

INSTALLATION INSTRUCTIONS

HYPERFUEL VALVE FUEL CONTROL SYSTEM

FORM HYPERFUEL II 3-06



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 HyperFuel Valve fuel control system is a microprocessor-based electronic system applicable to slow speed, stationary engines. The system features crankshaft-triggered timing accuracy and the capability to vary engine speed electronically by several means, including an external 4-20 mA control signal. The system is field-programmable and offers a variety of advanced control, emissions reduction, monitoring, diagnostic, and engine protection features. The HyperFuel Valve system consists of three main parts; a user interface Logic Module, an engine mounted Power Module and engine mounted Distributor Module.



1.2 The system is capable of outfitting applications requiring up to 20 individual outputs.

1.3 The Logic Module 291200-1 has an alphanumeric LCD display showing the operating status, engine RPM, valve on time, current loop input value and valve timing. Additional display screens show set-up and diagnostic information.



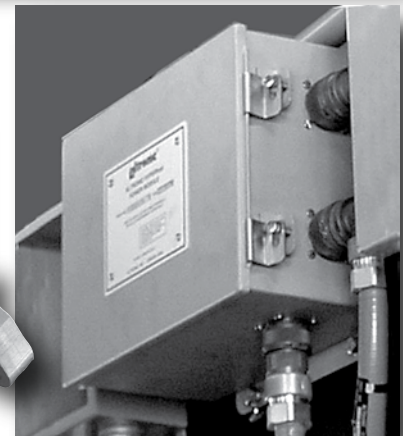
1.4 To allow for a simple and economical installation, the HyperFuel Valve controller utilizes standard Altronic magnetic pickups, Hall-effect pickup and trigger magnet, pickup cables, primary wiring harness(es) and junction box(es).

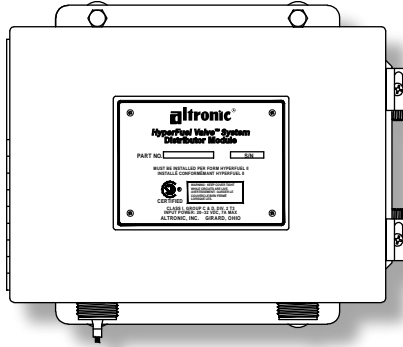
1.5 Power requirement is 24 Vdc, 10 amperes. For all applications, a minimum of a 10 ampere power supply should be installed.

For details, **REFER TO SECTION 10.4** and **FIGURE 5**.



WARNING: THE HYPERFUEL VALVE SYSTEM MUST BE CONFIGURED PRIOR TO USE ON AN ENGINE. REFER TO SECTION 9.5 OF HYPERFUEL VALVE OPERATING INSTRUCTIONS (FORM HYPERFUEL OI 3-06) TO VIEW THE CURRENT CONFIGURATION. VERIFY EEPROM PROGRAMMING PRIOR TO STARTING ENGINE.





5.0 MOUNTING THE DISTRIBUTOR MODULE

5.1 SEE FIGURE 13 FOR DIMENSIONS

The mounting requirements are the same as the Power Module.

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

6.0 MOUNTING FLYWHEEL GEAR/DRILLING FLYWHEEL HOLES

6.1 The Altronic HyperFuel Valve system requires a source of angular position pulses from the engine crankshaft. This can be a flywheel ring gear, a separately provided gear 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"

SEE FIGURE 1 AND FIGURE 2

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 near the most advanced firing position desired for no. 1 cylinder. The pickups must be mounted to rigid brackets to maintain an air gap of .015" \pm .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 1

8.0 MOUNTING THE FLYWHEEL RESET PIN

8.1 Set the engine with no. 1 cylinder six (6) degrees ahead of the most advanced fueling 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) 1/4"-20 bolt or stud. SEE FIGURE 1

8.2 Rotate the engine to the original set point and adjust the air gap between the end of the reset pin and the magnetic pickup at .010" using a feeler gauge.

HYPERFUEL VALVE FUEL CONTROL SYSTEM

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

9.1 The trigger magnet (260604, 260605 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 8, FIGURE 9** or **FIGURE 17** for details. The magnet **MUST** rotate on a diameter **NOT EXCEEDING**:

- **6 INCHES (150 MM) FOR MAGNET 720002, OR**
- **15 INCHES (375 MM) FOR MAGNET 260604 OR 260605**

9.2 Set the engine on the COMPRESSION stroke of no. 1 cylinder with the reset pin **DIRECTLY OPPOSITE** the reset pickup. The Hall-effect pickup (591014-x) must be mounted **DIRECTLY OPPOSITE** the trigger magnet (**SECTION 8.1**) coincident with the reset pickup and pin being lined-up.

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.

10.0 LOGIC MODULE ELECTRICAL HOOK-UP

10.1 The power connections to the HyperFuel Valve system must be in accordance with the National Electrical Code or other applicable country code. The logic module is suitable for installation in Class I, Division 2, Group D locations.

10.2 The Logic Module must have its own 24 Vdc power connection. Although the device has internal protective fuses (3 amp), an external fuse near the power source is recommended. **SEE SECTION 12** for other details regarding powering the HyperFuel Valve system.

10.3 Power wiring and signal (transducers) wiring must be in separate conduits and conduit entries into the Logic Module to avoid undesired electrical interaction. All conduit entries are sized for a ½"–14 NPT male conduit fitting. Separate as follows (**SEE FIGURE 6**):

RIGHT CONDUIT ENTRY POWER WIRING AND CABLE 293030-XX TO DISTRIBUTOR MODULE

CENTER CONDUIT ENTRY MAGNETIC PICKUPS AND HALL-EFFECT PICKUP

LEFT CONDUIT ENTRY CONTROL INPUTS, SERIAL COMMUNICATIONS, AND ALARM OUTPUTS

10.4 RIGHT ENTRY:

Input power supply wires (16 AWG minimum) should enter the right conduit entry and connect to the 24 Vdc supply terminals of terminal block. The interface cable 293030-xx connecting the Logic Module with the Distributor Module also enters through the right conduit entry. **SEE FIGURE 6** and **FIGURE 10** for connection details.



CAUTION: DO NOT MISTAKE THE BROWN (PIN "D") AND LIGHT BROWN (PIN "S") WIRES.

4-CYCLE ENGINE ONLY: The cable from the Hall-effect pickup also enters through the center entry and connects as **SHOWN IN FIG 6**.

NOTE: SHUTDOWN INPUT is a 5-volt, low-level signal.

NOTE: MISC INPUT is a 5-volt, low-level signal.

10.5 CENTER ENTRY:

Run a separate conduit for the two (2) magnetic pickup cable assemblies. These should enter through the center entry in the HyperFuel Valve box and terminate as **SHOWN IN FIGURE 6**.

10.6 LEFT ENTRY:

A separate conduit must be used to the left-hand entry for all connections to the user interface terminal strips in the Logic Module. Use 24 AWG, UL style 1015 wire or shielded cable for these connections; the 24 AWG wire is available from Altronic under part no. 603102 (black) or 603103 (white).

A. SHUTDOWN INPUT (terminal 4):

Use to stop the ignition for engine shutdown. This input is open for normal operation of the system and is connected to engine ground to inhibit ignition firings.

B. ALARM OUT (terminal 5), SHUTDOWN OUT (terminal 6), FUEL CONFIRM OUT (terminal 7):

Three output switches are available for monitoring ignition system status. Each output consists of a solid state switch normally closed to a single common rail COMMON OUT (terminal 8). The switches are rated 75 mA @ 100 Vdc. These output switches are electrically isolated from all other terminals. The recommended hook-up is **SHOWN IN FIGURE 6**. For operational details, refer to the HyperFuel Valve system Operating Instructions, form HyperFuel Valve OI.

C. 4-20 MA CONTROL INPUT:

The 4-20 mA timing control loop connects to terminals 9(+) and 10(-). This input is electrically isolated from all other terminals. **SEE FIGURE 6**

D. MISC INPUT (terminal 11):

Provides for control of various user selected features. This input is normally open; connect to engine ground to activate the selected feature. **SEE FIGURE 6**

HYPERFUEL VALVE FUEL CONTROL SYSTEM

11.0 POWER AND DISTRIBUTOR MODULE ELECTRICAL HOOK-UP

11.1 All required connections to the HyperFuel Valve Power Module are made through harnesses using multi-pin, threaded connectors.

11.2 17-PIN CONNECTOR:

The 293030-xx series cable plugs into the 17-pin connector on the bottom panel (right) of the Distributor Module. The bottom panel (left) 14-pin connector requires cable 293033-xx which connects to the 14-pin connector on the Power Module. Insert the connector into the module receptacles and tighten hand-tight; then carefully tighten an additional one-sixth turn with a wrench.

11.3 19-PIN CONNECTOR(S):

REFER TO SECTION 13.1 for hookup details for the output connector(s) of the Distributor Module.

