Installation Instructions

CPU-95EVS Enhanced VariSpark Digital Ignition System

Form CPU-95EVS II 7-20

altronic
HOERBIGER Engine Solutions

1.0 SYSTEM DESCRIPTION

1.1 The Altronic CPU-95EVS 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 4-20mA 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 three main parts: an engine-mounted Ignition Module, DC to DC power supply, and an optional user interface Display Module.

1.2 Models of the EVS ignition available:

791963-8A	8 output CPU-95EVS with Enhanced Display
791963-8A-SS	8 output CPU-95EVS with stainless steel enclosure
791963-16A	16 output CPU-95EVS with Enhanced Display
791963-16A-SS	16 output CPU-95EVS with stainless steel enclosure

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 and standard CPU-95 installations, the CPU-95EVS 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 24Vdc, 30 ampere nominal for typical applications. See sections 10 and 11 for details.

2.0 SYSTEM COMPONENTS

2.1 The system consists of an Ignition Module, a Power Supply 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 FIG 4 for a complete system overview.

2.2 Use Altronic unshielded ignition coil 501061 or 591010. Refer to the Application List (form CPU-95 AL) for requirement details and see FIG 10 (unshielded).

3.0 MOUNTING THE CPU-95EVS IGNITION MODULE

3.1 See FIG 19 and FIG 21 for physical dimension details. Select a mounting location meeting the following requirements:

- **On the engine**
- **Within 50 ft. (15.2m) of the Display Module**
- **Within 7 ft. (2.1m) 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)**

NOTE: The enclosure width is 1 inch (25.4mm) larger than the CPU-90 unit, ½ inch (12.7mm) on each side.

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 or standard CPU-95 system, the CPU-95EVS Ignition Module can be mounted in place of the CPU-90/CPU-95 unit; the mounting footprint is identical to facilitate the changeover.

4.0 MOUNTING DC TO DC POWER SUPPLY

4.1 The Enhanced VariSpark module requires a constant -185Vdc power in conjunction with 24Vdc for normal operation. The DC to DC -185V power supply should be mounted off the engine, protected from the environment. It is recommended to use a NEMA rated enclosure for environmental protection.

- **Within 10 feet (3m) of the 24Vdc power source recommended for minimum wire size**
- **Determine 24VDC power supply current requirement using charts in FIG 5**
- **Within 30 feet (9.1m) from the Ignition Module**
- **Not to exceed an ambient temperature of 150°F (65°C)**

Mounting Kits for Power Supply:

Standard mounting of the power supply offers (4) 10/32 holes in the base. In the event that this offering does not meet the customers needs, optional mounting kits are available.

720011-1: Mounting bars and screws for non-vibration mounting environments

720011-2: T-nuts, bolts, and lock washers for non-vibration mounting environments

720011-3: Mounting bars, screws, and shock mounts for vibration mounting environments

See FIG 8 for dimensional details.

5.0 MOUNTING THE CPU-95EVS DISPLAY MODULE

5.1 Mount the CPU-95EVS 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 FIG 20 for mounting dimensions. A NEMA 3R housing (720004-1) is also available as an alternative mounting option for the Display Module (FIG 21).

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

5.3 Operating temperature range is –40°F to 158°F (–40°C to 70°C). Humidity specification is 0-95%, non-condensing. Housed in an weatherproof aluminum enclosure, the CPU-95EVS 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.

6.0 MOUNTING FLYWHEEL GEAR/DRILLING FLYWHEEL HOLES

6.1 The Altronic CPU-95EVS 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" (46cm) or greater**
- **Number of teeth or holes of 180 or greater**
- **Maximum run-out referenced to the pickup of .007" (.178mm)**

Refer to FIG 2 and FIG 3 for further details.

7.0 MOUNTING THE MAGNETIC PICKUPS

7.1 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 8.0). The pickups must be mounted to rigid brackets to maintain an air gap of .015" (.381mm) ± .005" (.127mm) 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 FIG 2 for mounting details and FIG 18 for magnetic pickup dimensions.

8.0 MOUNTING THE FLYWHEEL RESET PIN

8.1 Set the engine with no. 1 cylinder six (6) degrees ahead of the most advanced firing point at which the engine will run. 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 FIG 2 for details.

8.2 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" (.254mm) using a feeler gauge.

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

9.1 The trigger magnet (260604 or 720002) must be mounted on the engine camshaft or other accessory drive operating at camshaft speed. An M8 (8mm) tapped hole, 0.5 inches (13mm) deep, is required — see FIG 15 or FIG 16 for details. For proper operation the magnet MUST rotate on a diameter NOT EXCEEDING 6 inches (152mm) for magnet 720002, or 15 inches (381mm) for magnet 260604.

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

9.2 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, coincident with the reset pickup and pin being lined-up; see FIG 4.

The Hall-effect pickup dimensions are shown on FIG 17. The air gap between the Hall-effect pickup and trigger magnet must not exceed .040" (1.0mm).

10.0 POWER SUPPLY MODULE ELECTRICAL HOOKUP

10.1 GENERAL: The power connections to the CPU-95EVS must be in accordance with the National Electrical Code, Canadian Electrical Code, or other relevant codes or standards. The CPU-95EVS is suitable for installation in Class I, Division 2, Group D locations.

WARNING: Although the device has internal protective fuses, two external fuses rated 1.25 X max current requirement 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 FIG 7.

10.2 POWER SOURCE: refer to FIG 7 for 791911 power wiring, power may be supplied as follows:

24 Volt batteries or a 24 Volt power supply is acceptable. Power source must be able to supply 24VDC nominal at load current draw. Load current is determined in FIG 5.

NOTE: Due to the high peak current draw of an ignition system care must be taken to ensure that the supply voltage does not vary more than ±5%.

IMPORTANT: For proper operation of the CPU-95EVS system, voltage and current supplied must be sufficient during all selected energy modes of operation. FIG 7 provides these details regarding the DC power hookup:

1. CURRENT DRAW PER SYSTEM — using FIG 5:
   A. Select number of cylinders for engine installation.
   B. Select engine operating RPM.
   C. Select highest spark profile the engine will utilize.
   D. 2 STROKE ENGINE ONLY: multiply current requirement by 2.

NOTE: If spark profile is unknown for performance indications use E3SS for current requirement.

2. MINIMUM WIRE GAUGE REQUIREMENT
   A. Use the Current Draw Per System requirement.
   B. Determine the length of wire from the 24V power source location to the DC-DC converter location as run in conduit.
   C. Plot the point on the chart in FIG 6.
3. POWER SOURCE
   A. 24V Battery and charger that are capable of supplying the determined current draw per system at nominal 24VDC.
   B. DC power supply capable of furnishing 24-28VDC, and determined current draw per system at a minimum.
4. 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 FIG 6 for the minimum wire size required. Based on the current requirement determined in the previous step, select wire size from the chart in FIG 6.

IMPORTANT: For proper operation of the CPU-95EVS system, voltage and current supplied must be sufficient during all selected modes of operation.

NOTE: Wire gauge selection is used for wiring from 24VDC power supply to -185V DC-DC converter.

10.3 POWER INPUT: The power input connection consists of one 3-input terminal strip (J1).

10.4 POWER OUTPUT: The power output is at -185V as referenced to ground. Currently a terminal strip is used to make the output connection of the power supply module, P/N (791911-1). From the output of the terminal strip, one of the following 7-pin connector harnesses: P/N 393023-X, 393011-X, 393025-2, or 393013-X is used to mate with the 7-pin input connector of the CPU-95EVS, P/N (791963-XXX). See FIG 4 and FIG 7 for a wiring diagram and pin out information.

11.0 IGNITION MODULE ELECTRICAL HOOKUP (Refer to FIG 12)

11.1 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-95EVS. A separate power supply is required because the CPU-95EVS system is a negative ground system and the minus must be grounded.

11.2 RIGHT ENTRY: Input power supply wires (16 AWG minimum) should enter the right conduit entry and connect to the POWER (24Vdc + and GROUND –) terminals of the terminal block. See FIG 12.

11.3 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 seen in FIG 12.

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

NOTE: Due to the nature of this low-level signal, care must be taken to choose appropriately rated dry contacts. Contacts that have previously been used to switch igntion voltage to ground should be avoided due to the potential for pre-existing damage.

11.4 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, PN 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 combination of these 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-95EVS Operating Instructions, form CPU-95EVS OI and Terminal Program user instructions, form CPU-95EVS 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 100Vdc, 75mA. The recommended hookup is shown on FIG 12. For further description, refer to the CPU-95EVS Operating Instructions, form CPU-95EVS OI.

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.

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

12.0 DISPLAY MODULE ELECTRICAL HOOKUP (See FIG 13)

12.1 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 (30.5cm) away from all high voltage wiring.

12.2 POWER: Power input must come from the Ignition Module to the Display Module and connect to terminals 1(+) and 2(–), see FIG 12. 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 in FIG 12. 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 in FIG 12.

12.3 COMMUNICATIONS: The Display Module communicates to the Ignition Module via 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 FIG 12, 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.

12.4 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-95EVS Operating Instructions, form CPU-95EVS OI, and Terminal Program User Instructions, form CPU-95EVS PI.

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

12.5 CURRENT LOOP INPUT: The 4-20mA timing control input, terminals 9(+) and 10(–), accepts a 4-20mA 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 PN 603102 (black) or 603103 (white), or equivalent for these connections. See FIG 12 for connection details and FIG 14 for timing curve.

13.0 PRIMARY WIRING

13.1 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 FIG 1 if shortening the conduit length of the harness is desired. Insert the connector into the Altronic CPU-95EVS Ignition Module receptacle and hand-tighten; then carefully tighten an additional one-sixth turn with a wrench.

Referring to FIG 11, write in the engine firing order below:

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

13.2 Connect the harness leads in the junction box in accordance with the engine 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 FIG 10 for coil connection details.

13.3 Primary wire should be no. 16 AWG stranded, tinned copper wire. The insulation should have a minimum thickness of .016" (.41mm) and be rated 221°F (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.

13.4 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.

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

14.0 SHUTDOWN WIRING

14.1 Two means are provided to shut off the DC-powered CPU-95EVS ignition system:

- **A low voltage SHUTDOWN INPUT (terminal 1) in the Ignition Module**
- **The output “G” lead (shutdown lead)**

14.2 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 24Vdc, 0.5amps minimum.

14.3 In the 791963-XXX model, a “G” lead is provided to stop the ignition. This lead is open for normal operation and is connected to engine ground for shutdown. This lead can also be used for oscilloscope analysis (a 24VDC signal that pulls low with every firing event), but does not allow for ignition powered instruments.

NOTE: The CPU-95EVS utilizes a simulated G-lead in comparison to the standard CPU-95 modules.

15.0 SECONDARY WIRING

15.1 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).

15.2 The spark plug leads should be fabricated from silicone insulated 7mm 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 (610mm). Spark plug leads should be kept at least 2 inches (51mm) away from any grounded engine part. In deep spark plug wells, use rigid insulated extenders projecting out of the well.

