suitable terminals and silicone spark plug boots. The use of leads with resistor spark plug boots **(Altronic series 5932xx-xx)** is recommended to minimize interference from emitted RFI on the operation of other nearby electronic equipment. Another option is the use of suppression ignition cable **(Altronic part no. 503185)**. It is also essential to keep spark plug leads as short as possible and in all cases not longer than **24 inches (600 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.

13.3 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.

DRAWINGS SECTION:

INSTALLATION DRAWINGS:

DIMENSIONAL DRAWINGS:

FIG. 1 SHIELDED HARNESS CONDUIT LENGTH ADJUSTMENT

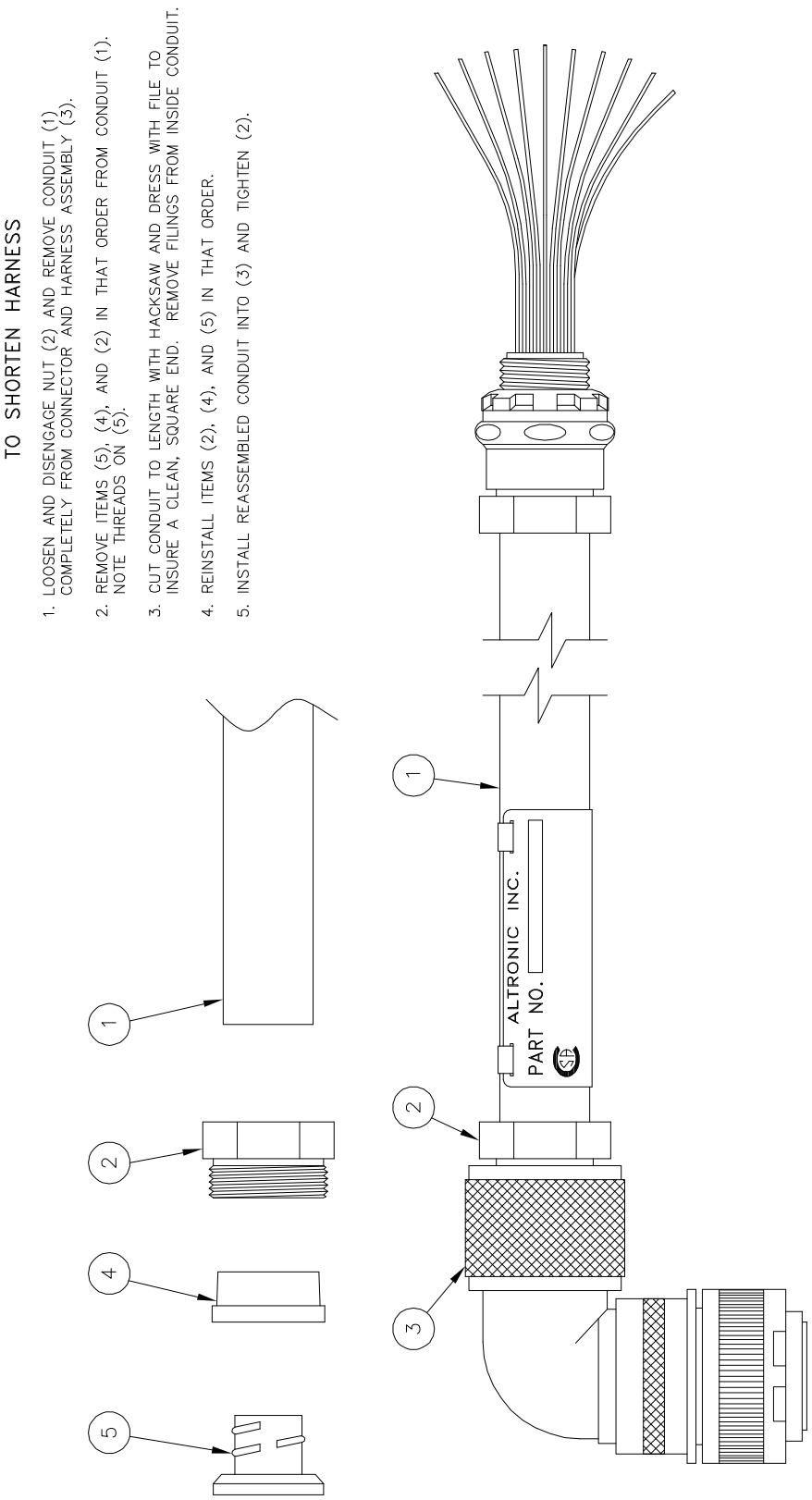


FIG. 2 PICKUP MOUNTING DETAIL

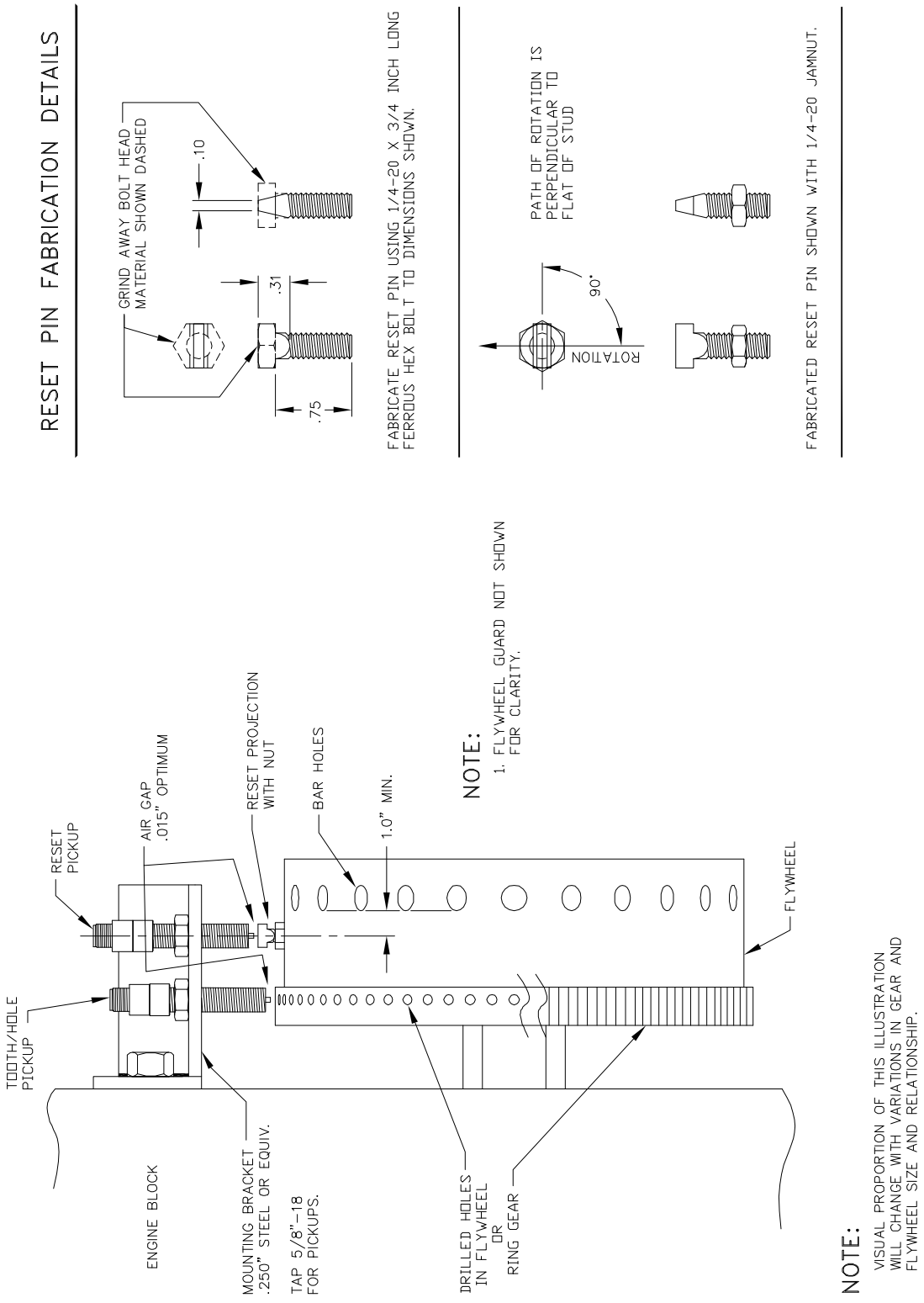


FIG. 3 FLYWHEEL HOLE DRILLING

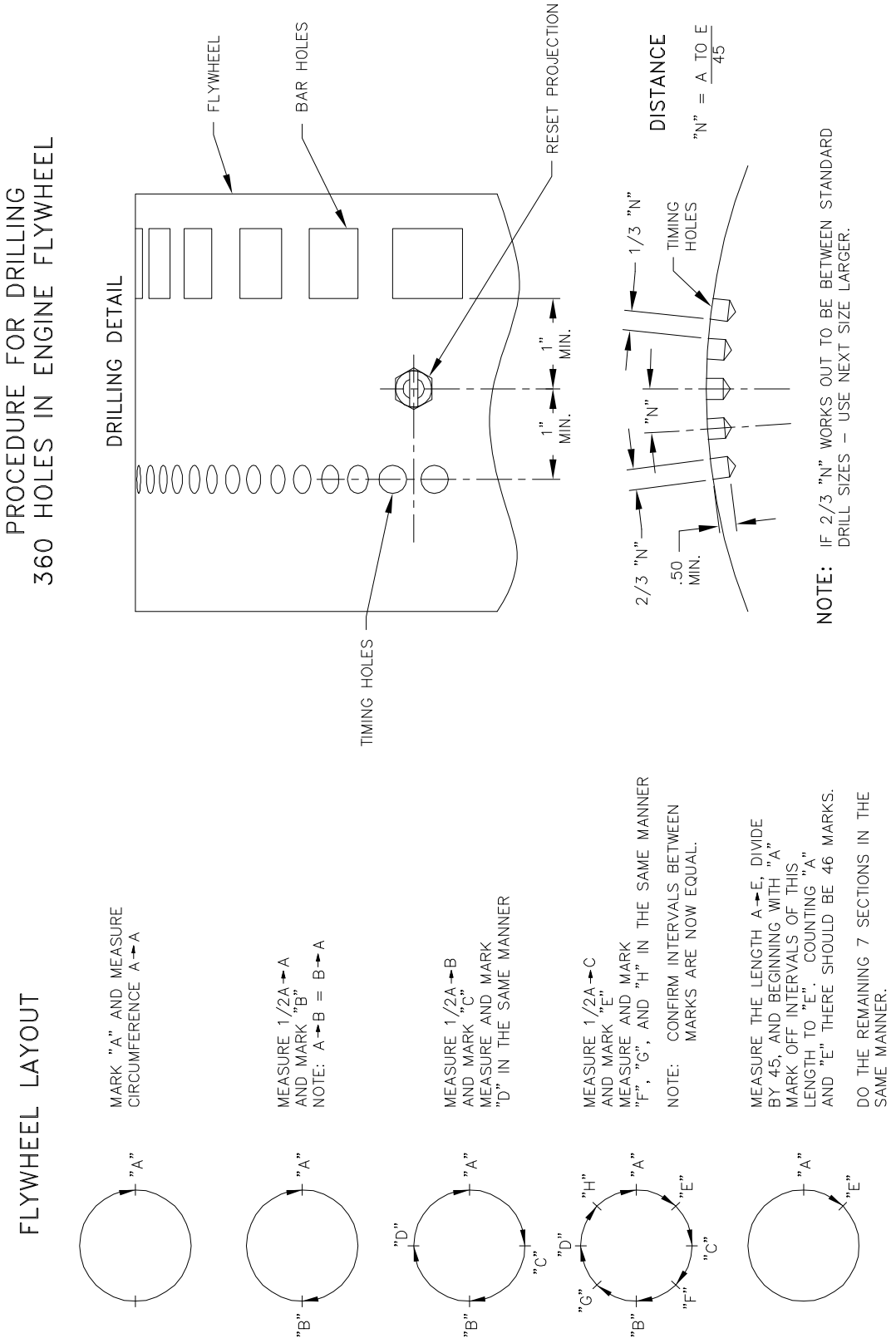


FIG. 4 IGNITION SYSTEM BASIC LAYOUT

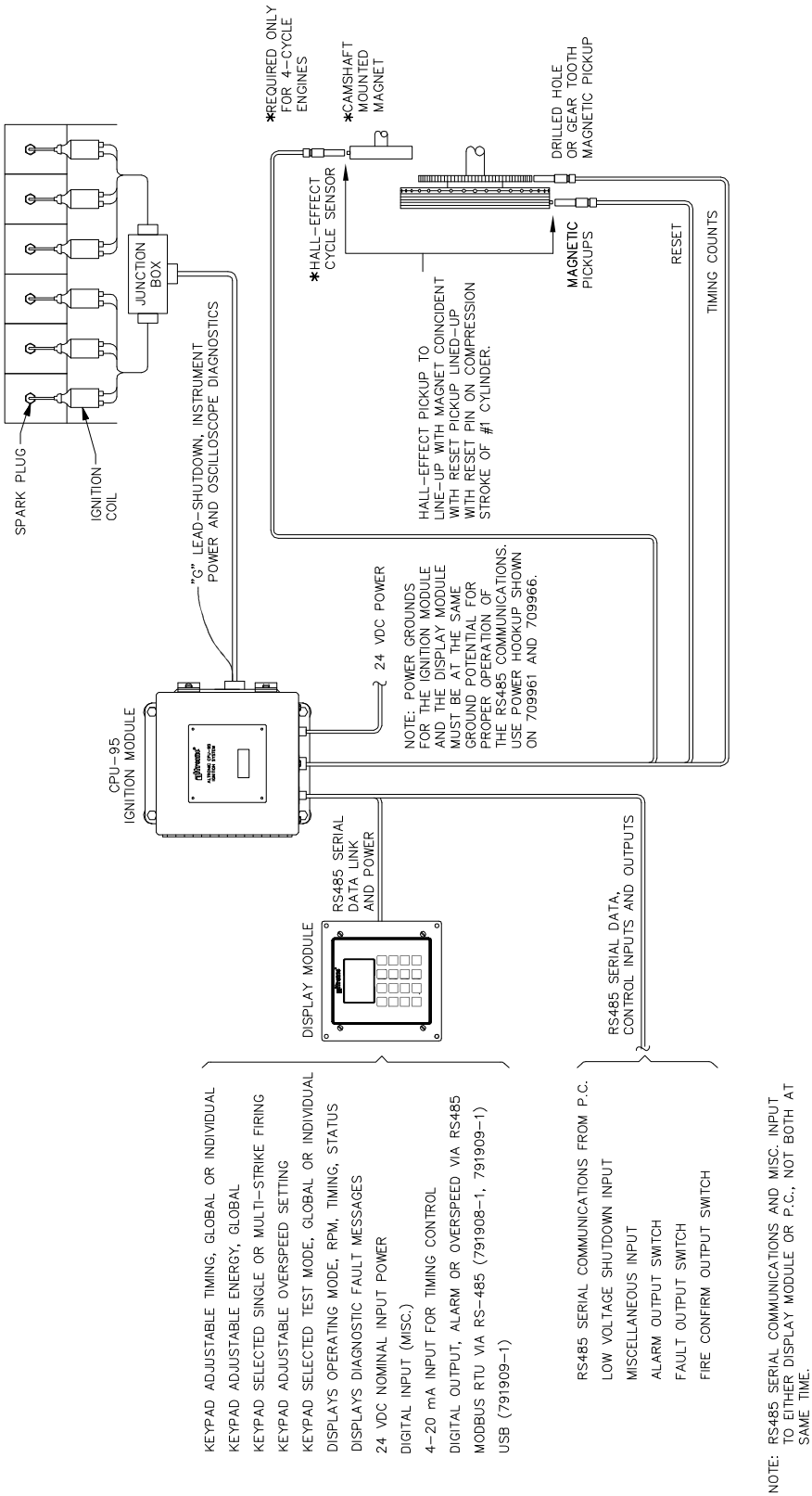
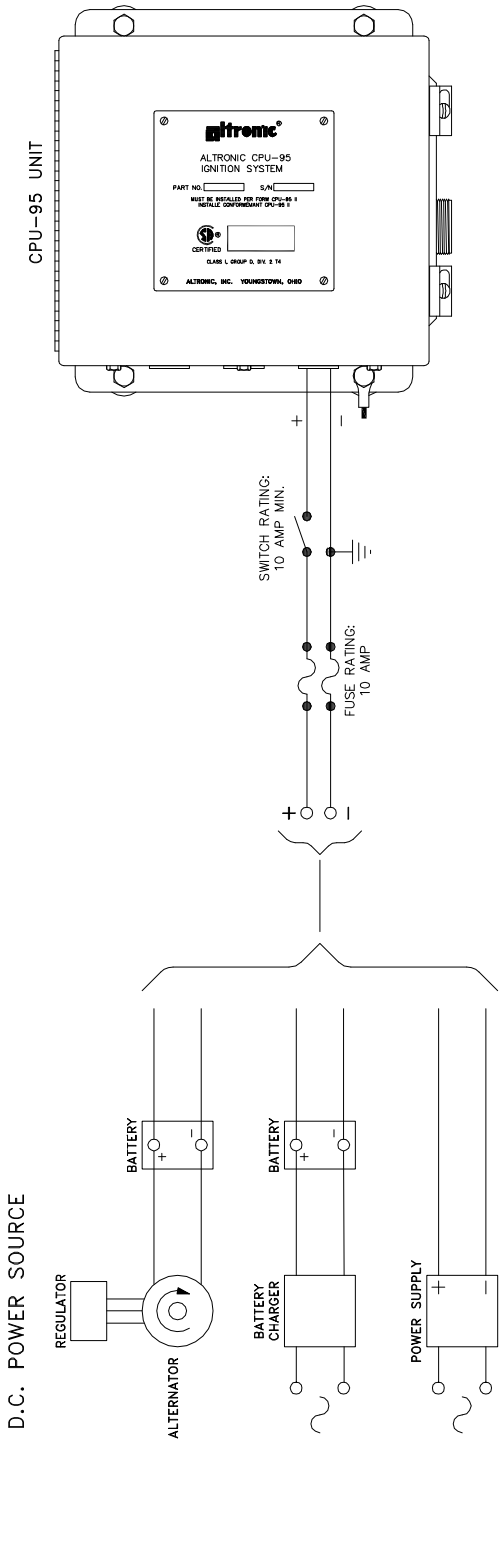