NOTE: SEE SECTION 12.0 for details of the DC power connection to the Power and Distributor Modules.

12.0 DC POWER HOOKUP - 293030-XX CABLE

12.1 The power connections to the HyperFuel Valve system must be in accordance with the National Electrical Code or other applicable country code. The HyperFuel is suitable for installation in Class I, Division 2, Group D locations.

12.2 It is necessary to split the control cable and power leads of the 293030-xx cable in an engine-mounted junction box or conduit tee. This box should be separate from the main junction box used to terminate the output harness(es) to the fuel valves.

The junction box (**REFER TO FIGURE 3**) should have three (3) ½" conduit entries:

1ST ENTRY: CONDUIT FITTING OF 293030-XX SERIES CONNECTING CABLE FROM THE DISTRIBUTOR MODULE.

2ND ENTRY: TWO LEADS FROM A SOURCE OF NOMINAL 24 VDC (24-28 VDC). THE NEGATIVE OF THE 24 VDC SUPPLY MUST BE COMMON WITH ENGINE GROUND. REFER TO FIGURE 5 FOR DETAILS OF THE POWER HOOKUP.

3RD ENTRY: THE GRAY JACKETED CONTROL CABLE FROM THE 293030-XX SERIES CABLE CONNECTING TO LOGIC MODULE.

12.3 The HyperFuel Valve system can be powered in one of two ways:

- 24 VOLT BATTERY WITH CHARGER
- DC POWER SUPPLY CAPABLE OF FURNISHING 24-28 VDC. A MINIMUM CURRENT CAPABILITY OF 10 AMPS IS REQUIRED. **SEE FIGURE 5**

NOTE: The negative (-) of the 24 Vdc supply MUST BE COMMON WITH ENGINE GROUND. Engines using positive ground DC accessories or starter motors will require a separate, dedicated power supply for the HyperFuel Valve system.



WARNING:

ALTHOUGH THE DEVICE HAS INTERNAL PROTECTIVE FUSES (30 AMP), TWO EXTERNAL 50 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.

IMPORTANT!

For proper operation of the HyperFuel Valve system, voltage and current supplied must be sufficient during all selected modes of operation. **FIGURE 5 PROVIDES DETAILS** regarding the DC power hook-up:

1. **CURRENT DRAW PER SYSTEM** – formula varies depending on number of outputs used, engine cycle and RPM.
2. **MINIMUM WIRE GAUGE REQUIREMENTS** – **CHART 1 OF FIGURE 5** gives the requirement vs. the length of run between the power source and the HyperFuel Valve Power 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.

13.0 PRIMARY WIRING

13.1 The main wiring harness (293023-x, 293026-x, or 293027-x) connects the Distributor Module to the engine junction box. If it is desired to shorten the conduit length of the harness, **SEE FIGURE 14**. Insert the connector into the Altronic HyperFuel Valve Distributor Module receptacle and tighten hand-tight; then carefully tighten an additional one-sixth turn with a wrench.

FOR DISTRIBUTOR MODULE 291220-1 SEE FIGURE 4
(x1 = connector 1; x2 = connector 2)

Connector:	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
Engine:										
Connector:	F1	F2	K1	K2	L1	L2	M1	M2	N1	N2
Engine:										

NOTE: Terminal strips should be capable of handling no. 12 gauge or larger stranded wire and 50 Amp peak current pulses with minimal losses.

13.2 Connect the harness leads in the junction box in accordance with the engine's firing order. Screw-type terminals are recommended. The leads from the junction box corresponding to the above system outputs connect to the fuel valve coil positive (+) terminals. The "J" lead and the common valve ground lead(s) connecting the negative (-) terminals of the valve coils must be grounded to the engine in the junction box. On V-engines, run a separate common ground lead for each bank. Separate ground connections in the junction box are recommended.

HYPERFUEL VALVE FUEL CONTROL SYSTEM

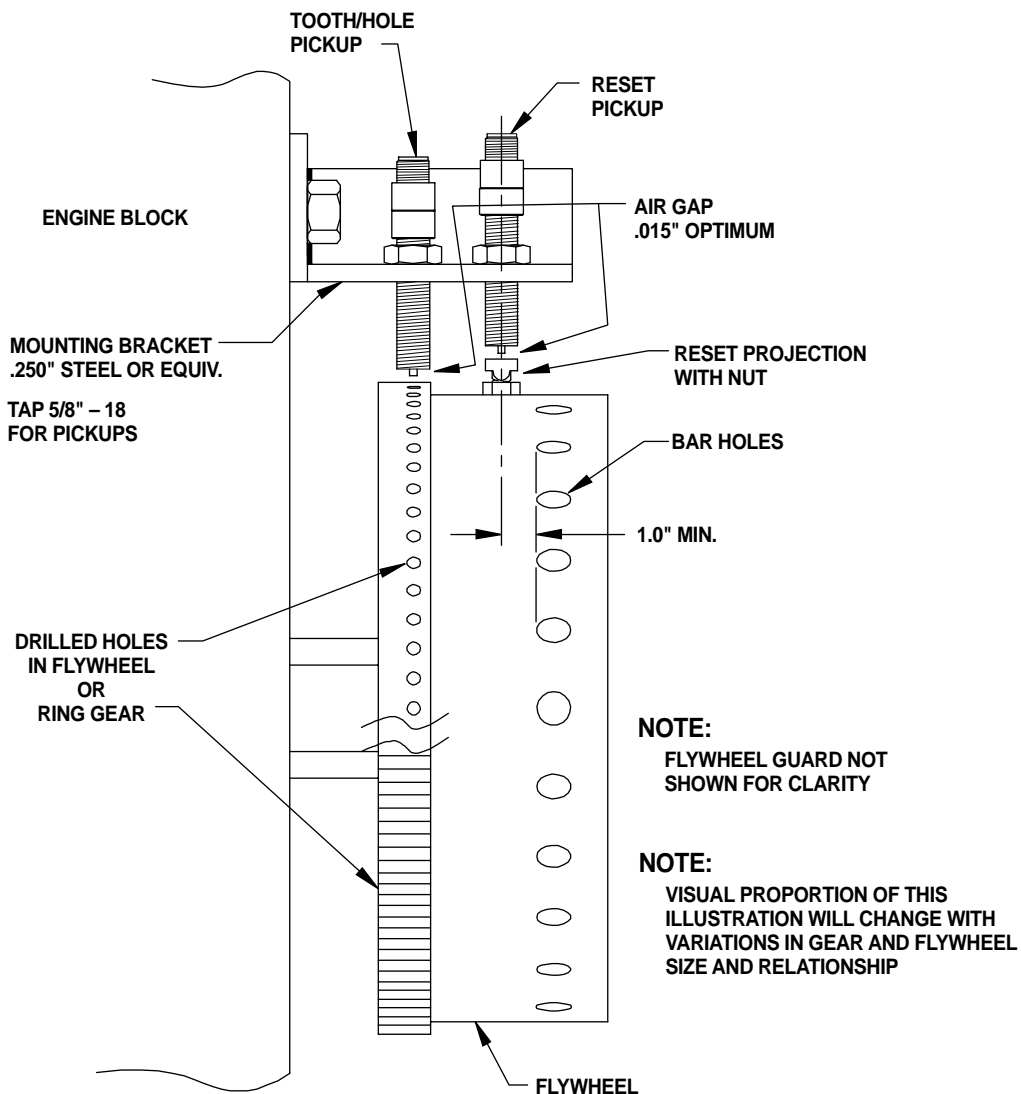
13.3 Primary wire should be no. 12 gauge stranded, tinned copper wire or heavier. The insulation should have a minimum thickness of .016" and be rated 105° C. or higher. PVC or polyolefin insulations are recommended. Belden 9912 or equivalent meets these specifications. All primary wiring should be protected 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.

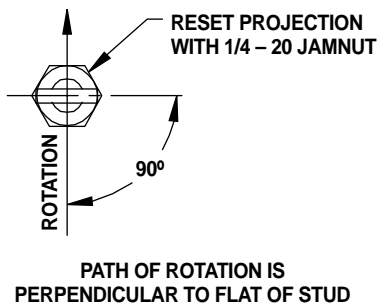
14.0 SHUTDOWN WIRING

14.1 To shut-off the DC-powered HyperFuel Valve system, a special input (SHUTDOWN INPUT – terminal 4) in the Logic Module is provided. This input is open for normal operation and is connected to engine ground to initiate a fuel system shutdown. Use a switch rated 24 Vdc, 0.5 amps. **REFER TO SECTION 10.6A** and **FIGURE 6** for details.