15.3 The use of a clear silicone grease such as Dow Corning DC-4, GE 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.

16.0 EIS applications

16.1 A special application has been developed for the CPU-95EVS that allows the use of EIS coils on the 3500 series engines.

16.2 The system consists of the standard components of the CPU-95EVS system to include the ignition unit, power supply, display, and typical pick-up interfaces. In supplement to the typical output structure, a fully connectorized set of parts are utilized. This is primarily driven by the use of the Engine Block Connector (EBC).

16.3 Referencing Fig 22, the output connector from the CPU-95EVS exits using a 19-Pin connector and enters a one to one junction box, This junction box offers the use of a detonation sensing unit to use number one cylinder as well as checking timing. Leaving the junction box as another 19-Pin connector that routes to the EBC using a 37-Pin connector. It is important to note that the 19-Pin to 37-Pin harness is designed specifically for the firing order of the engine model. No decoding has to be done in the junction box.

16.3 When using the 95EVS with detonation monitoring, the use of adapter 691117-1 is mandatory in conjunction with DET-1620. DET-1600 can not be used. Reference Bulletin 517 for detailed wiring. Reference Fig 22 for overview.

WARNING: CPU-95EVS for use with EIS system 791963-XXE can only be used with EIS coils. Damage to unit may occur if utilized with standard blue or red coils.

DRAWINGS SECTION:

FIG. 1 SHIELDED HARNESS CONDUIT LENGTH ADJUSTMENT

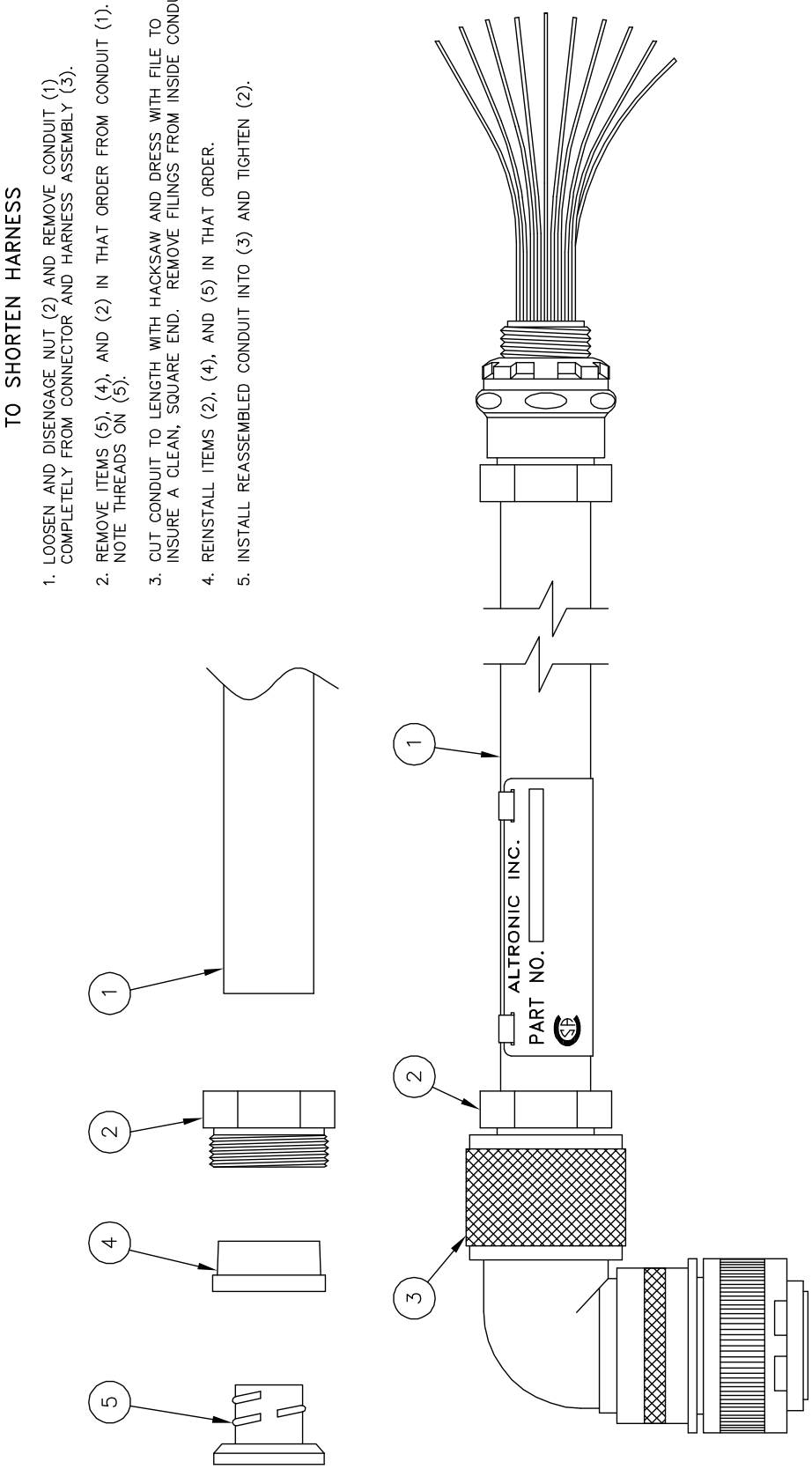


FIG. 2 PICKUP MOUNTING DETAIL

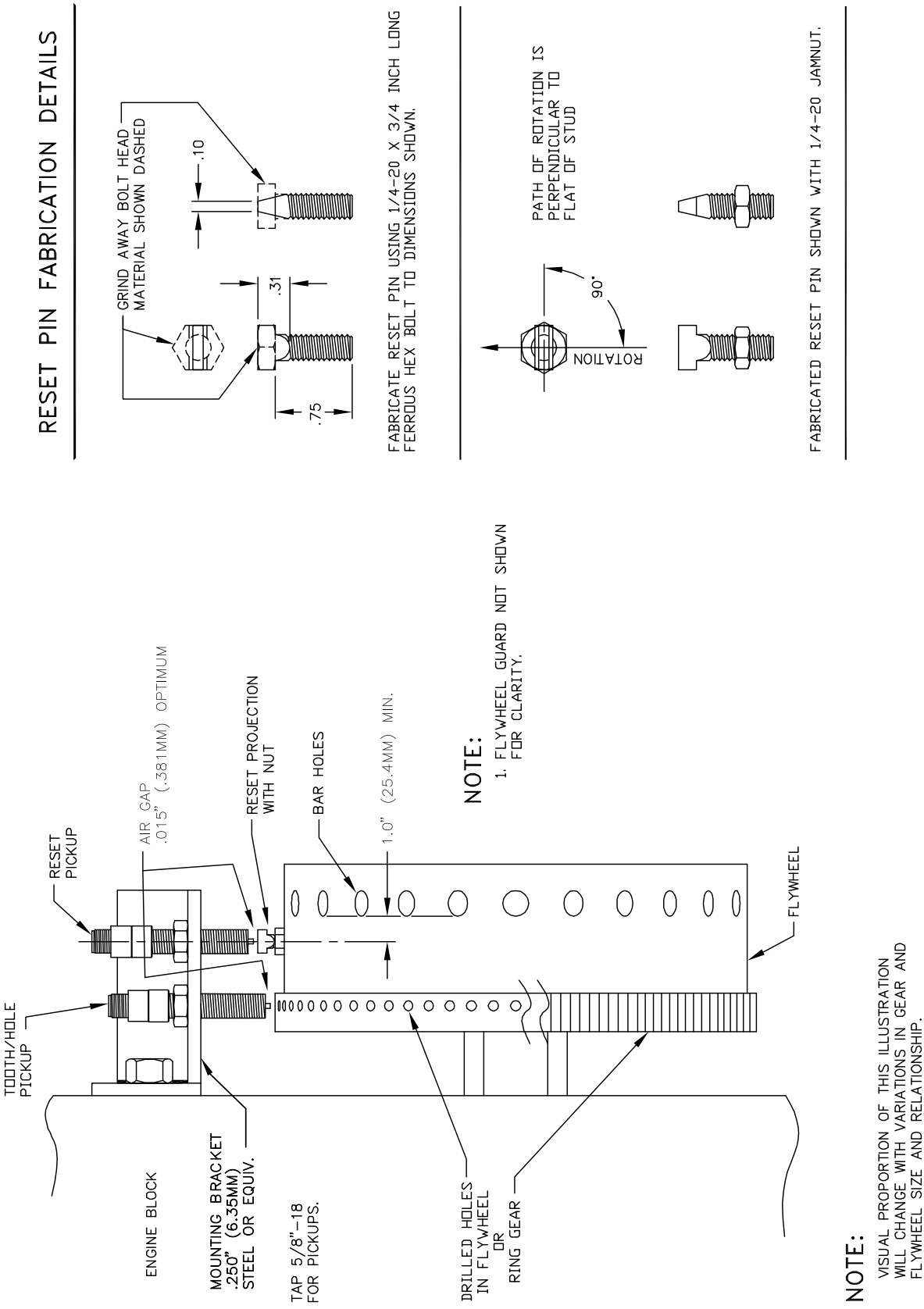


FIG. 3 FLYWHEEL HOLE DRILLING

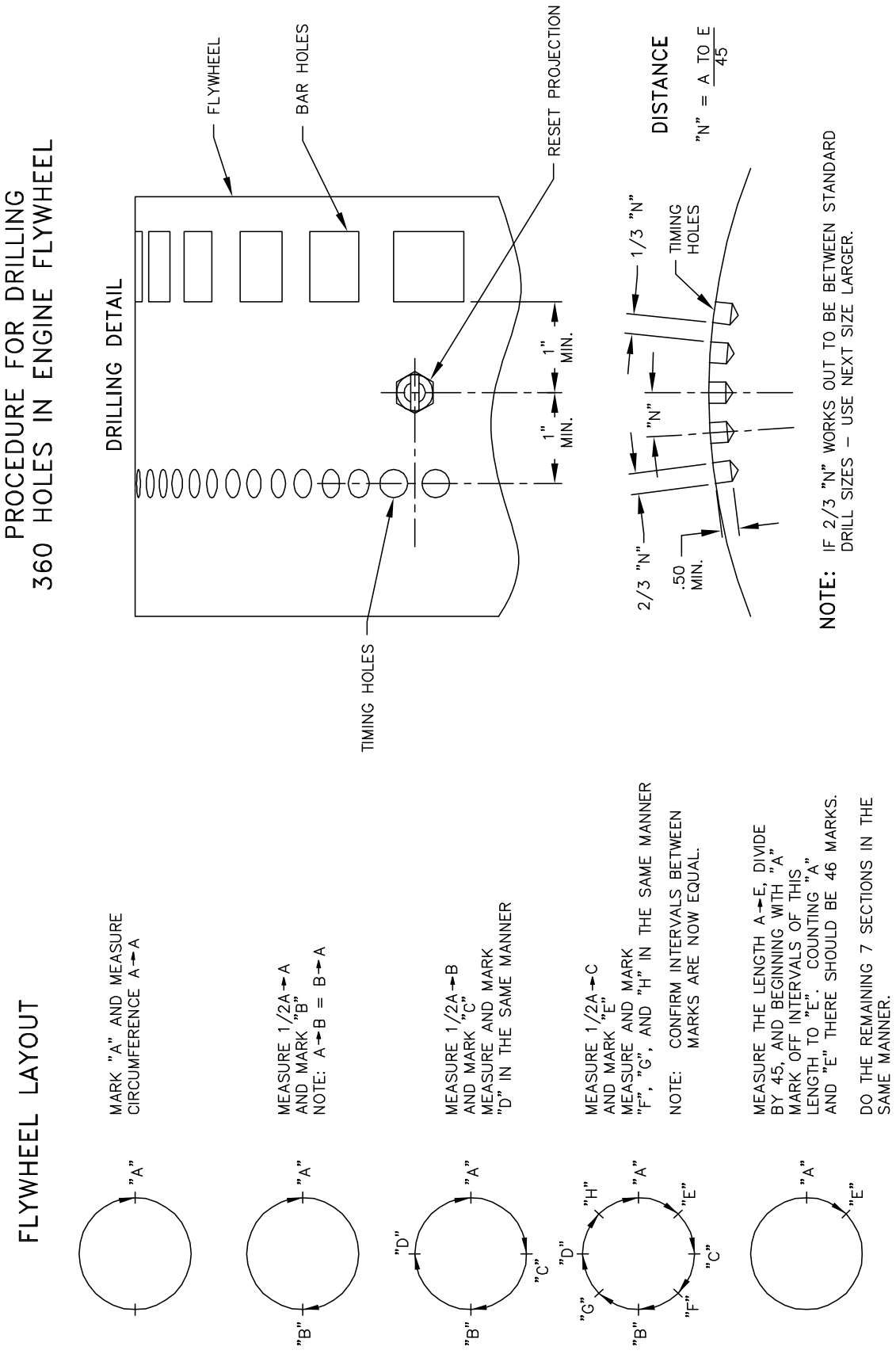


FIG. 4 IGNITION SYSTEM BASIC LAYOUT (791963-16A)

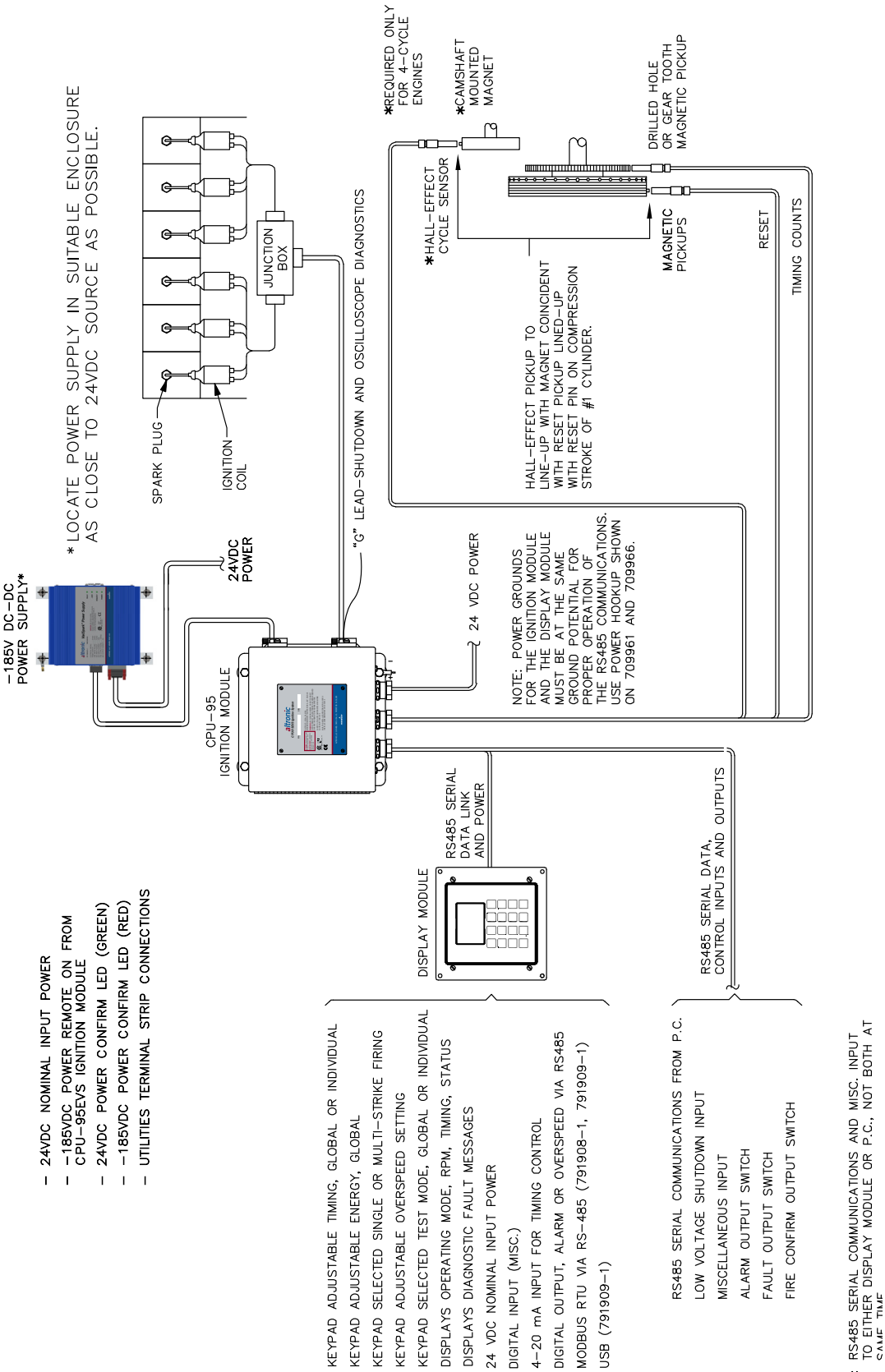
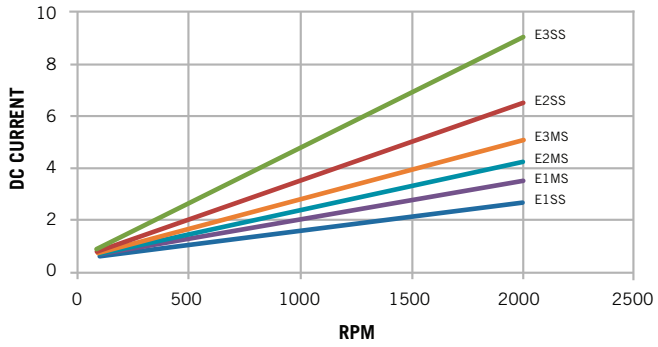
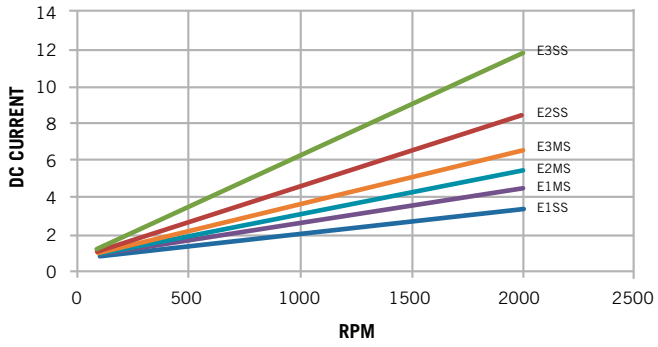


FIG. 5 IGNITION OPERATING CURRENT REQUIREMENTS

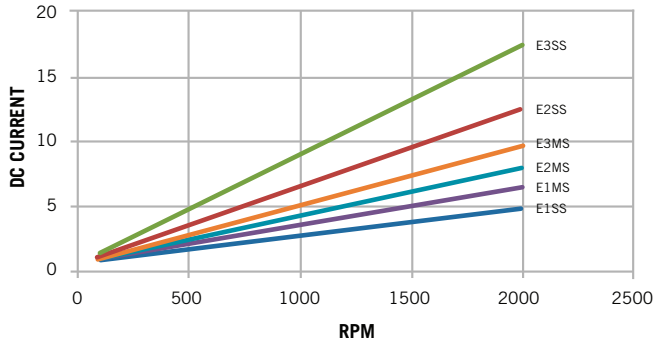
6 CYL



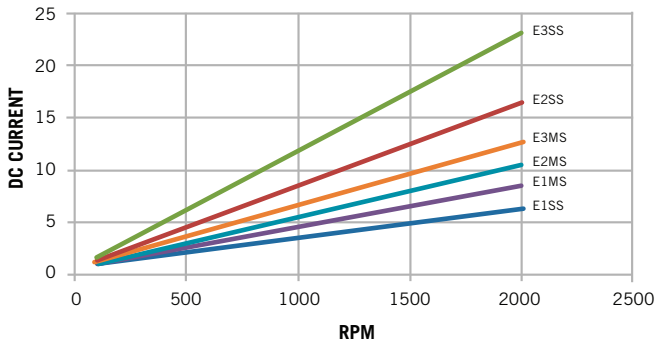
8 CYL



12 CYL

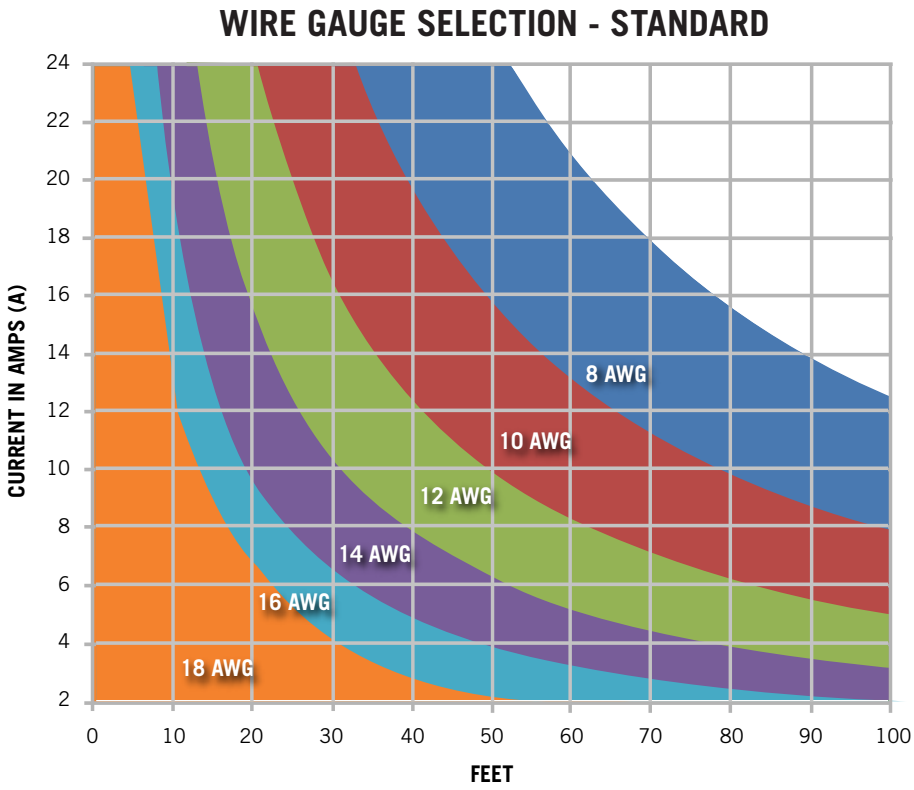


16 CYL



NOTE: Operating current requirements are based on a 4-stroke cycle engine application, in case of 2-stroke cycle engine multiply the required current by a factor of 2 to determine actual current requirement.