FIG. 5 DC POWER HOOKUP



POWER SUPPLY SPEC: 5 AMP CONTINUOUS.

1. IT IS RECOMMENDED THAT EACH SYSTEM BE CONNECTED SEPARATELY BACK TO THE POWER SOURCE. USE CHART 1 TO DETERMINE THE WIRE SIZE (GAUGE) REQUIRED.

DISTANCE IN FEET	MINIMUM WIRE GAUGE
UP TO 25	16 AWG
26–40	14 AWG
41–65	12 AWG
66–100	10 AWG
101–160	8 AWG

CHART 1

2. IF MULTIPLE UNITS ARE POWERED FROM A SOURCE LOCATED IN A SEPARATE BUILDING, USE CHART 2 TO DETERMINE THE WIRE SIZE (GAUGE) REQUIRED BETWEEN THE POWER SOURCE AND THE ENGINE ROOM. CREATE A COMMON POWER HOOKUP POINT IN THE ENGINE ROOM; THEN USE CHART 1 TO DETERMINE THE WIRE SIZE REQUIRED FROM THIS COMMON POINT TO EACH IGNITION MODULE.

NO. OF SYSTEMS X DISTANCE IN FEET	MINIMUM WIRE GAUGE
26–40	14 AWG
41–65	12 AWG
66–100	10 AWG
101–160	8 AWG
161–250	6 AWG
251–400	4 AWG

CHART 2

NOTE: ABOVE 400, USE MULTIPLE PAIRS OF WIRES FROM THE POWER SOURCE TO THE ENGINE ROOM.

AVERAGE CURRENT DRAW	4-CYCLE	2-CYCLE
SINGLE-STRIKE MODE	N X RPM / 12,500	N X RPM / 6,250
DOUBLE-STRIKE MODE	N X RPM / 8,000	N X RPM / 4,000
VariSpark MODE	N X 0.35 MAX.	N X 0.35 MAX.

N = NUMBER OF OUTPUTS USED.
MULTIPLY BY NUMBER OF ENGINES FOR TOTAL REQUIREMENT.