FIG. 1 PICKUP MOUNTING DETAIL



EDGE VIEW



RESET PROJECTION

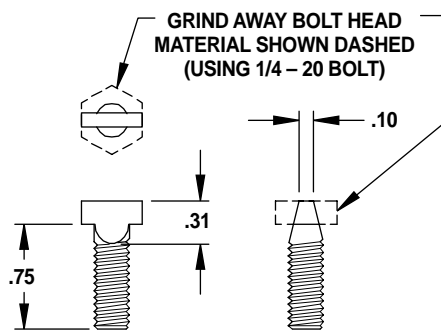
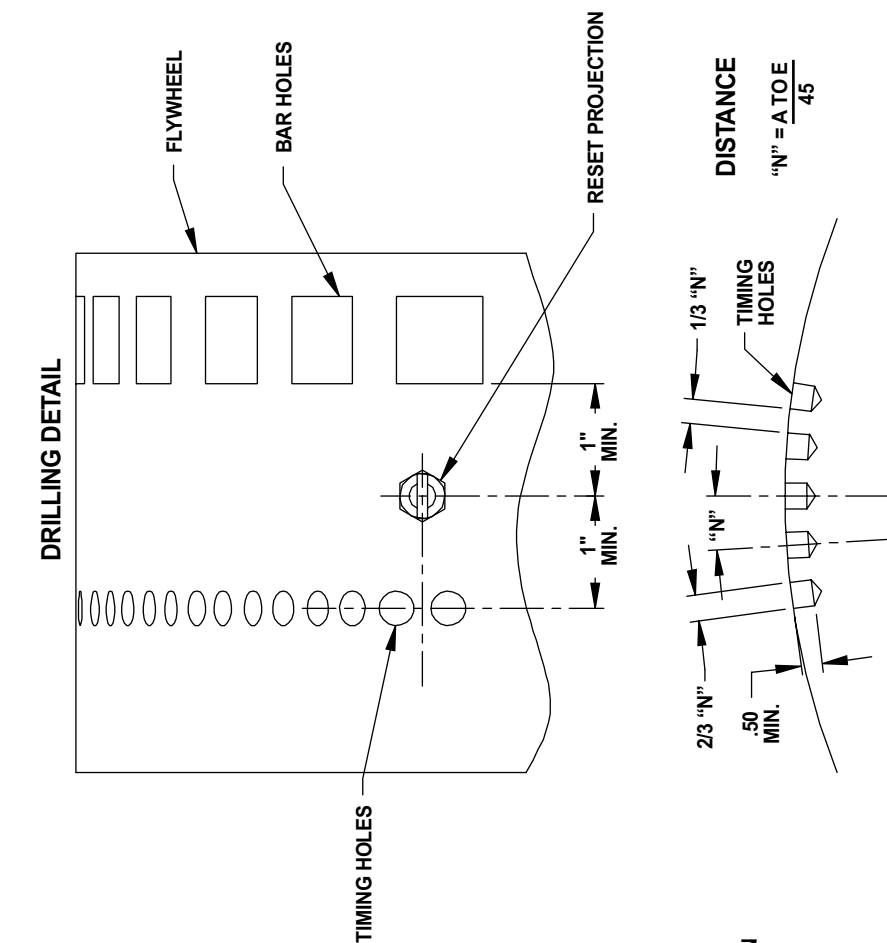


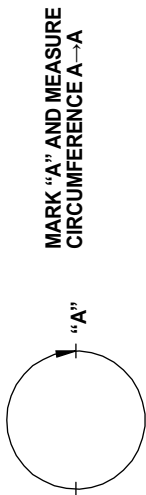
FIG. 2 FLYWHEEL HOLE DRILLING

PROCEDURE FOR DRILLING 360 HOLES IN ENGINE FLYWHEEL

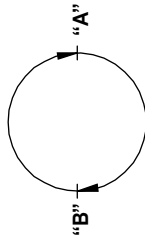


NOTE: IF 2/3 "N" WORKS OUT TO BE BETWEEN STANDARD DRILL SIZES - USE NEXT SIZE LARGER.

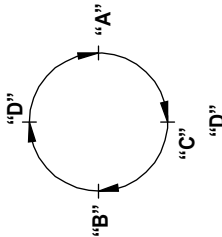
FLYWHEEL LAYOUT



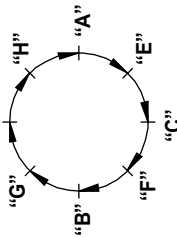
MARK "A" AND MEASURE CIRCUMFERENCE A → A



MEASURE 1/2A → A AND MARK "B"
NOTE: A → B = B → A



MEASURE 1/2A → B AND MARK "C"
MEASURE AND MARK "D" IN THE SAME MANNER

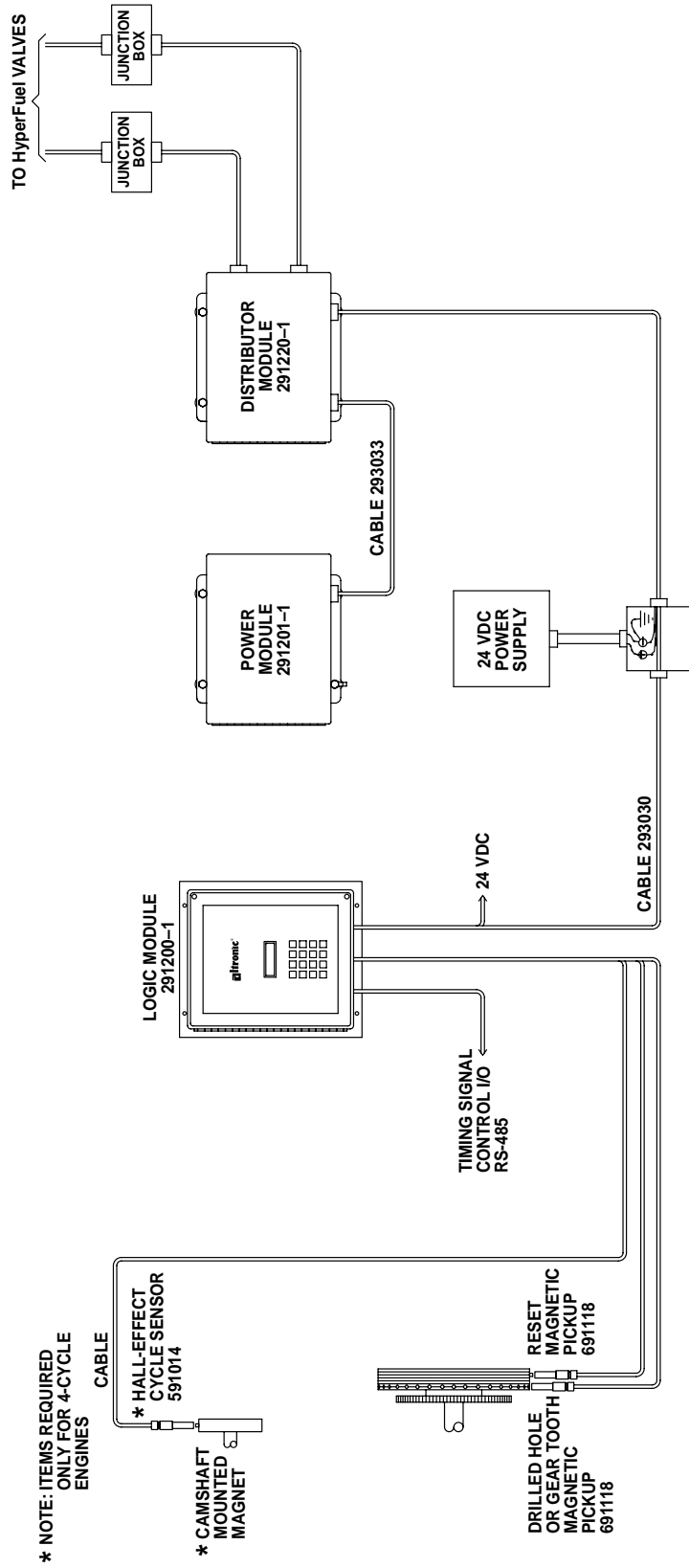


MEASURE 1/2A → C AND MARK "E"
MEASURE AND MARK "F", "G" AND "H" IN THE SAME MANNER

NOTE: CONFIRM INTERVALS BETWEEN MARKS ARE NOW EQUAL

MEASURE THE LENGTH A → E DIVIDE BY 45, AND BEGINNING WITH "A" MARK OFF INTERVALS OF THIS LENGTH TO "E", COUNTING "A" AND "E" THERE SHOULD BE 46 MARKS. DO THE REMAINING 7 SECTIONS IN THE SAME MANNER.