FIG. 6 IGNITION WIRE GAUGE SELECTION



NOTE: Wire gauge selection is used for wiring from 24VDC power supply to -185V DC-DC converter.

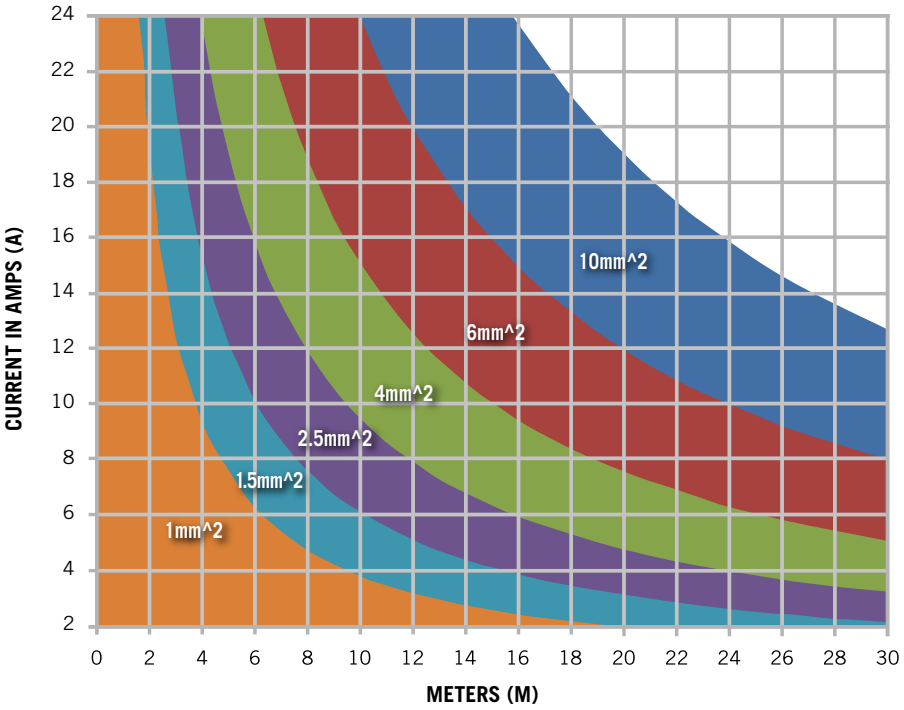
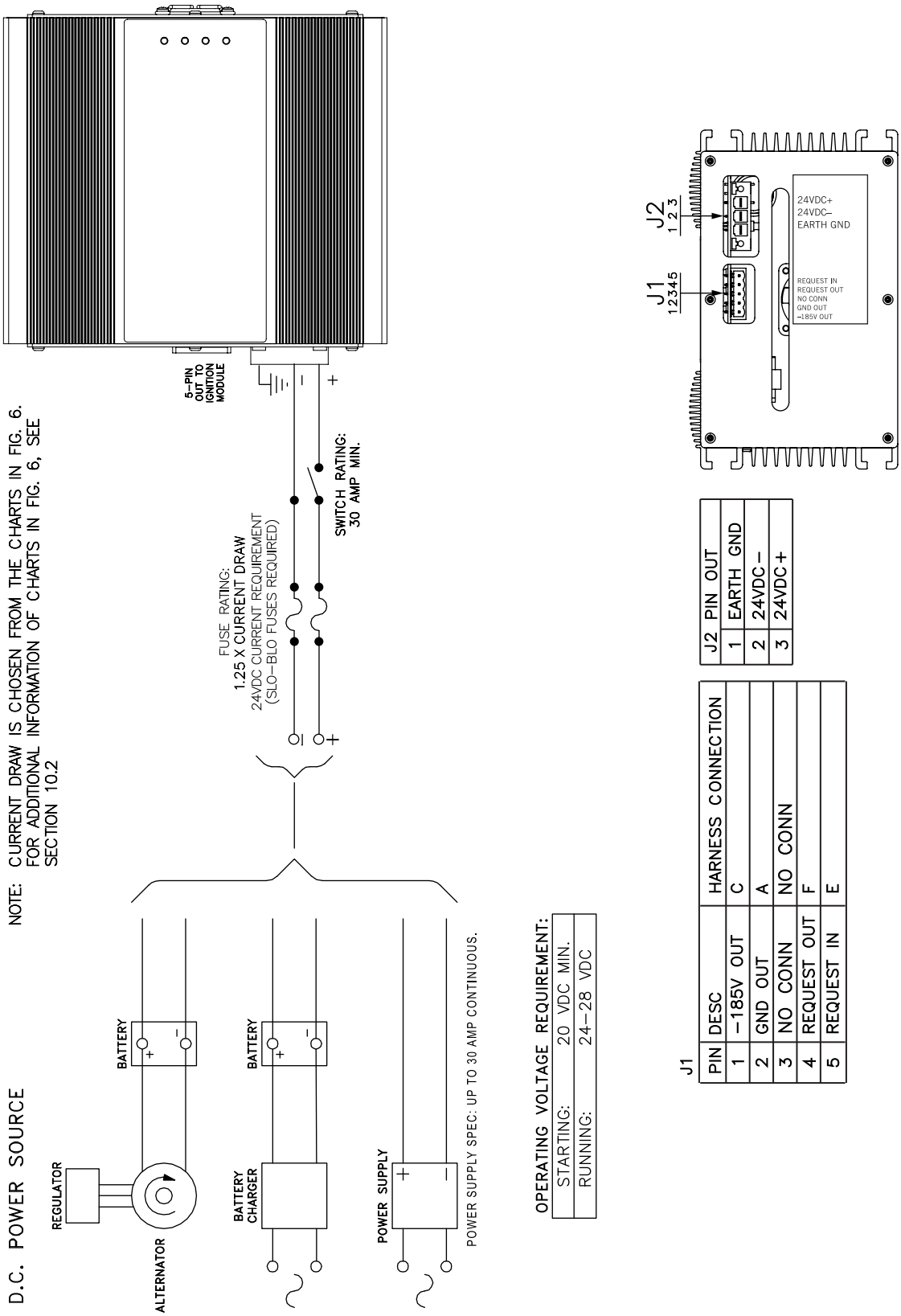


FIG. 7 DC POWER HOOKUP: DC-DC POWER SUPPLY (791911-1)



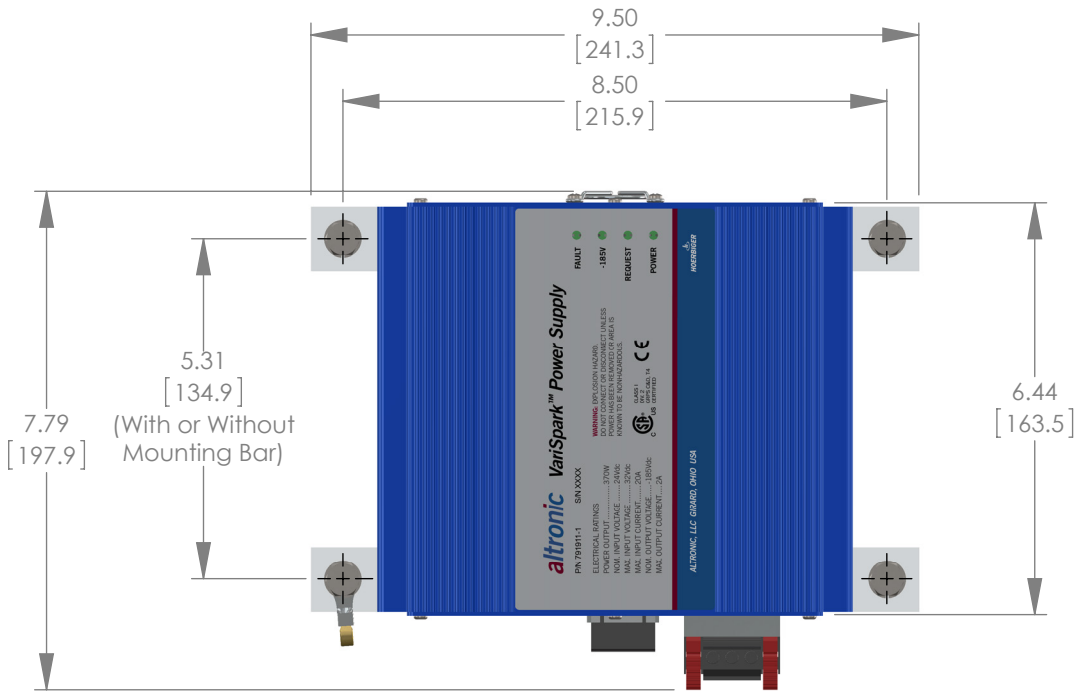
J2 PIN OUT

1	EARTH GND
2	24VDC –
3	24VDC +

J1

PIN	DESC	HARNESS CONNECTION
1	–185V OUT	C
2	GND OUT	A
3	NO CONN	NO CONN
4	REQUEST OUT	F
5	REQUEST IN	E

FIG. 8 MOUNTING DIMENSIONS: POWER SUPPLY (791911-1)



NOTE: Mounting bars and vibrations dampeners are optional items as the power supply is designed for mounting in a separate environmentally approved enclosure. For ordering mounting options see CPU-95AL 9-14 or later, Item J.