OPERATING VOLTAGE REQUIREMENT:	
STARTING:	20 VDC MIN.
RUNNING:	24–28 VDC

FIG. 6 COIL WIRING DIAGRAM, UNSHIELDED IGNITION SYSTEM

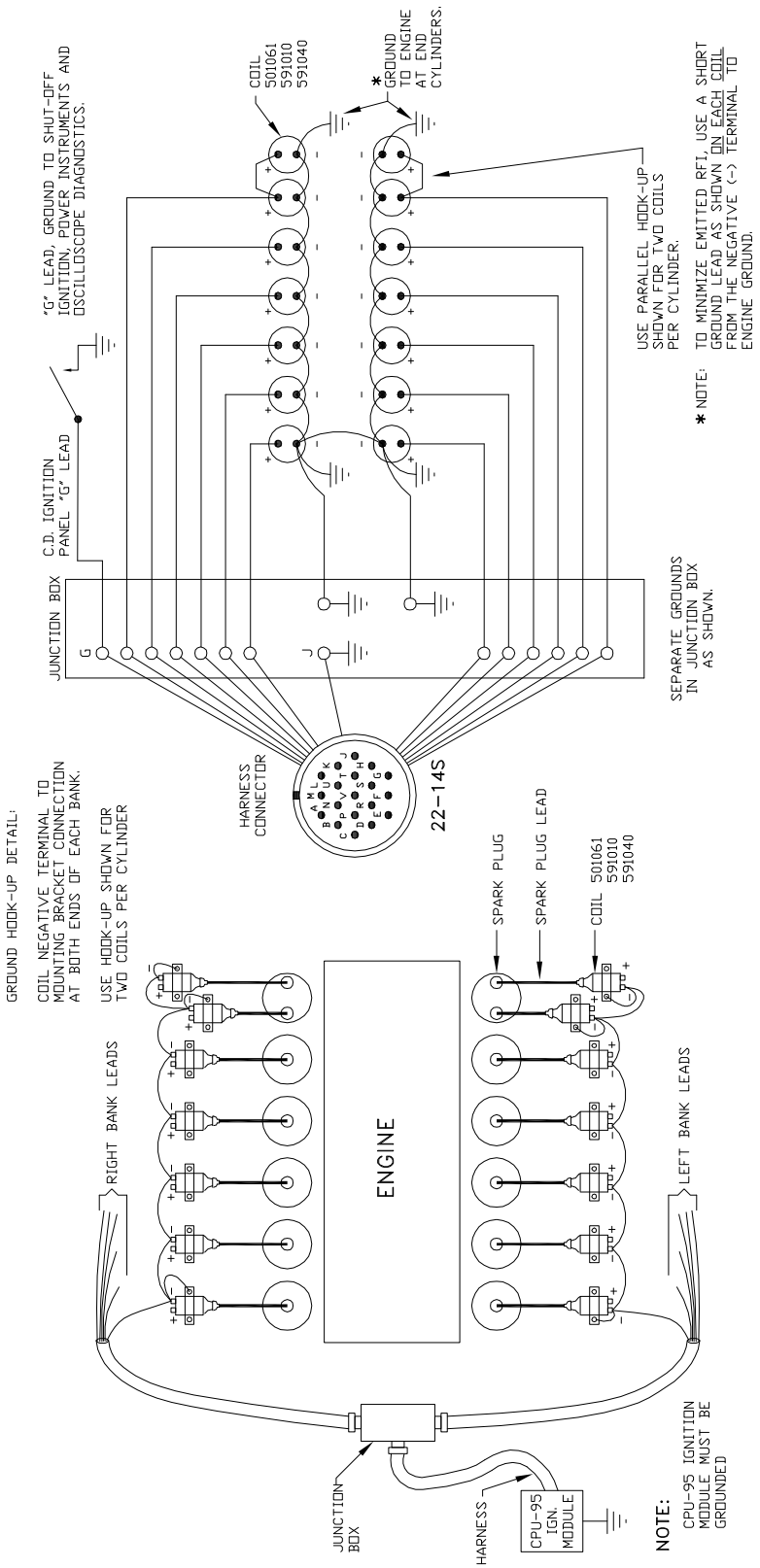


FIG. 7 COIL WIRING DIAGRAM, SHIELDED IGNITION SYSTEM

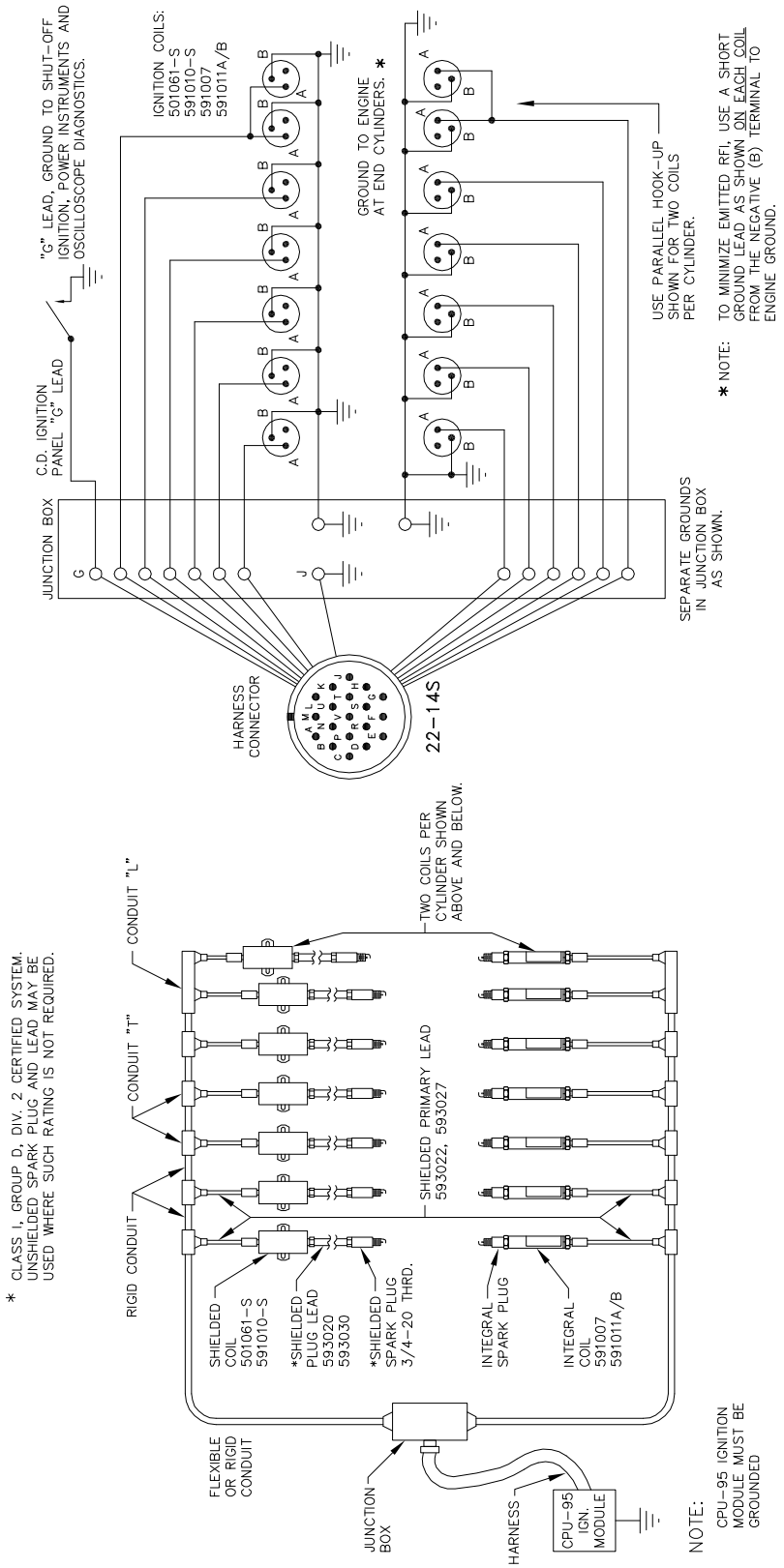
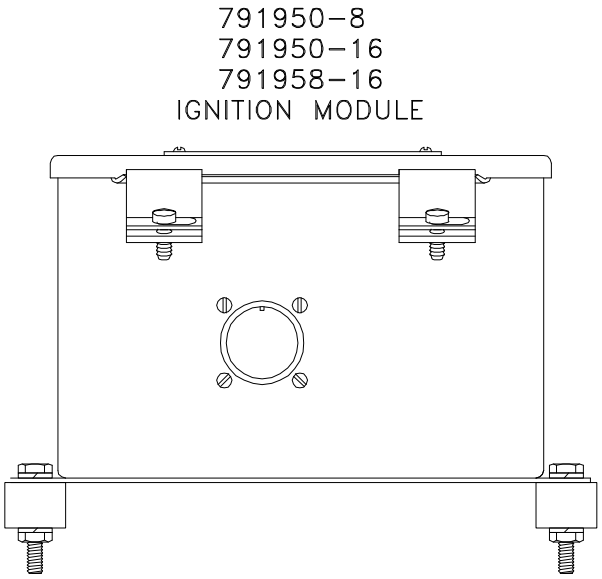
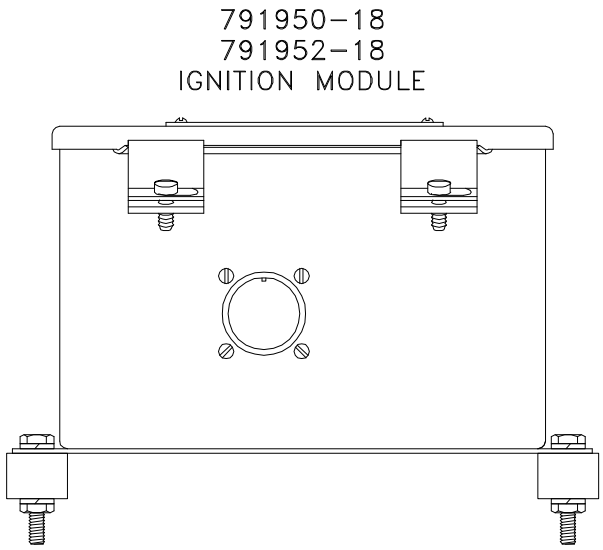