FIG. 3 HYPERFUEL VALVE SYSTEM BASIC LAYOUT



* NOTE: ITEMS REQUIRED ONLY FOR 4-CYCLE ENGINES

* CAMSHAFT MOUNTED MAGNET

DRILLED HOLE OR GEAR TOOTH MAGNETIC PICKUP 691118

HYPERFUEL VALVE FUEL CONTROL SYSTEM

FIG. 4 VALVE HOOK-UP DIAGRAM

NO. OUTPUTS	MEMORY CODE	VALVE DRIVE ORDER
4	D2x, D4x	A1-A2-B1-B2
5	E2A, E4A	A1-A2-B1-B2-C1
6	F2x, F4x	A1-A2-B1-B2-C1-C2
7	G2A, G4A	A1-A2-B1-B2-C1-C2-D1
8	H2x, H4x	A1-A2-B1-B2-C1-C2-D1-D2
9	12A, 14A	A1-A2-B1-B2-C1-C2-D1-D2-E1
10	J2x, J4x	A1-A2-B1-B2-C1-C2-D1-D2-E1-E2
12	L2x, L4x	A1-A2-B1-B2-C1-C2-D1-D2-E1-E2-F1-F2
14	N2x, N4x	A1-A2-B1-B2-C1-C2-D1-D2-E1-E2-F1-F2-K1-K2
16	P2x, P4x	A1-A2-B1-B2-C1-C2-D1-D2-E1-E2-F1-F2-K1-K2-L1-L2
18	R2x, R4x	A1-A2-B1-B2-C1-C2-D1-D2-E1-E2-F1-F2-K1-K2-L1-L2-M1-M2
20	T2x, T4x	A1-A2-B1-B2-C1-C2-D1-D2-E1-E2-F1-F2-K1-K2-L1-L2-M1-M2-N1-N2

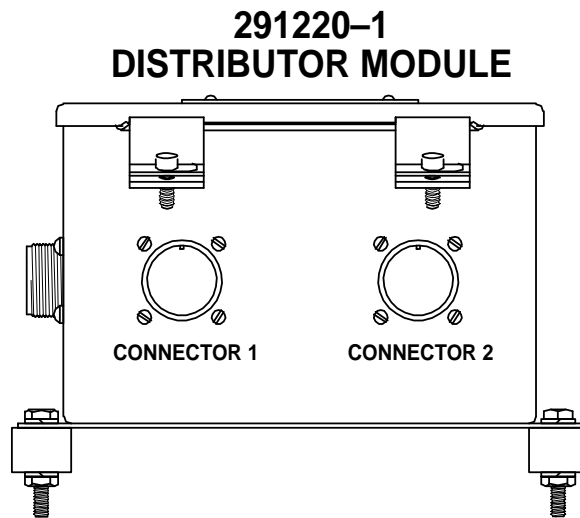


FIG. 5 DC POWER HOOK-UP

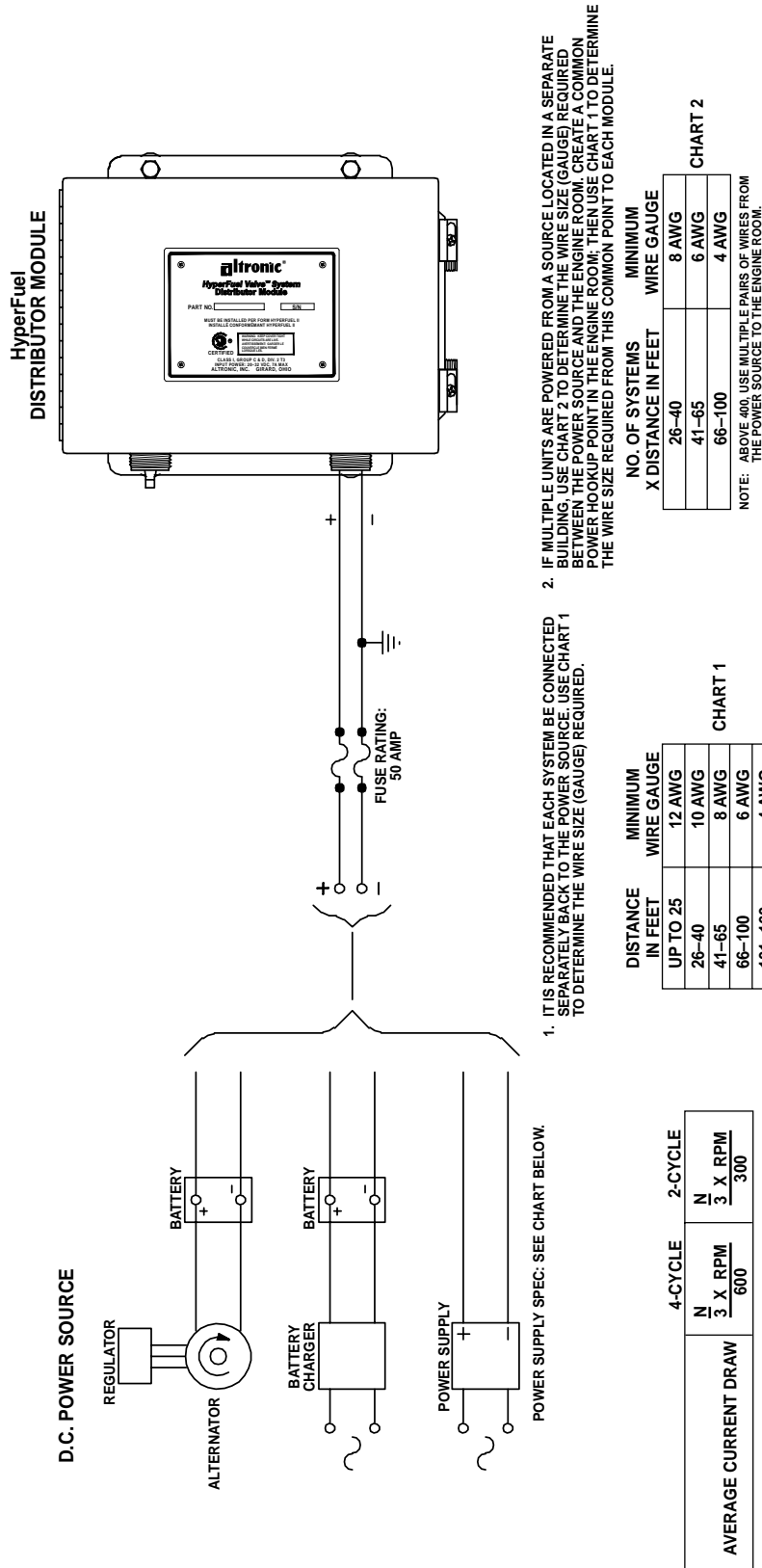
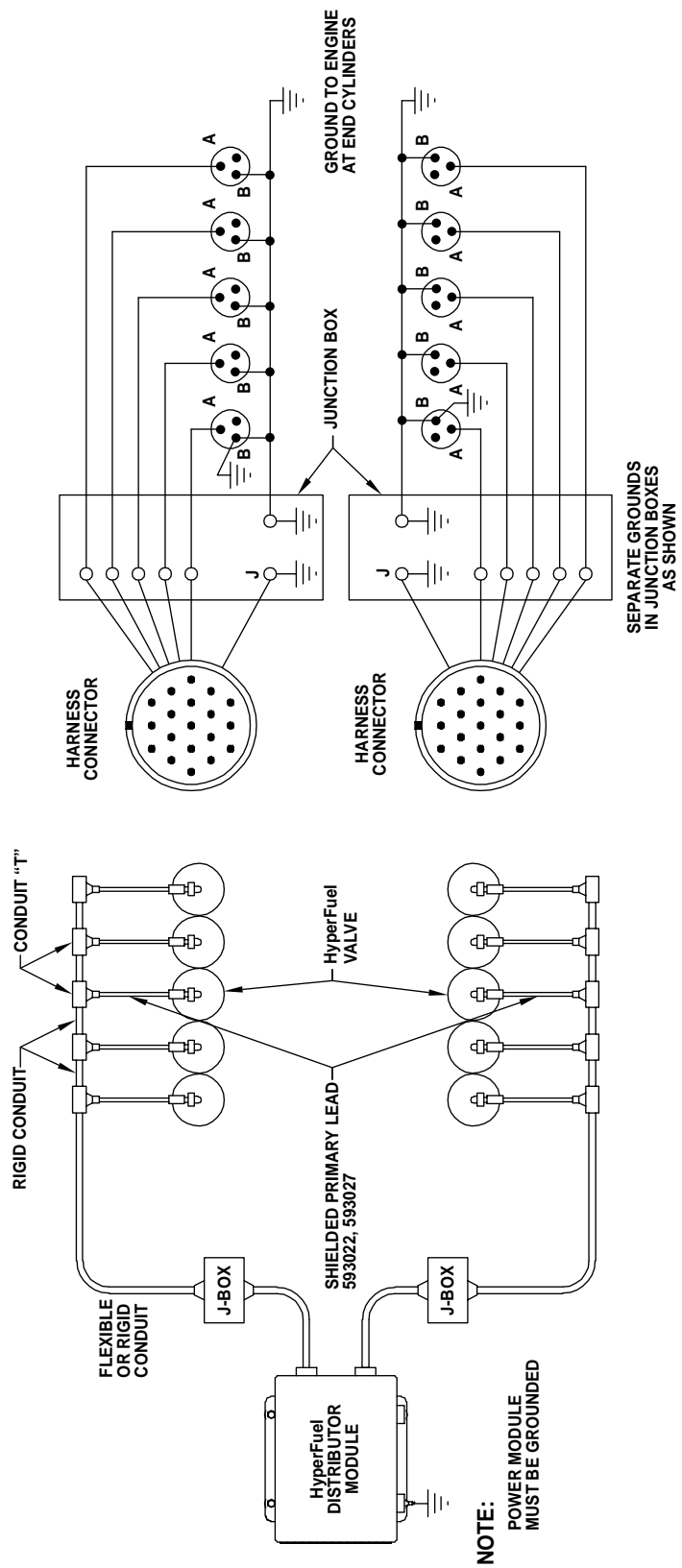