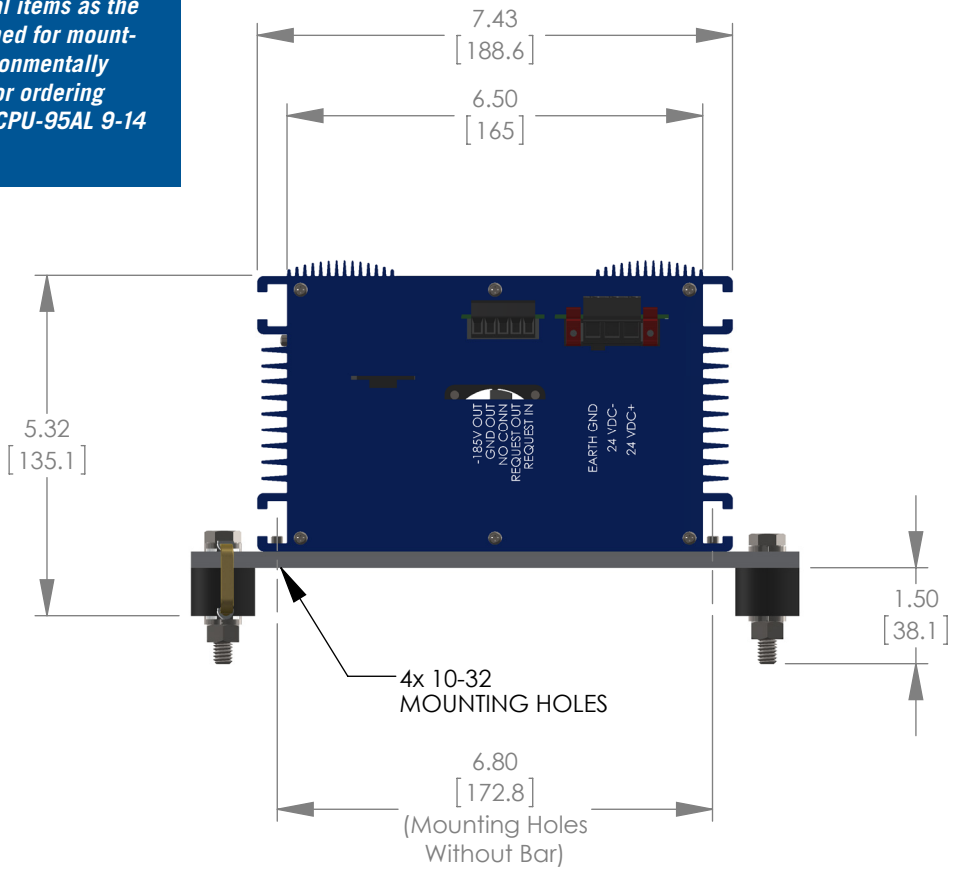
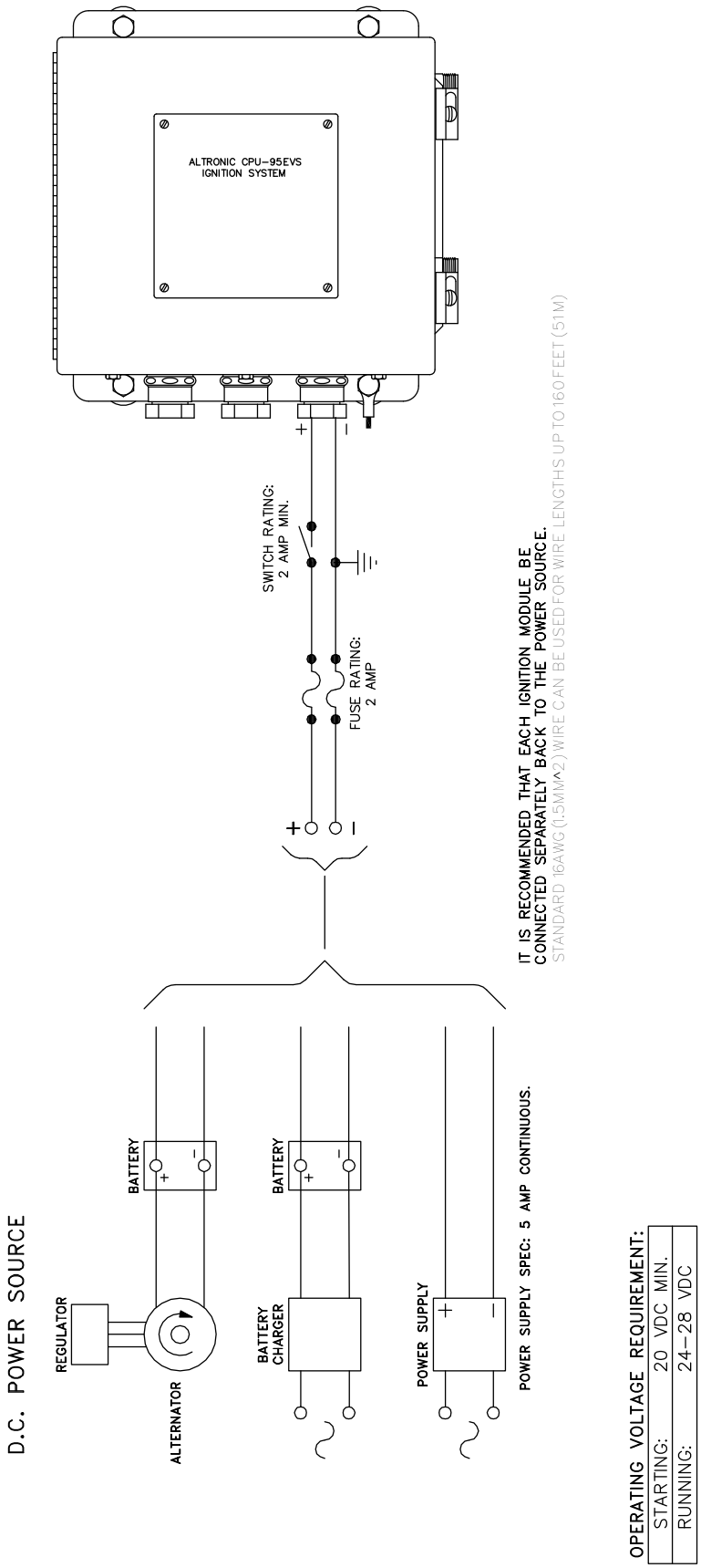


FIG. 9 DC POWER HOOKUP: IGNITION MODULE



OPERATING VOLTAGE REQUIREMENT:

STARTING:	20 VDC MIN.
RUNNING:	24–28 VDC

FIG. 10 COIL WIRING DIAGRAM, UNSHIELDED IGNITION SYSTEM

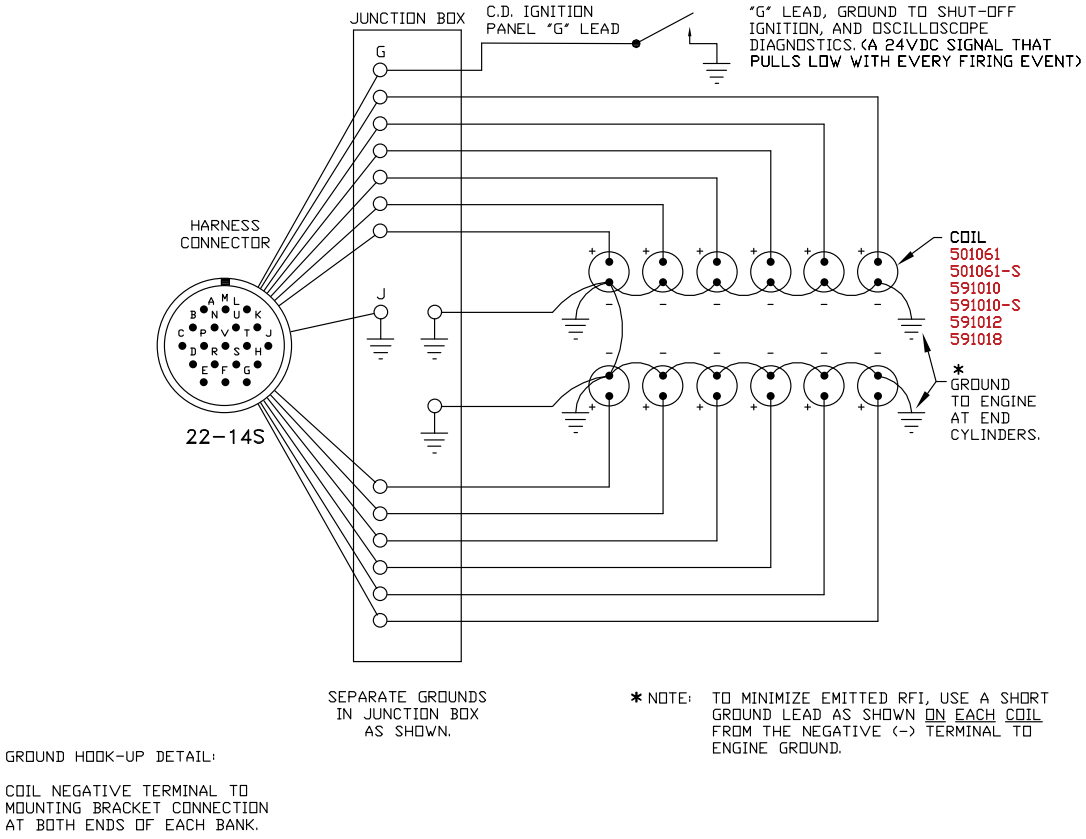
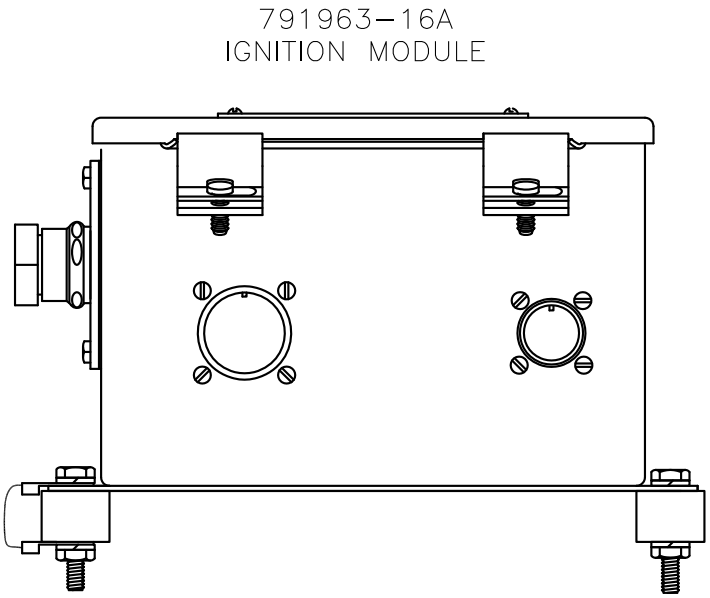


FIG. 11 HOOKUP DIAGRAM, IGNITION MODULE 791963-16A



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. 12 WIRING DIAGRAM, IGNITION MODULE