FIG. 8 HOOKUP DIAGRAM, IGNITION MODULE 791950-8 / 791950-16



NO. OUTPUTS	MEMORY CODE	IGNITION SYSTEM FIRING ORDER
4	D2x, D4x	A-B-C-D
5	E2A, E4A	A-B-C-D-E
6	F2x, F4x	A-B-C-D-E-F
7	G2A, G4A	A-B-C-D-E-F-K
8	H2x, H4x	A-B-C-D-E-F-K-L
9	I2A, I4A	A-B-C-D-E-F-K-L-M
10	J2x, J4x	A-B-C-D-E-F-K-L-M-N
12	L2x, L4x	A-B-C-D-E-F-K-L-M-N-P-R
14	N2x, N4x	A-B-C-D-E-F-K-L-M-N-P-R-S-T
16	P2x, P4x	A-B-C-D-E-F-K-L-M-N-P-R-S-T-U-V

FIG. 9 HOOKUP DIAGRAM,IGNITION MODULE 791950-18 / 791952-18



NO. OUTPUTS	MEMORY CODE	IGNITION SYSTEM FIRING ORDER
4	D2x, D4x	A–B–C–D
5	E2A, E4A	A–B–C–D–E
6	F2x, F4x	A–B–C–D–E–F
7	G2A, G4A	A–B–C–D–E–F–G
8	H2x, H4x	A–B–C–D–E–F–G–H
9	I2A, I4A	A–B–C–D–E–F–G–H–K
10	J2x, J4x	A–B–C–D–E–F–G–H–K–L
12	L2x, L4x	A–B–C–D–E–F–G–H–K–L–M–N
14	N2x, N4x	A–B–C–D–E–F–G–H–K–L–M–N–P–R
16	P2x, P4x	A–B–C–D–E–F–G–H–K–L–M–N–P–R–S–T
18	R2x, R4x	A–B–C–D–E–F–G–H–K–L–M–N–P–R–S–T–U–V