FIG. 7 WIRING DIAGRAM – SHIELDED



HYPERFUEL VALVE FUEL CONTROL SYSTEM

FIG. 8 MAGNET ASSEMBLY

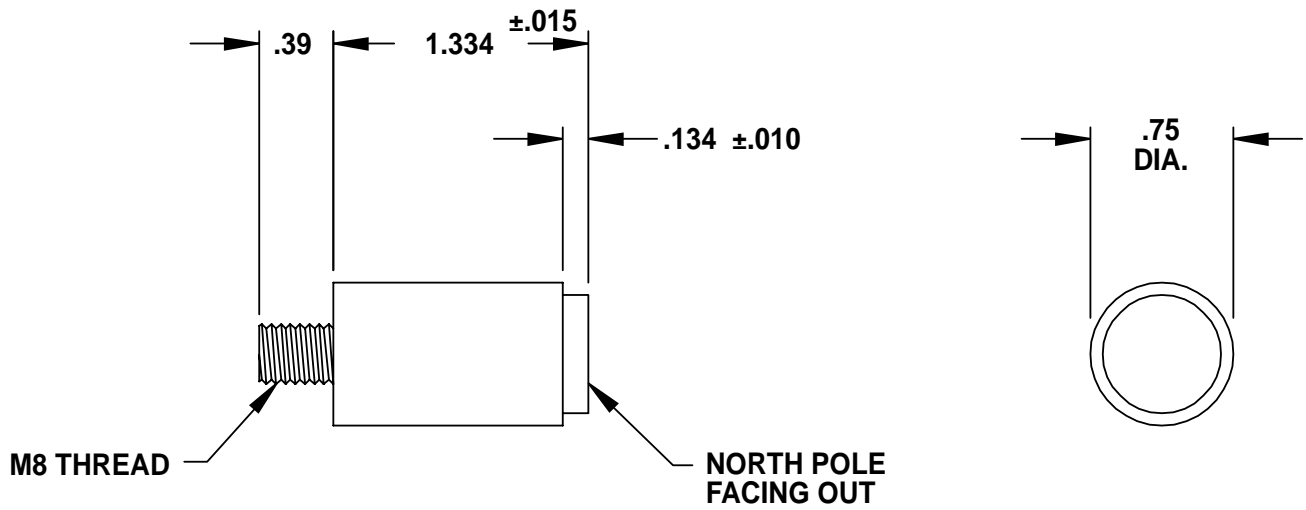


FIG. 9 MAGNET ASSEMBLY, HEX

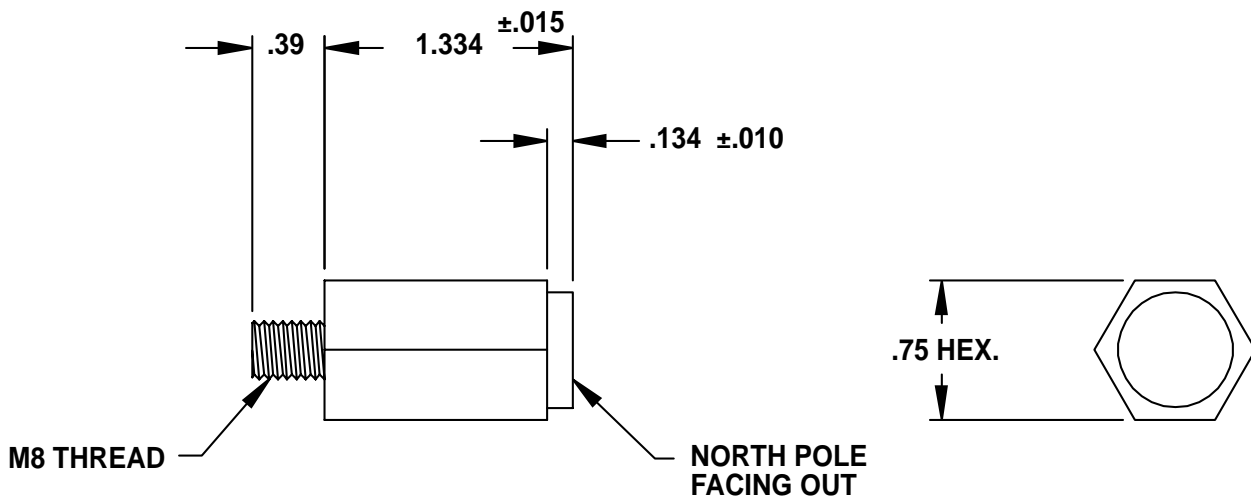
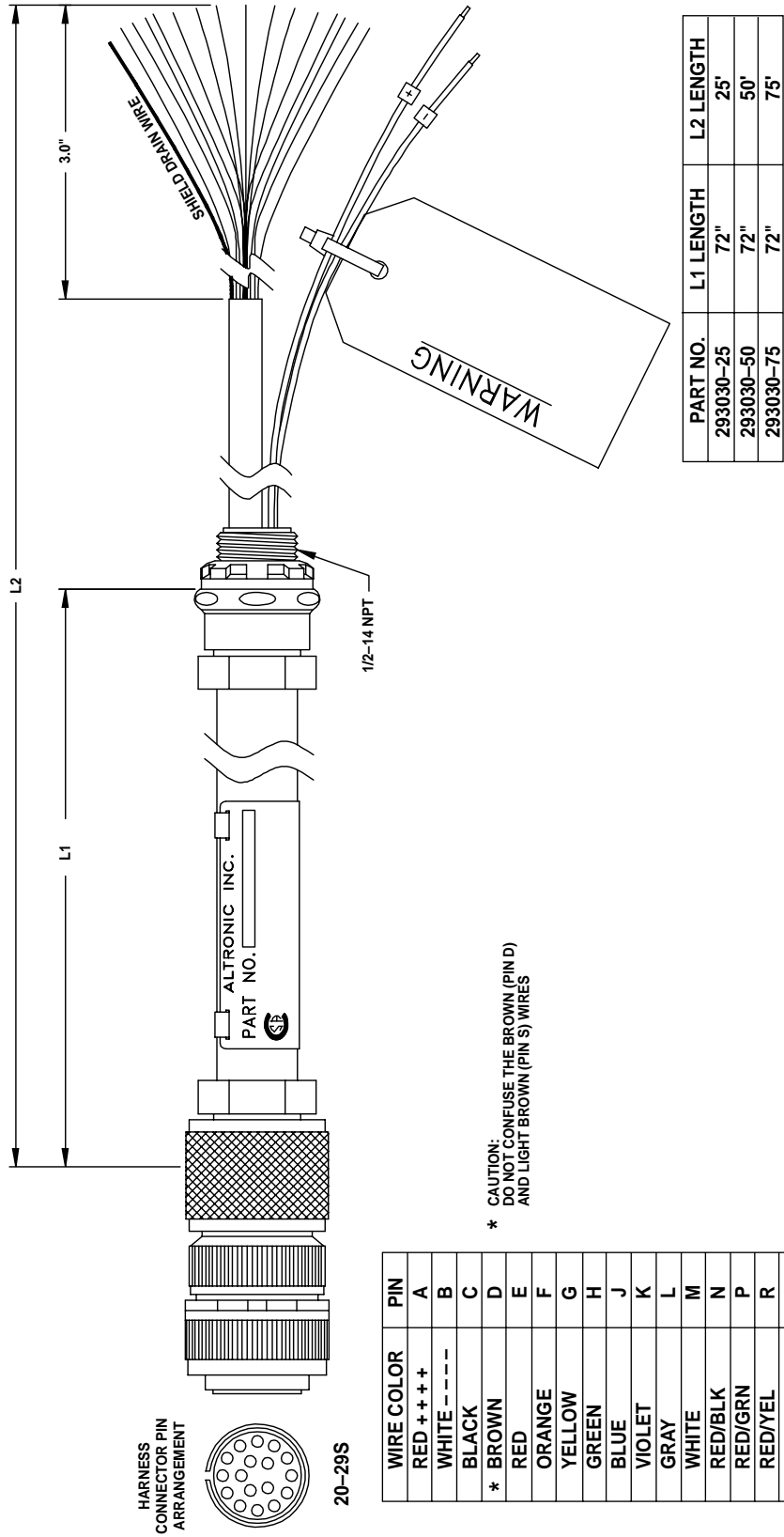