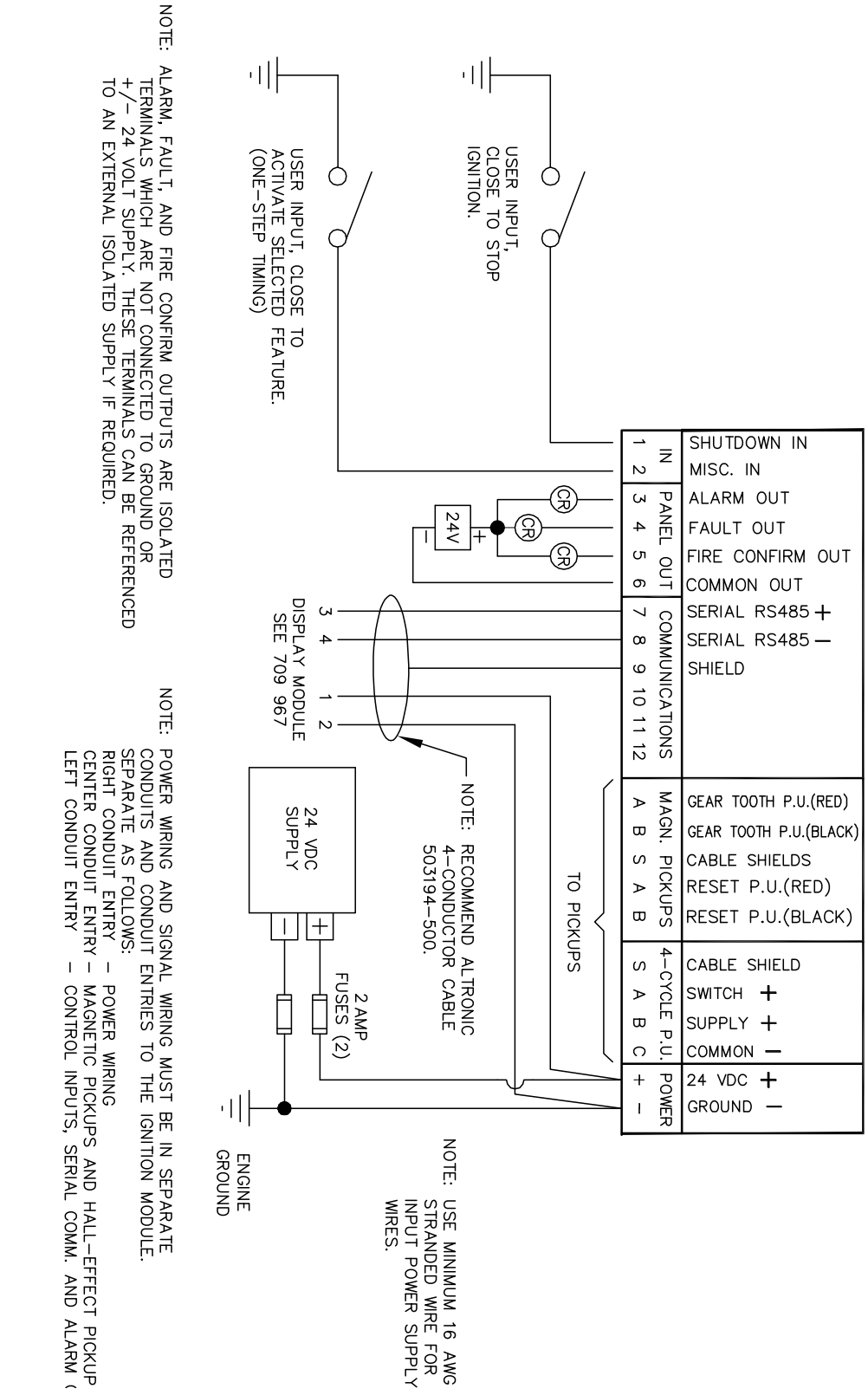


FIG. 13 WIRING DIAGRAM, DISPLAY MODULE

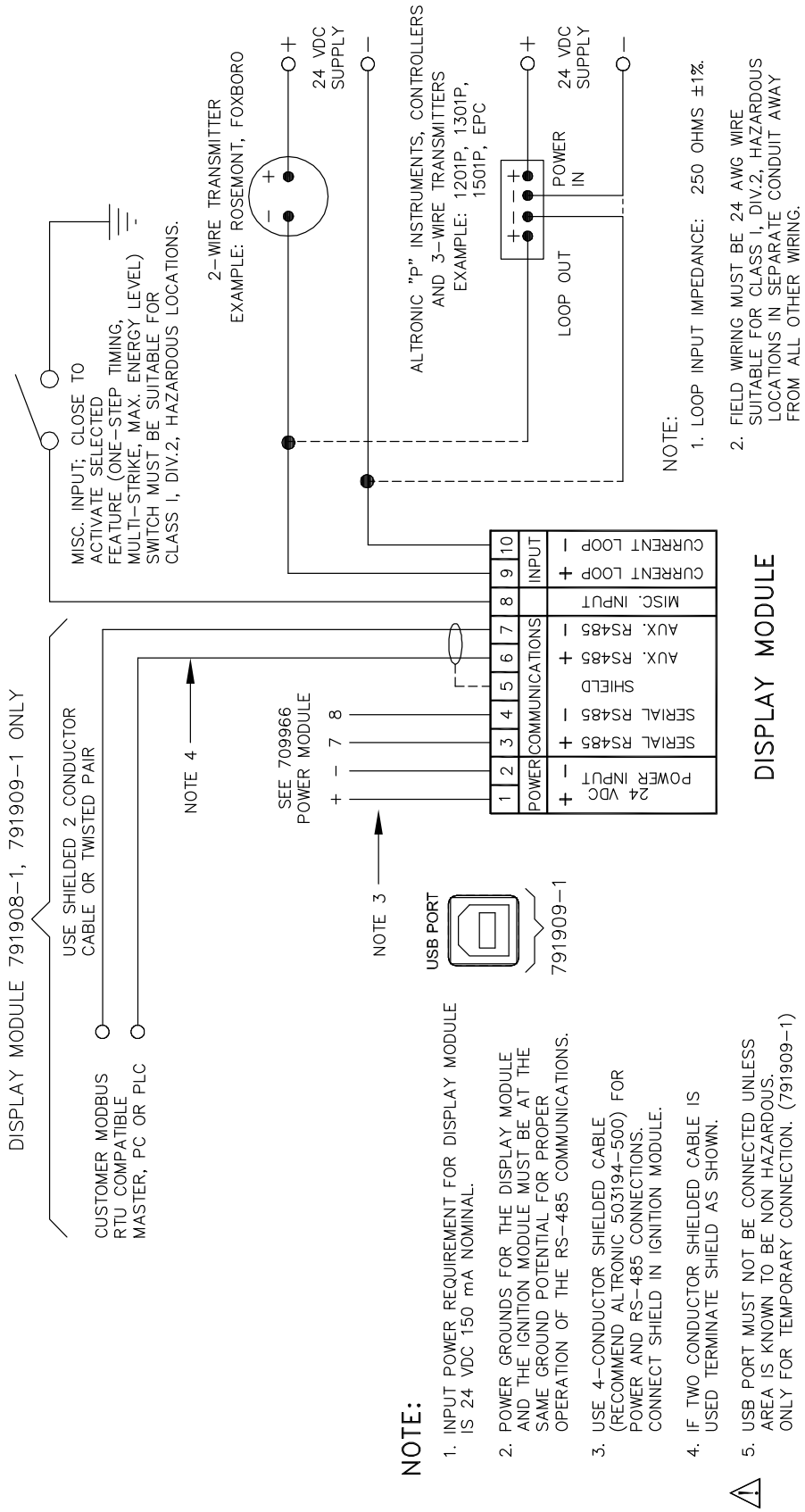


FIG. 14 TIMING CURVE, 4-20 MA

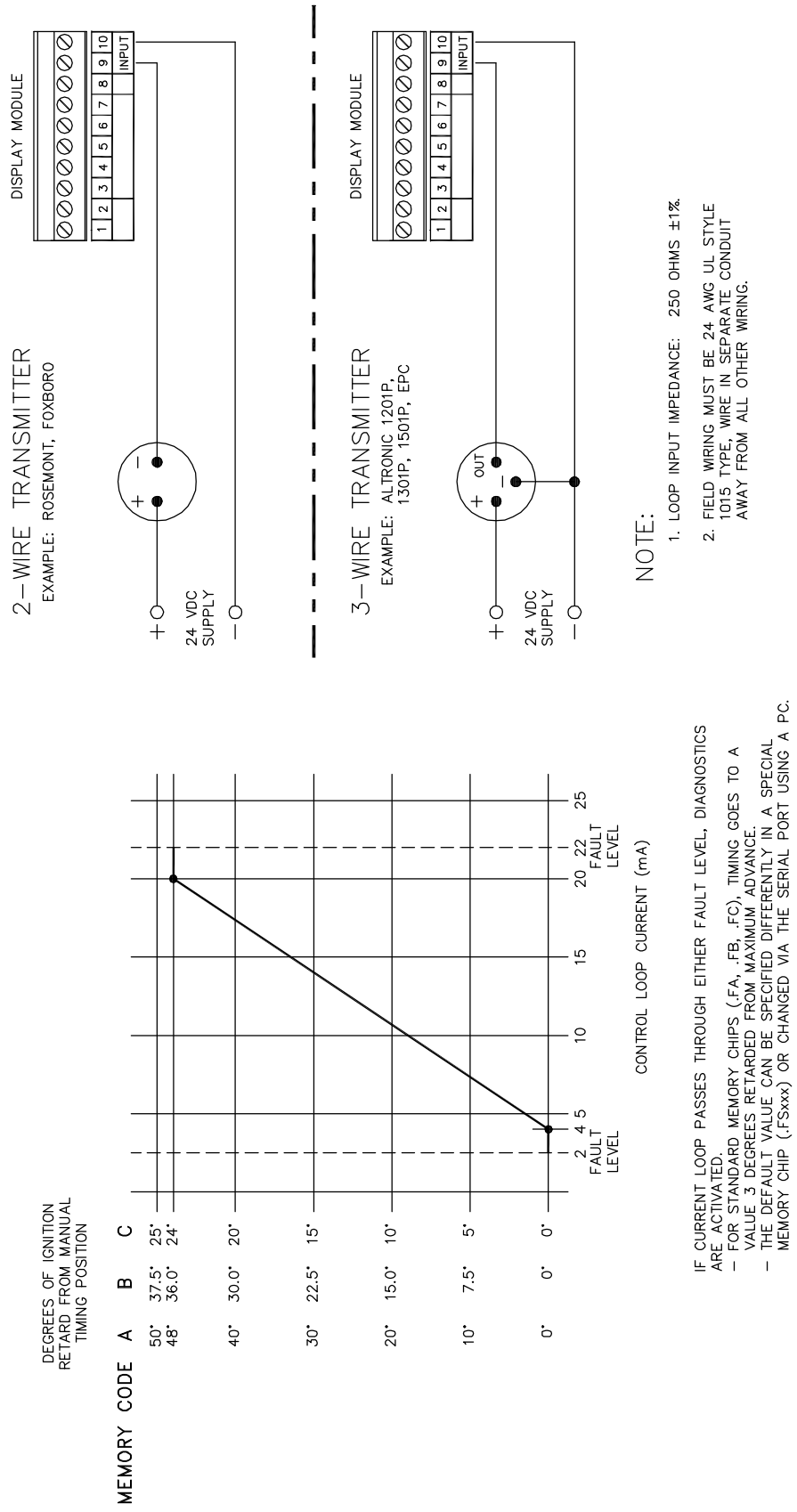


FIG. 15 MAGNET ASSEMBLY SALES DRAWING

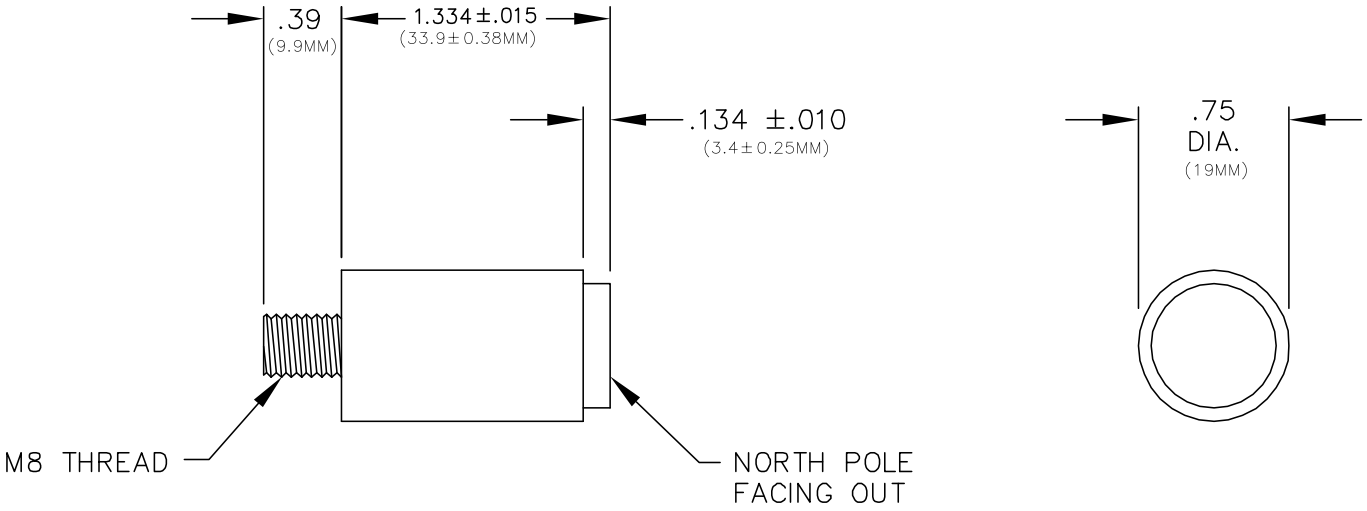


FIG. 16 MAGNET ASSEMBLY SALES DRAWING

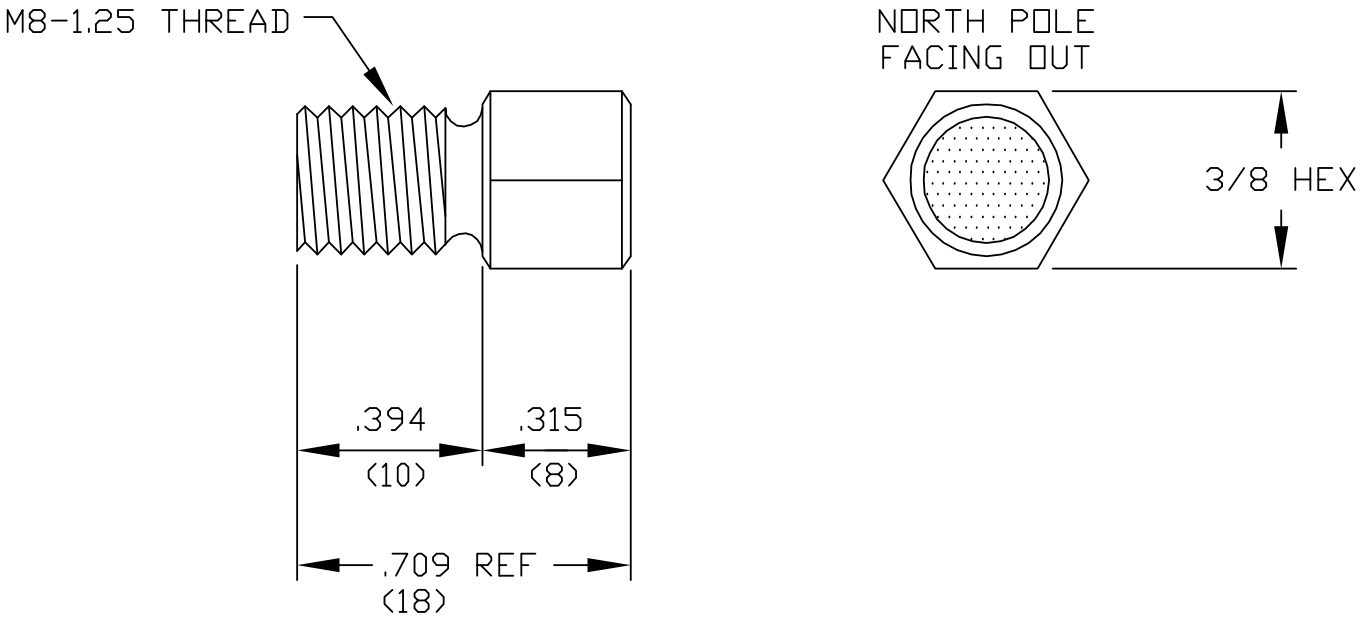
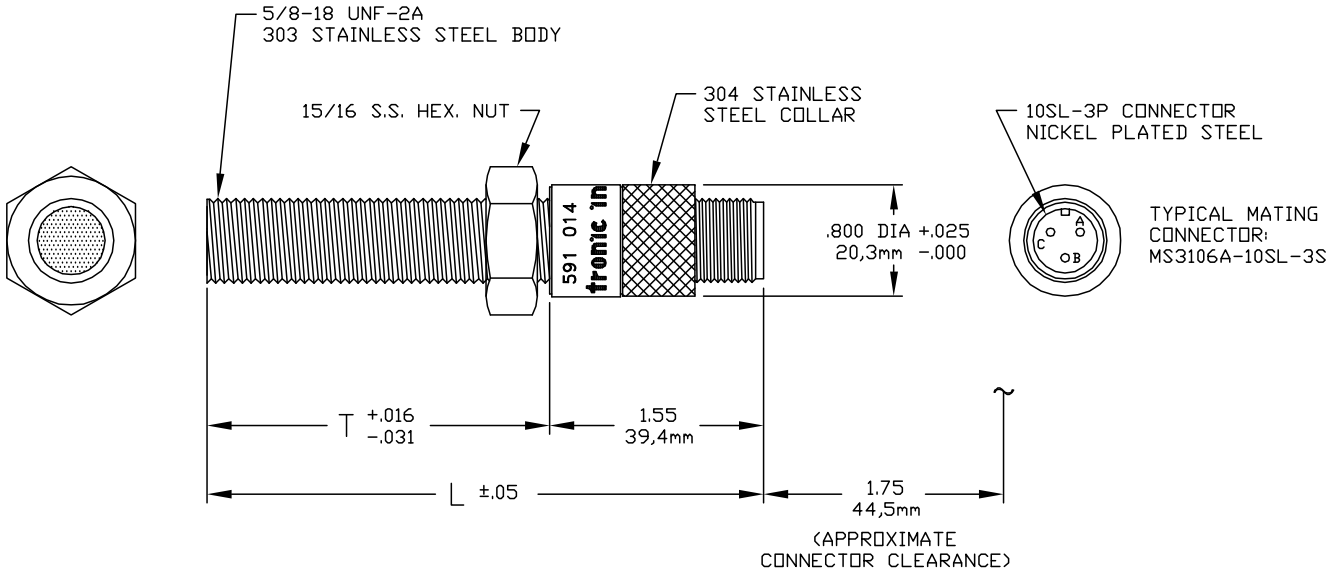