FIG. 10 WIRING DIAGRAM, IGNITION MODULE

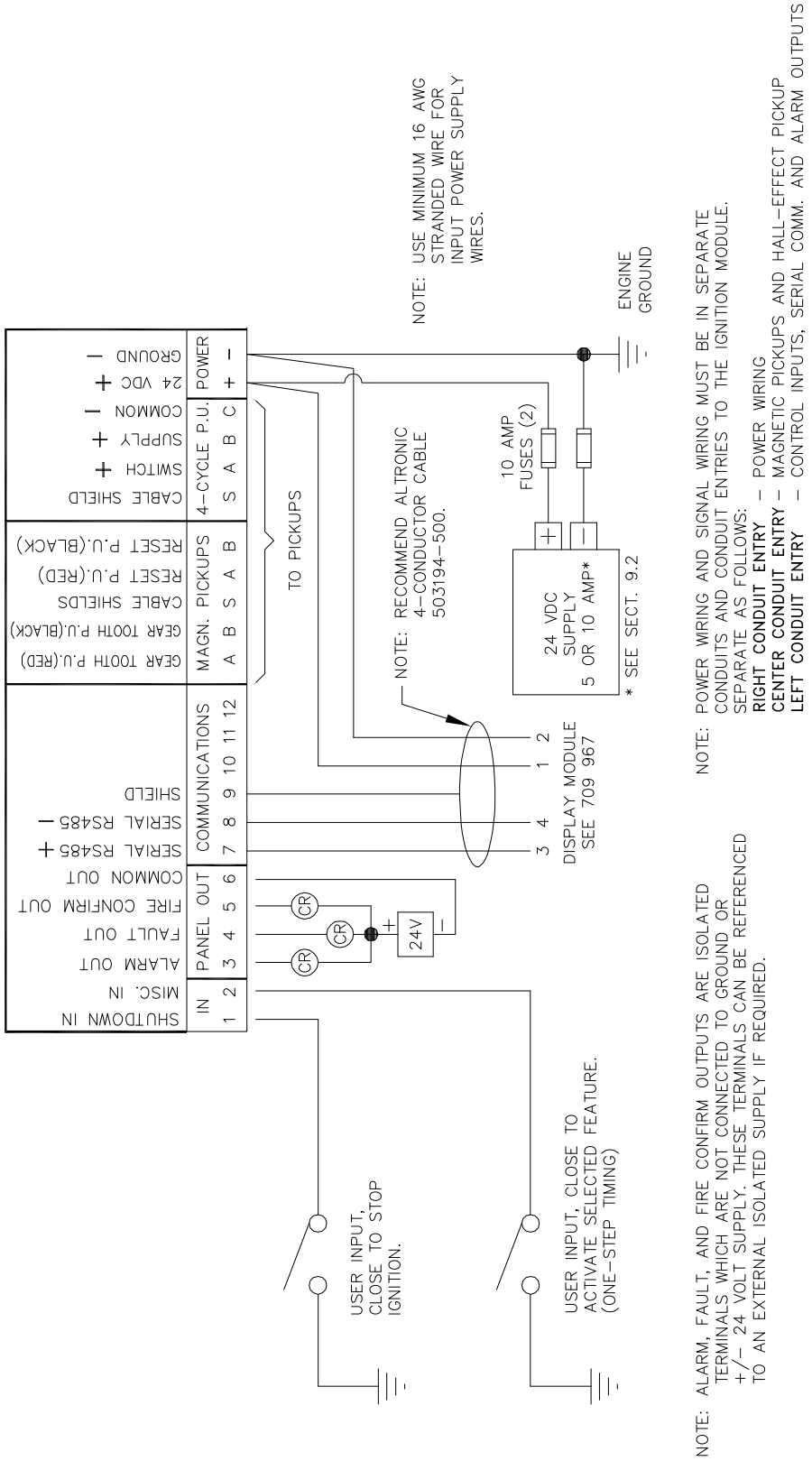


FIG. 11 WIRING DIAGRAM, DISPLAY MODULE

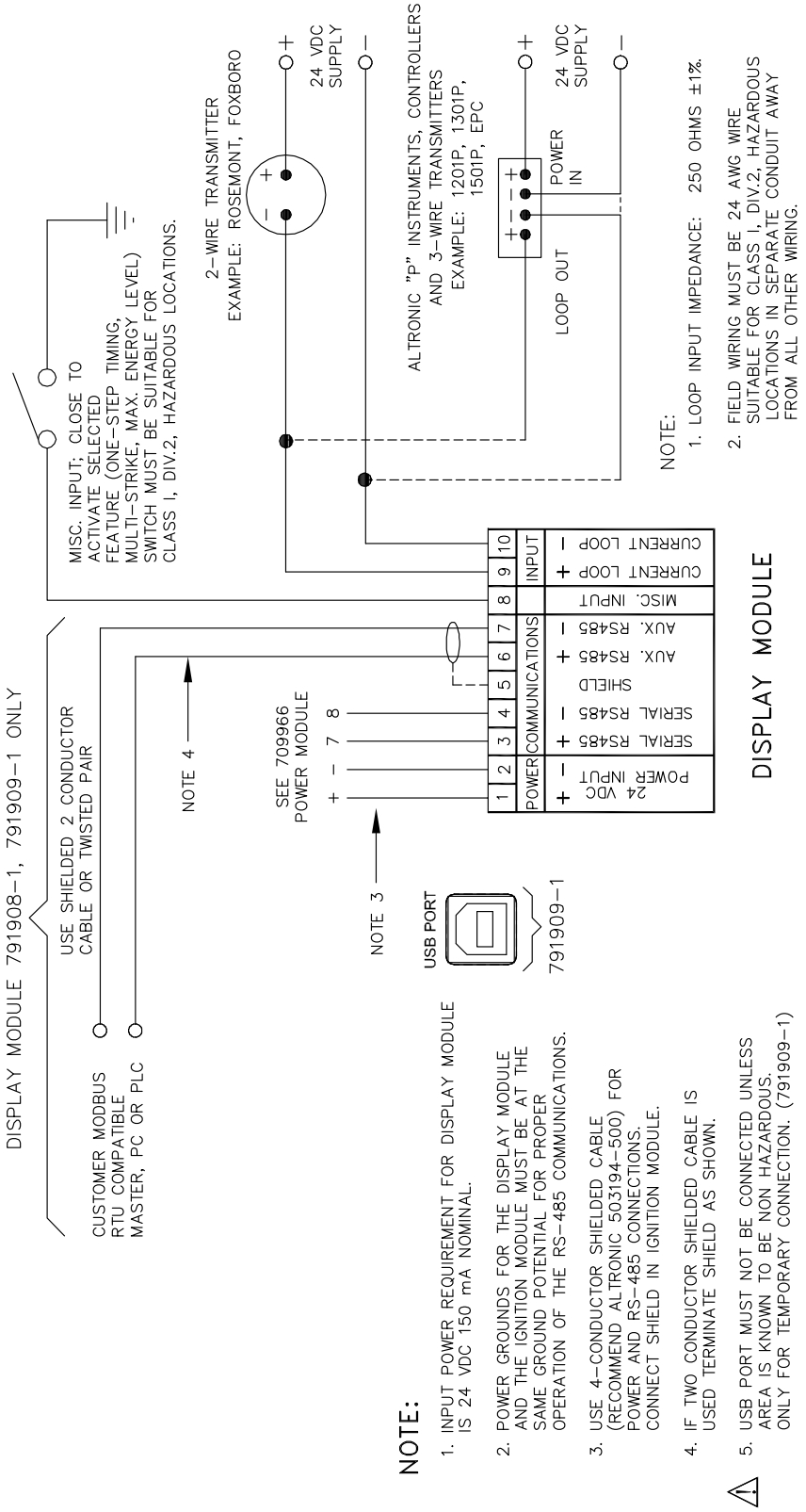


FIG. 12 TIMING CURVE, 4-20 MA

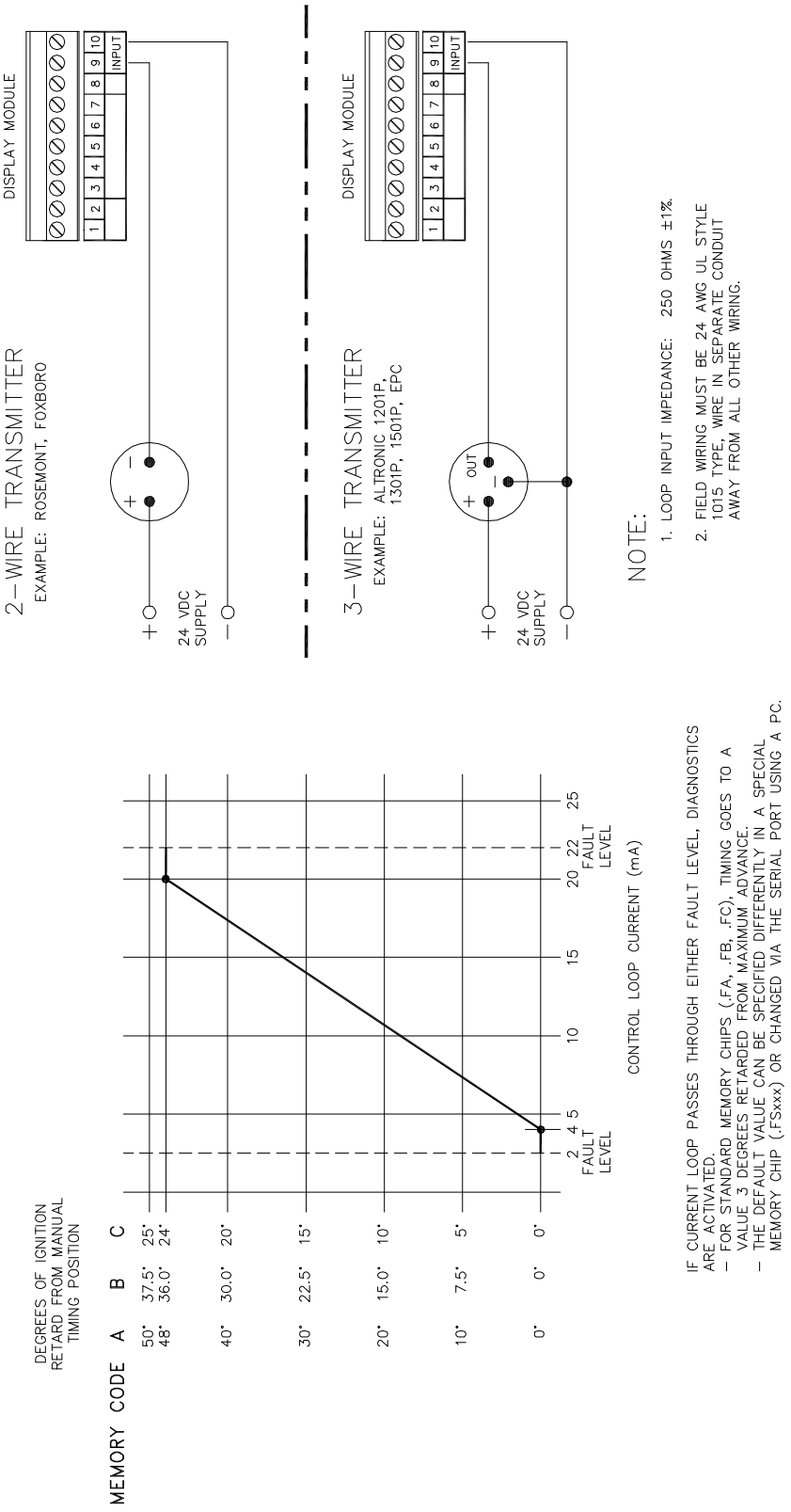


FIG. 13 MAGNET ASSEMBLY SALES DRAWING

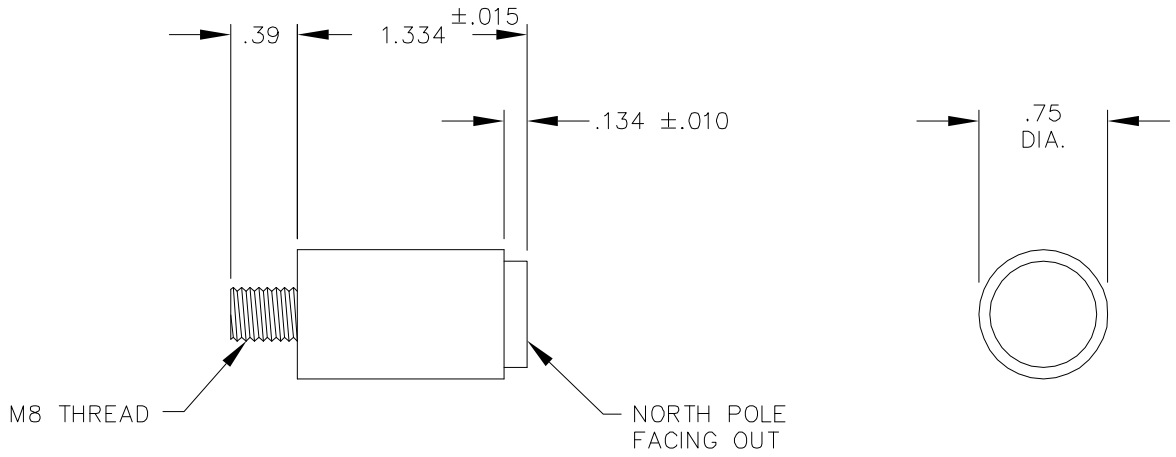


FIG. 14 MAGNET ASSEMBLY SALES DRAWING

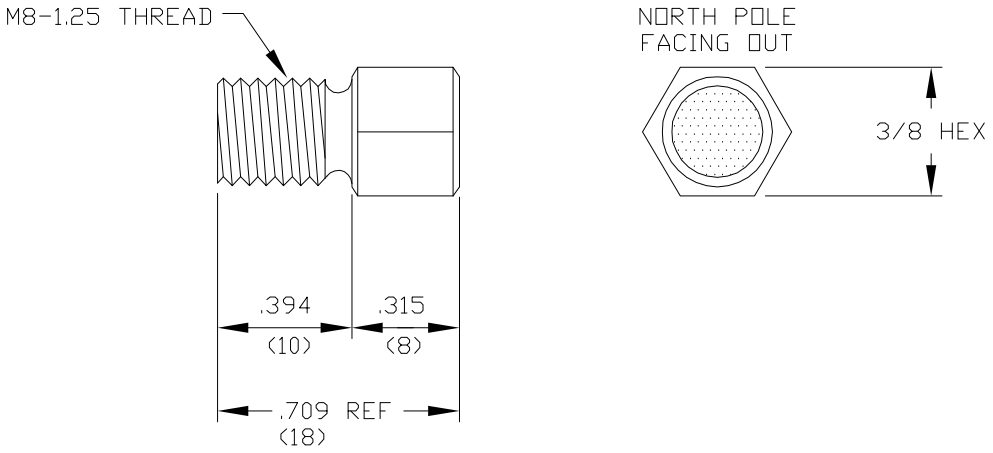
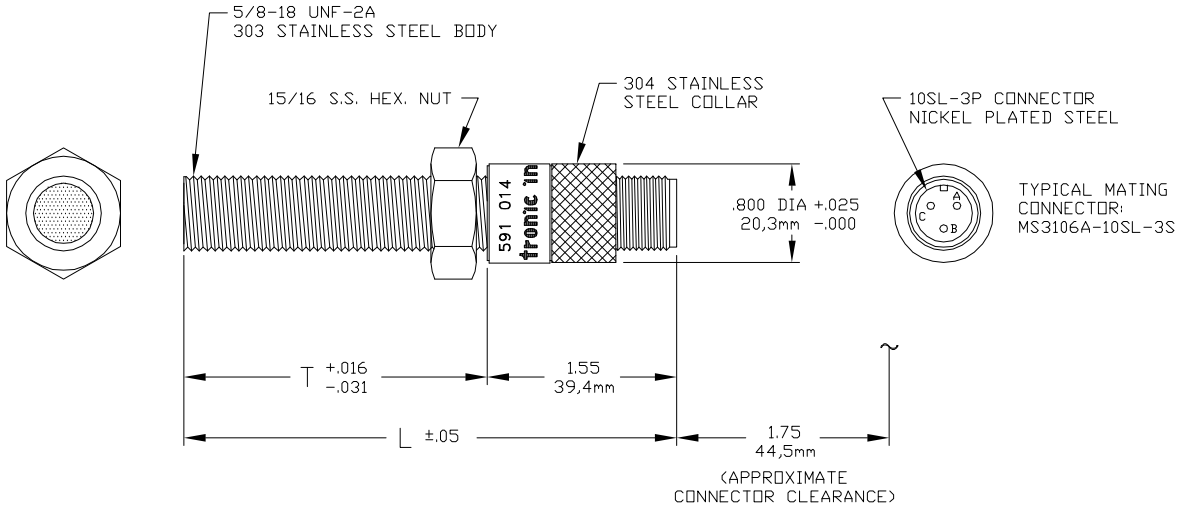


FIG. 15 HALL-EFFECT PICKUP SALES DRAWING