FIG. 10 CABLE ASSEMBLY, SHIELDED P/N 293030-XX



HYPERFUEL VALVE FUEL CONTROL SYSTEM

FIG. 11 POWER MODULE MOUNTING DIMENSIONS

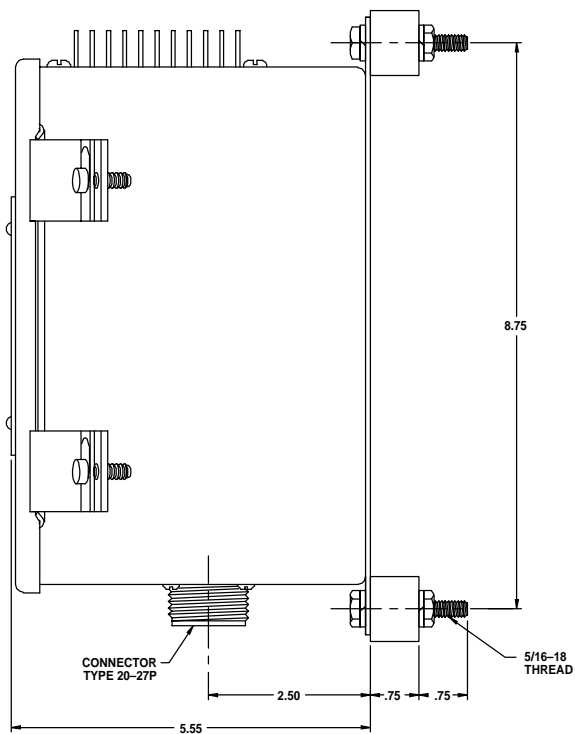
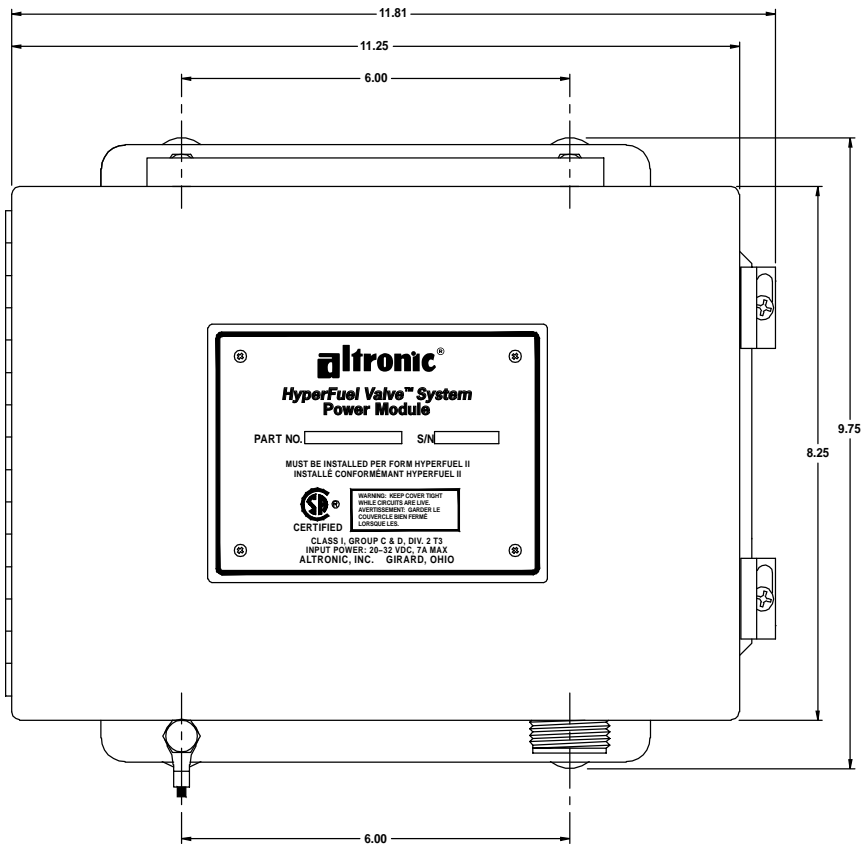
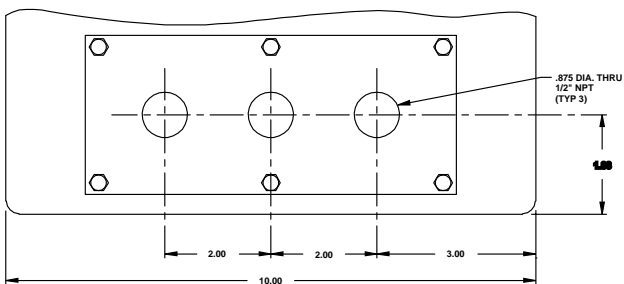
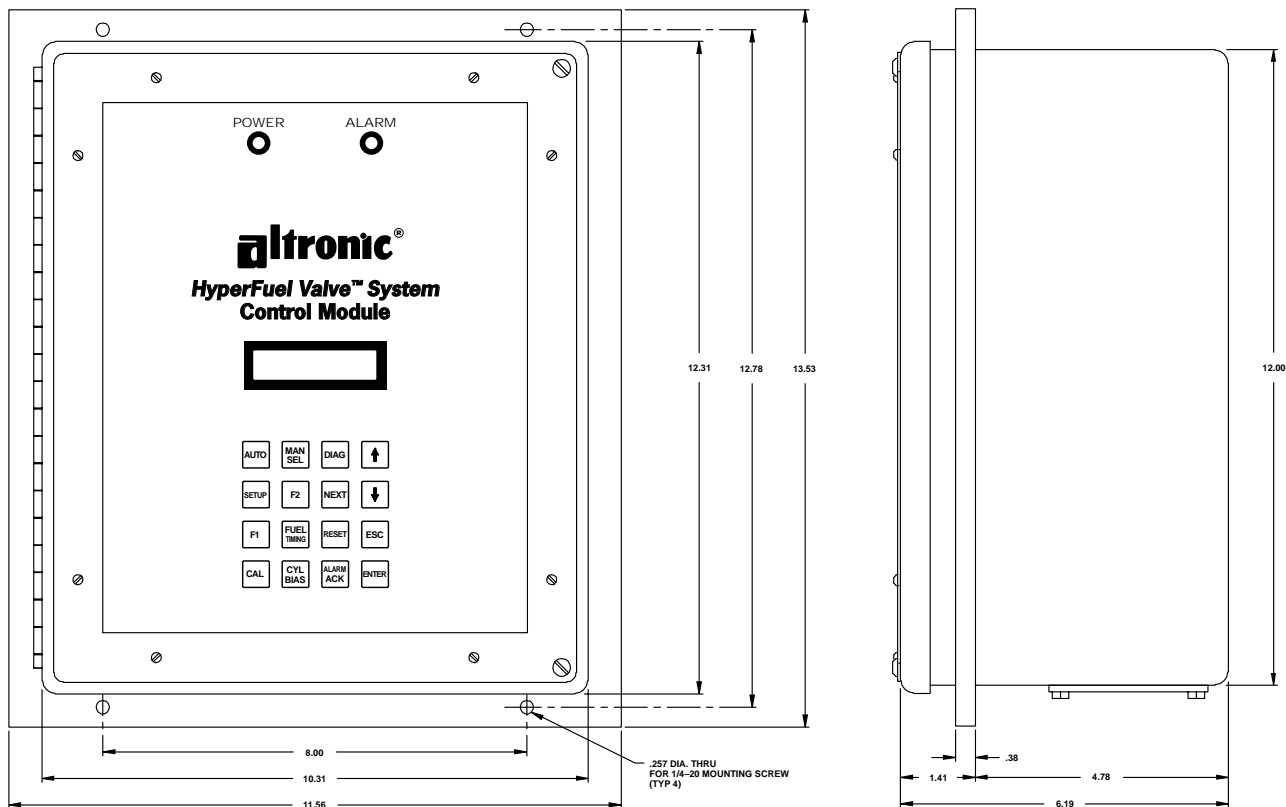


FIG. 12 LOGIC MODULE MOUNTING DIMENSIONS



SPECIFICATIONS

OUTPUTS:

- 3 SOLID-STATE RELAY OUTPUTS (FUEL, ALARM, SHUTDOWN) RATED AT 100 VDC/AC @ 75 mA (SINKING)
- 1 14 LINE DIGITAL BUS (TO OUTPUT MODULE)
- 1 5 LINE DIGITAL BUS (FUTURE EXPANSION MODULE)

INPUTS:

- 1 HALL-EFFECT PICK-UP INPUT
- 2 MAGNETIC PICK-UP INPUTS (GEAR, TOOTH, RESET)
- 1 4-20 mA LOOP INPUT (ISOLATED)
- 2 DIGITAL INPUTS (GROUND TO ACTIVATE) (SHUTDOWN, MULTIFUNCTION CONFIGURABLE)
- 2 RS485 SERIAL COMMUNICATIONS PORTS (CONTROL MODULE, FUTURE EXPANSION MODULE)

DISPLAY: 2 X 16 BACKLIT LCD MODULE

POWER: 20-32 VDC, 10 WATTS

PACKAGE: NEMA 4, WEATHERPROOF ENCLOSURE

FIELD CONNECTIONS: PLUG-IN TERMINAL STRIPS IN BOX ACCESSED VIA PLATE IN BOTTOM

HYPERFUEL VALVE FUEL CONTROL SYSTEM

FIG. 13 DISTRIBUTOR MODULE MOUNTING DIMENSIONS

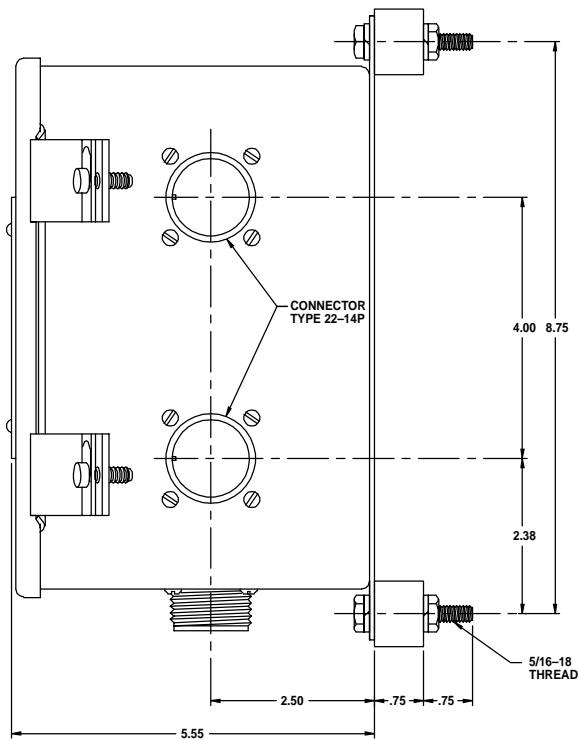
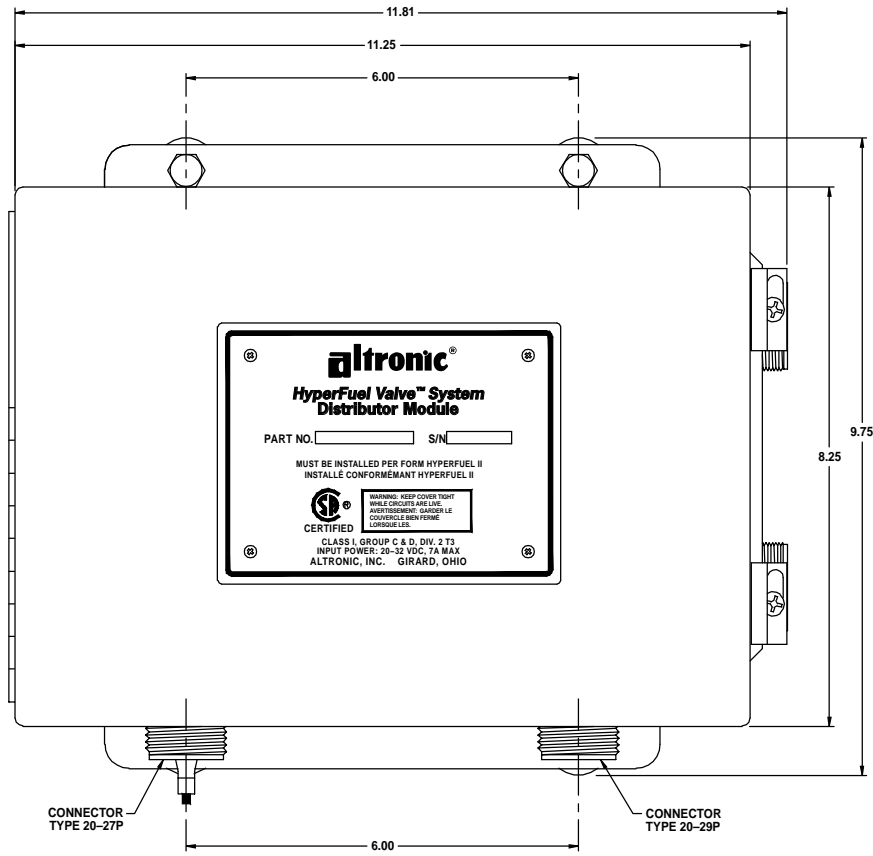
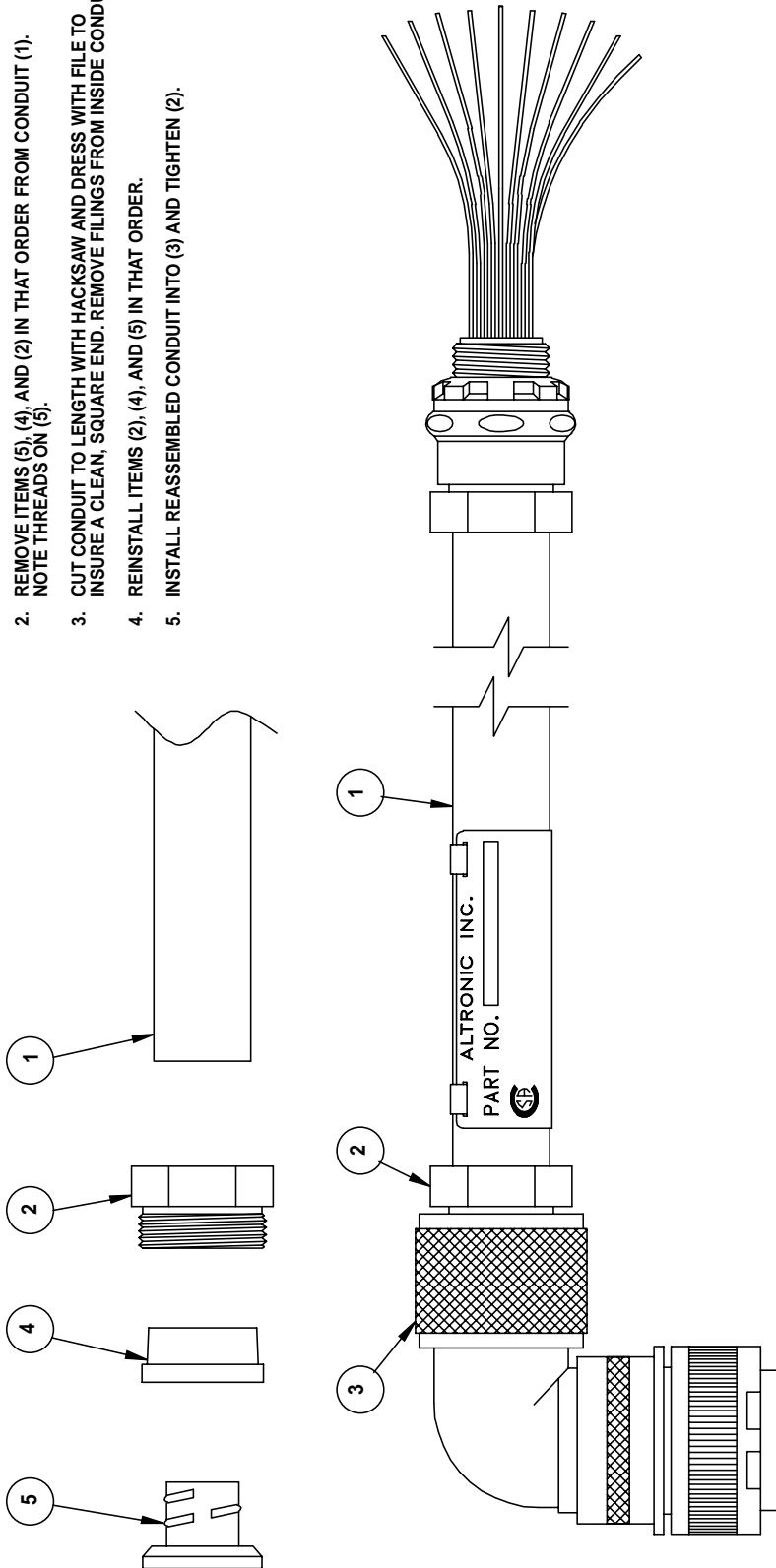