FIG. 17 HALL-EFFECT PICKUP SALES DRAWING

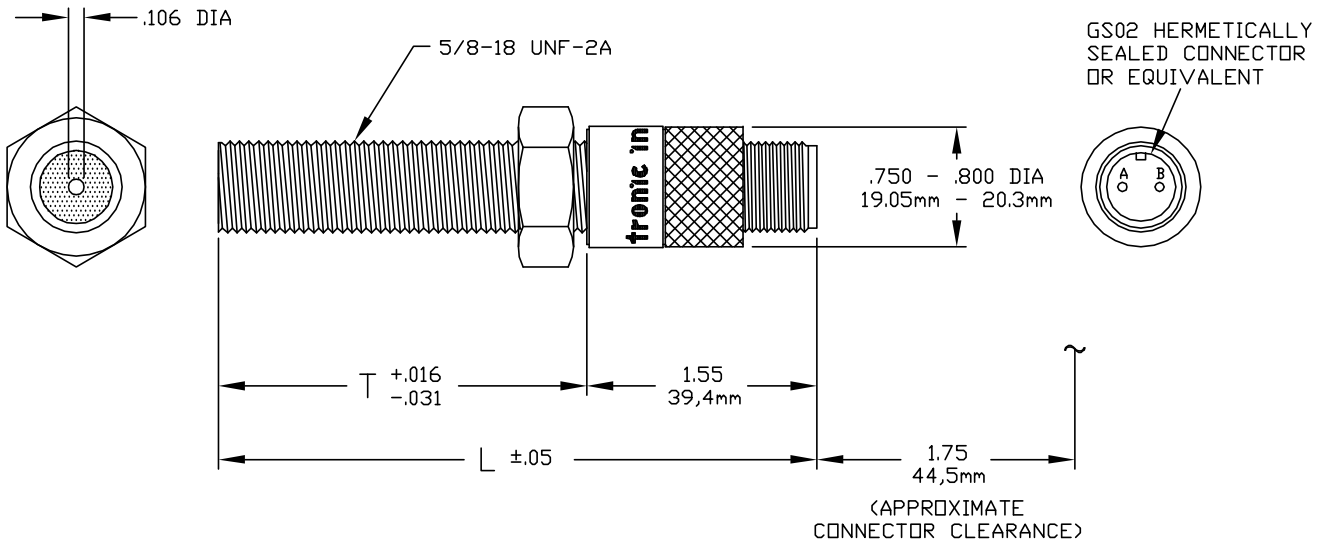
ALTRONIC P/N	T	L
591014-2	2.50"/63,5mm	4.05"/102,8mm
591014-4	4.50"/114,3mm	6.05"/153,7mm

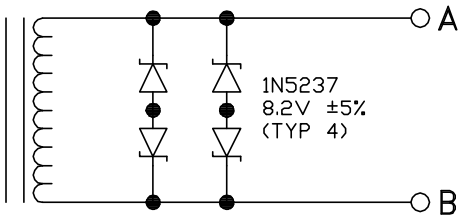


NOTE:

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. 18 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	800-1200 Ω

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. 19 IGNITION MODULE MOUNTING DIMENSIONS