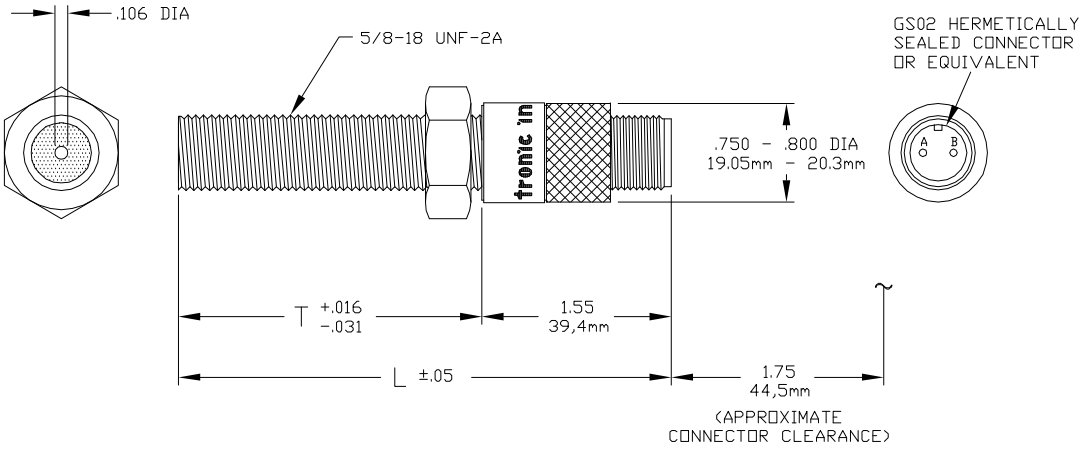
ALTRONIC P/N	T	L
591014-2	2.50"/63,5mm	4.05"/102,8mm
591014-4	4.50"/114,3mm	6.05"/153,7mm

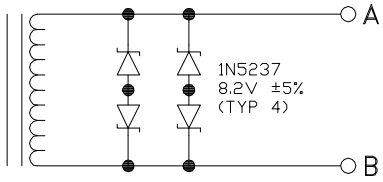


NOTE:

1. NORTH POLE OF MAGNET MUST FACE SENSING END WITH AIR GAP OF .030/.040 (,76/1,0).
2. CENTERLINE OF MAGNET'S ROTATION MUST RUN THROUGH CENTERLINE OF PICKUP.

FIG. 16 MAGNETIC PICKUP SALES DRAWING





*NOTE:

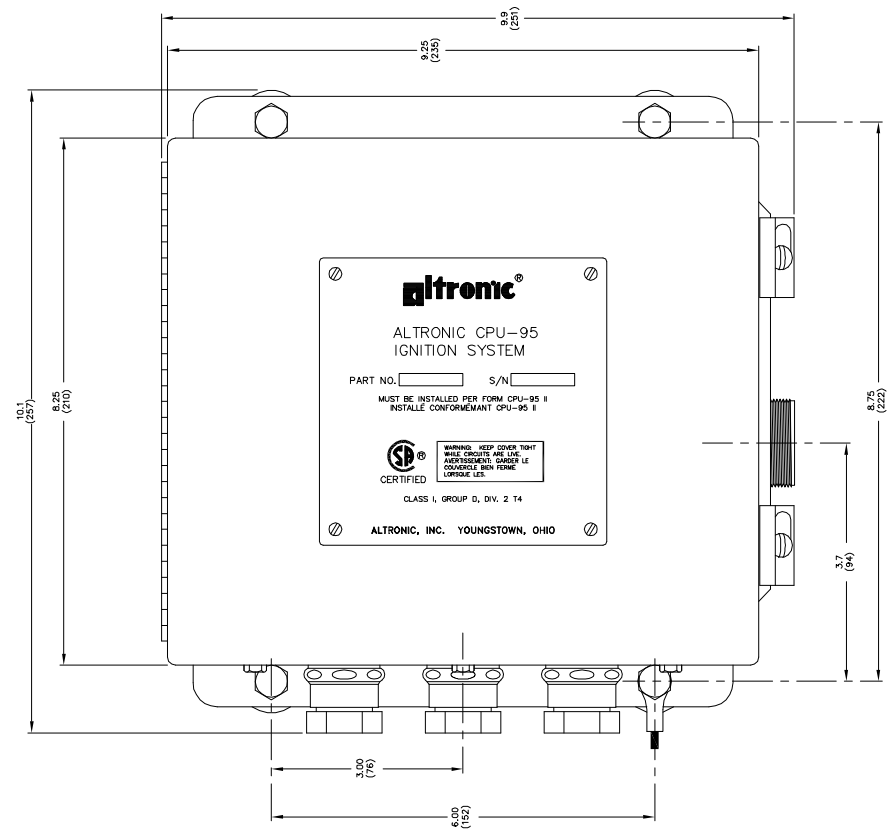
ELECTRICAL VALUES GIVEN ARE ABSOLUTE RATINGS ASSURED 100% BY TEST.