FIG. 14 SHIELDED HARNESS CONDUIT LENGTH ADJUSTMENT

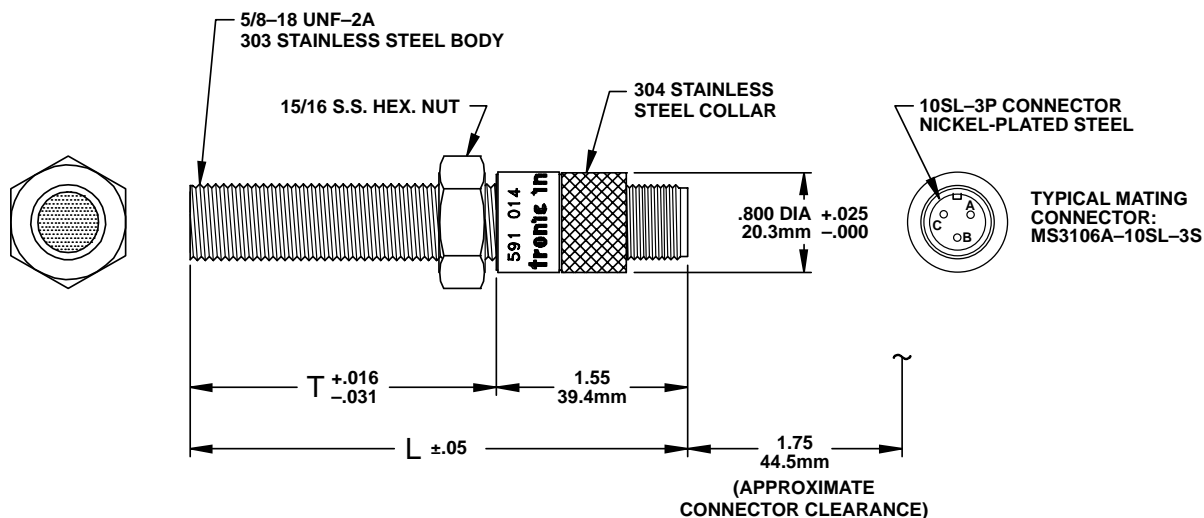
TO SHORTEN HARNESS

1. LOOSEN AND DISENGAGE NUT (2) AND REMOVE CONDUIT (1) COMPLETELY FROM CONNECTOR AND HARNESS ASSEMBLY
2. REMOVE ITEMS (5), (4), AND (2) IN THAT ORDER FROM CONDUIT (1). NOTE THREADS ON (5).
3. CUT CONDUIT TO LENGTH WITH HACKSAW AND DRESS WITH FILE TO INSURE A CLEAN, SQUARE END. REMOVE FILINGS FROM INSIDE CONDUIT.
4. REINSTALL ITEMS (2), (4), AND (5) IN THAT ORDER.
5. INSTALL REASSEMBLED CONDUIT INTO (3) AND TIGHTEN (2).



HYPERFUEL VALVE FUEL CONTROL SYSTEM

FIG. 15 HALL-EFFECT PICKUP



ALTRONIC P/N	T	L
591014-2	2.50"/63.5mm	4.05"/102.8mm
59101-4	4.50"/114.3mm	6.05"/153.7mm

NOTE:

1. NORTH POLE OF MAGNET MUST FACE SENSING END WITH AIR GAP OF .030/.040 (.76/1.0mm).
2. CENTERLINE OF MAGNET'S ROTATION MUST RUN THROUGH CENTERLINE OF PICKUP.

SPECIFICATIONS:

SUPPLY VOLTAGE..... 5 TO 8 VOLTS D.C.

SUPPLY CURRENT..... 50 mA. MAX.

OUTPUT VOLTAGE @ 5 mA. SUPPLY VOLTAGE MINUS 1.0 VOLT MAX.

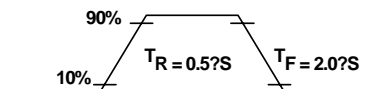
OUTPUT CURRENT SOURCING 10 mA. MAX.

STORAGE AND OPERATING TEMP..... -40° C TO +125° C
-40° F TO +257° F

ENCAPSULATED IN GLASS-FILLED EPOXY SUITABLE FOR ENGINE OIL OR OTHER NON-CONDUCTIVE MEDIA ONLY.

MAXIMUM OPERATING PRESSURE..... 50 psi DIFFERENTIAL

TYPICAL OUTPUT WAVEFORM



TRIGGERED BY THE NORTH POLE OF MAGNET 5 VOLT SUPPLY 1KΩ LOAD

SCHEMATIC

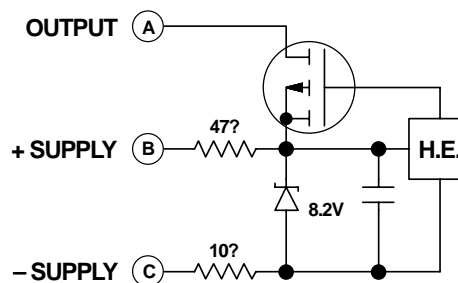
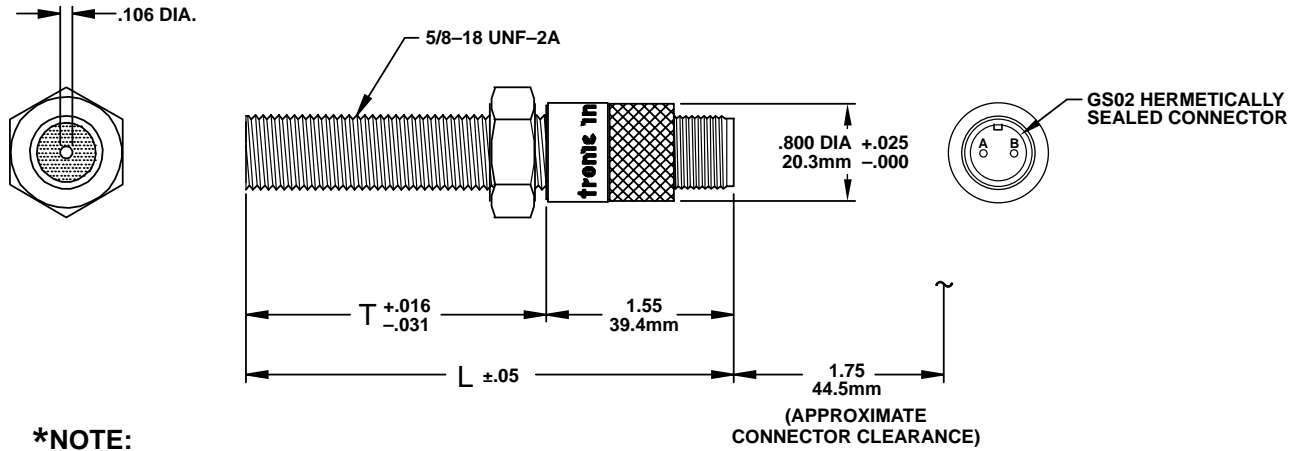


FIG. 16 MAGNETIC PICKUP

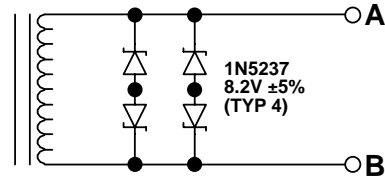


***NOTE:**

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

ELECTRICAL DATA *	
MAX. COIL INDUCTANCE	420 mH
MIN. COIL RESISTANCE	900?

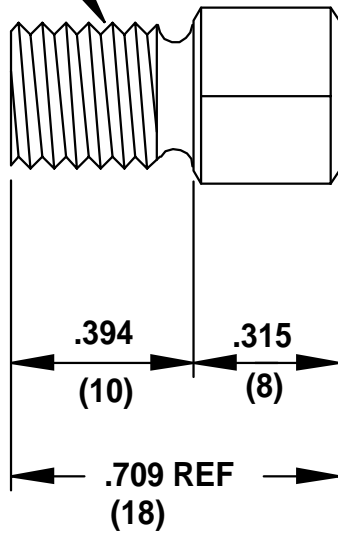
ALTRONIC P/N	T	L
691118-1	1.75"/44.5mm	3.30"/83.3mm
691118-2	2.50"/63.5mm	4.05"/102.8mm
691118-3	3.0"/76.2mm	4.55"/115.6mm
691118-4	4.5"/114.3mm	6.05"/153.7mm
691118-6	6.0"/152.4mm	7.55"/191.8mm



HYPERFUEL VALVE FUEL CONTROL SYSTEM

FIG. 17 MAGNET ASSEMBLY

M8-1.25 THREAD



NORTH POLE
FACING OUT