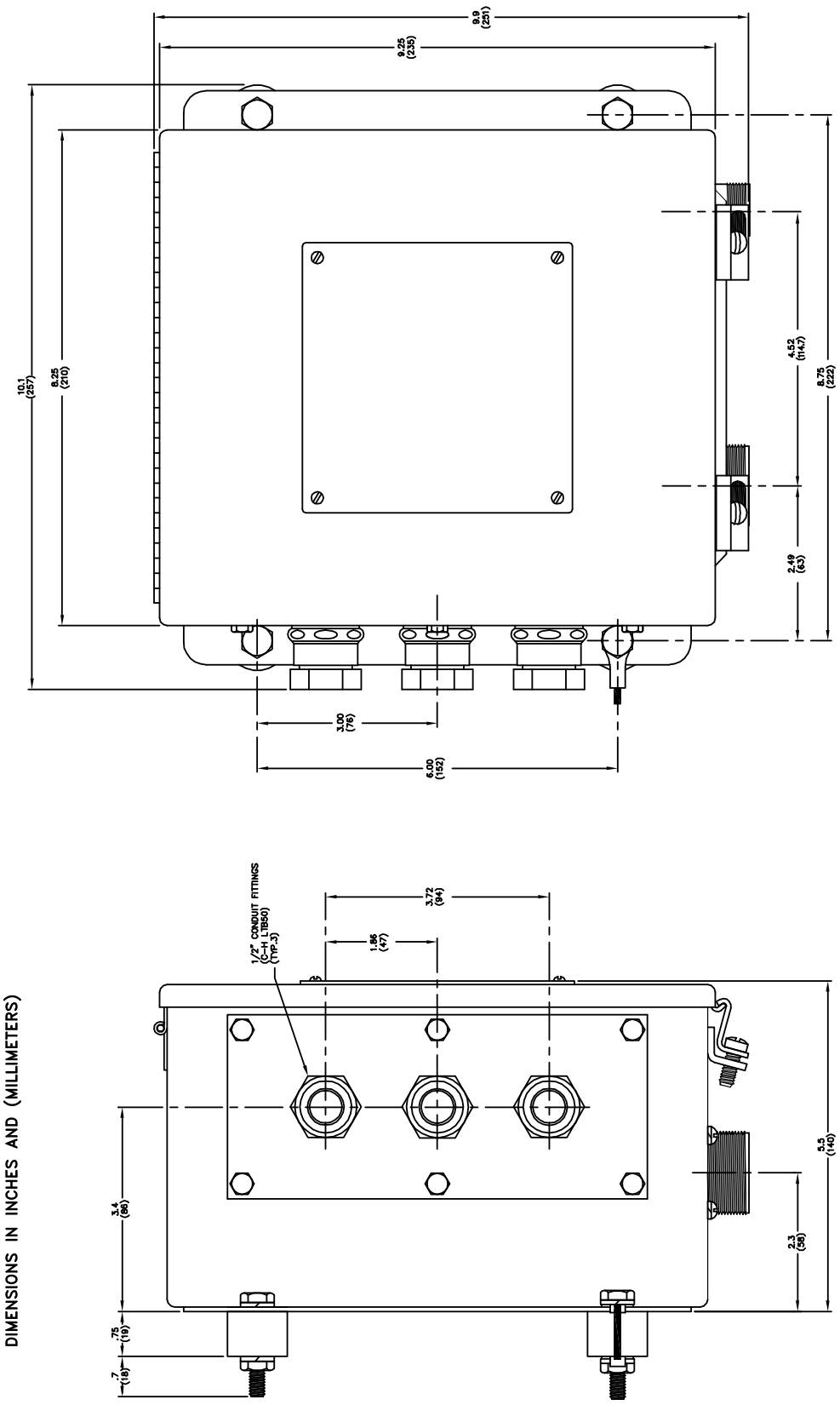


FIG. 20 DISPLAY MODULE MOUNTING DIMENSIONS

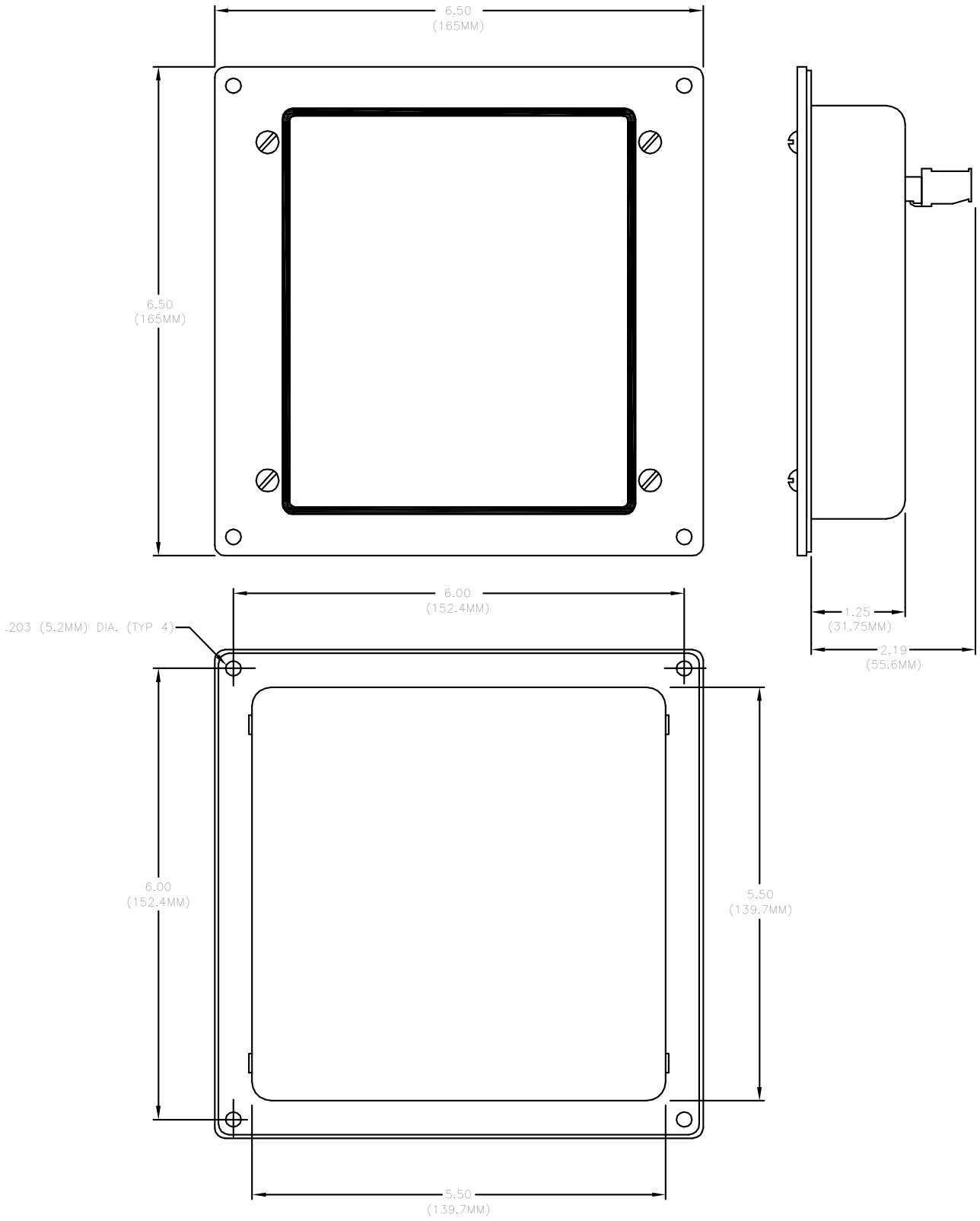


FIG. 21 NEMA 3R ENCLOSURE MOUNTING DIMENSIONS

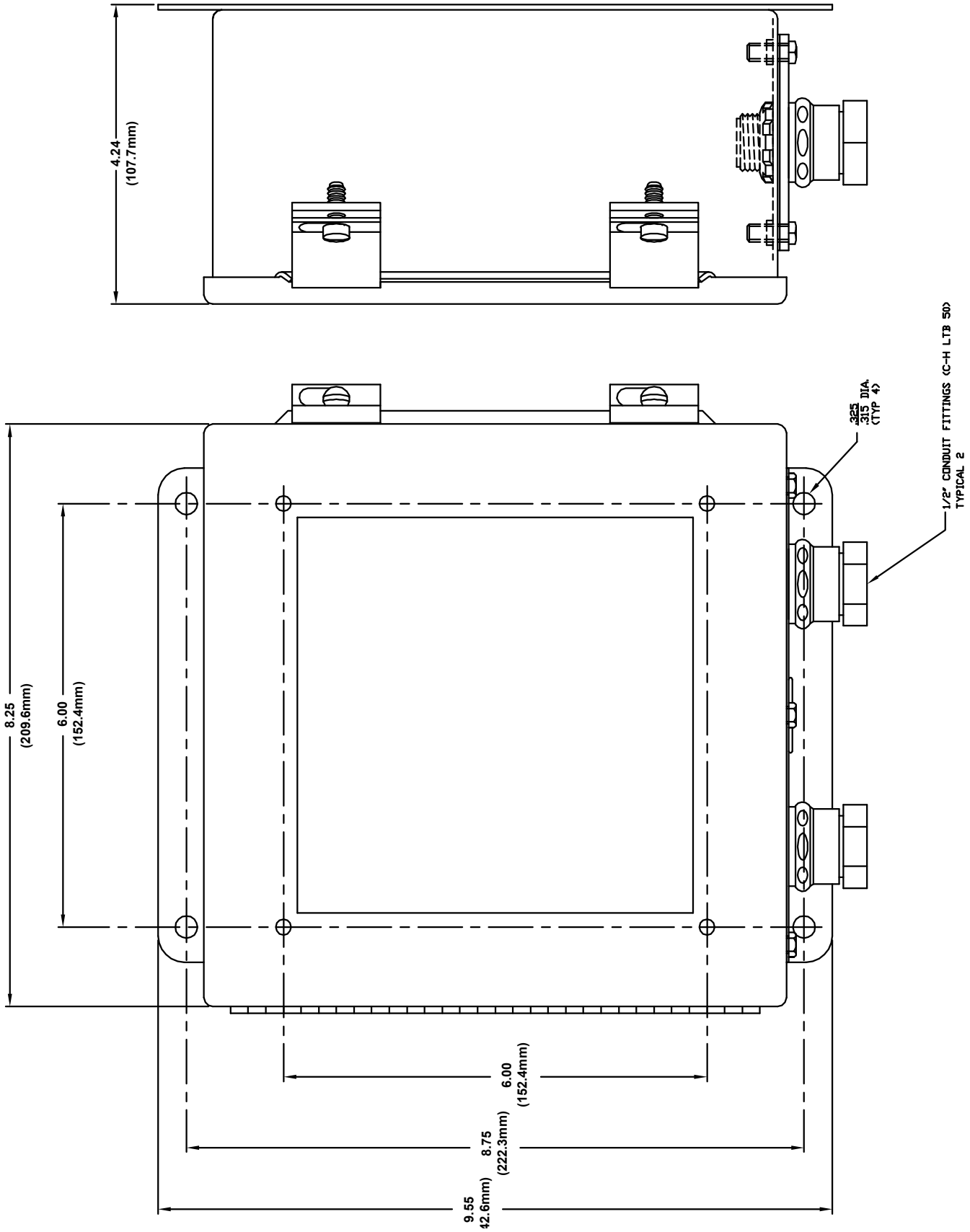


FIG. 22 CPU-95EVS LAYOUT FOR USE WITH EIS SYSTEM