POLARITY: PIN "B" POSITIVE WITH RESPECT TO PIN "A" WITH THE APPROACH OF A FERROUS TARGET.

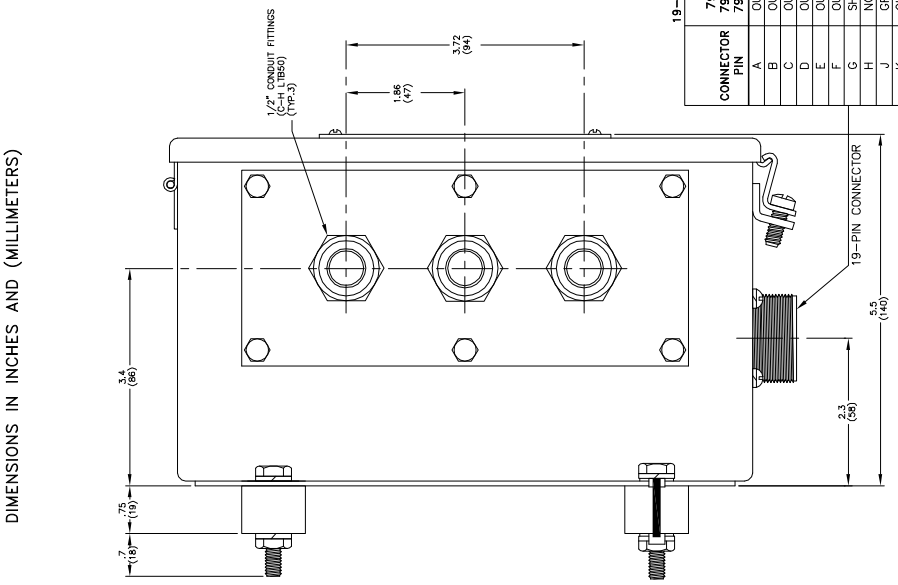
ELECTRICAL DATA *	
MAX. COIL INDUCTANCE	420 mH
MIN. COIL RESISTANCE	800-1200Ω

ALTRONIC P/N	T	L
691118-1	1.75"/44,5mm	3.30"/83.3mm
691118-2	2.50"/63,5mm	4.05"/102.8mm
691118-3	3.0"/76.2mm	4.55"/115.6mm
691118-4	4.5"/114.3mm	6.05"/153.7mm
691118-6	6.0"/152.4mm	7.55"/191.8mm

FIG. 17 IGNITION MODULE MOUNTING DIMENSIONS



19-PIN CONNECTOR			
CONNECTOR PIN	MODEL 791950-8 791950-16 791958-16	MODEL 791950-18 791952-18
A	OUTPUT 1	OUTPUT 1
B	OUTPUT 2	OUTPUT 2
C	OUTPUT 3	OUTPUT 3
D	OUTPUT 4	OUTPUT 4
E	OUTPUT 5	OUTPUT 5
F	OUTPUT 6	OUTPUT 6
G	SHUTDOWN LEAD	OUTPUT 7
H	NOT USED	OUTPUT 8
J	GROUND	GROUND
K	OUTPUT 7	OUTPUT 9
L	OUTPUT 8	OUTPUT 10
M	OUTPUT 9	OUTPUT 11
N	OUTPUT 10	OUTPUT 12
P	OUTPUT 11	OUTPUT 13
R	OUTPUT 12	OUTPUT 14
S	OUTPUT 13	OUTPUT 15
T	OUTPUT 14	OUTPUT 16
U	OUTPUT 15	OUTPUT 17
V	OUTPUT 16	OUTPUT 18



DIMENSIONS IN INCHES AND (MILLIMETERS)

FIG. 18 DISPLAY MODULE MOUNTING DIMENSIONS

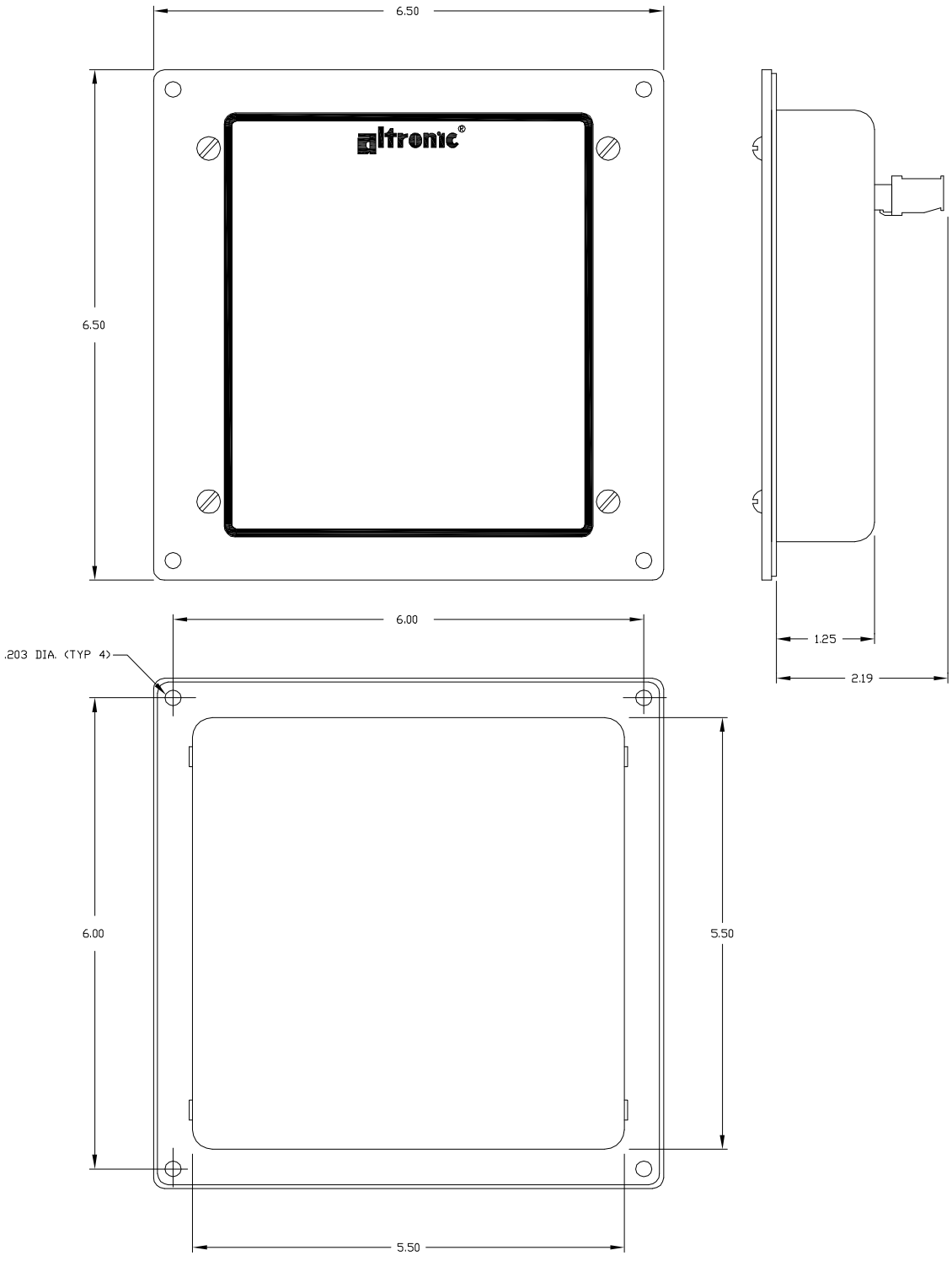


FIG. 19 NEMA 3R ENCLOSURE MOUNTING DIMENSIONS