

# Ignition Systems for Industrial Engines

*altronic*



# Altronic Ignition Systems

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## Pushing the Performance Envelope: Altronic Ignition Systems and Accessories

Girard, Ohio-based Altronic, LLC has spent much of the last 40 years defining and redefining the state-of-the-art when it comes to ignition systems and accessories for industrial natural gas-fueled engines. As a result of this constant attention to product development and manufacturing excellence, engine manufacturers and end users alike from around the world continue to turn to Altronic first for technically-advanced, high-quality ignition systems and components.

Browsing through these pages will give you a good overview of both the evolution of the Altronic ignition and ignition accessory product line, as well as a good idea about the system options available for your specific make and model of engine.

# Altronic Ignition Systems Application Guide

Engine Manufacturer	No. Cyls.	ALT. I	ALT. III	ALT. V	CD1 CD200	DISN CD200	CPU-95	CPU-2000 CPU-XL
AJAX	1-2	R		O	O			
	3	R	R		O		O	
	4		R		O		O	
ALCO	6-16		O				R	
ALLIS-CHALMERS	4-6			O	R			
ARIEL	1-2	R		O				
ARROW	1	R						
	2	R		O				
BELL	1	R						
BUDA	6-8		O		R			
CATERPILLAR	4-6	O	O	O	R	R	R	
	8-16		O			R	R	
CHICAGO PNEUMATIC	8-10	R						
CLARK	1-2	R						
	3-8		O			O	R	
	10-12						O	
	16-20						R	
CLIMAX	6-12		O				R	
CONTINENTAL	3-6	O		O	R			
CONTINENTAL-EMSCO	1-2	R		O				
COOPER-BESSEMER	1-2	R						
	3-8		O			O	R	
	10-12						O	
	16-20						R	
CUMMINS	4-6	O	O	O	R	R		
	12-16		O			R	R	
DE LAVAL	6-16						R	
DEUTZ	2-6	O		O	R	R		
	8-16		O			R		
DORMAN	3-6	R		O	R			
	6-16		O			R		
FAIRBANKS MORSE	1	R						
FORD	4-6	O			R			
	8				R	O		
GEMINI	1-2	R						
GUASCOR	6-16		O			R	R	
HERCULES (WHITE)	4-6	O		O	R			
INGERSOLL RAND	1-2	R						
	4-16		O			O	R	
INTERNATIONAL	4-6			O	R			
IVECO	6-12				R	R		

Engine Manufacturer	No. Cyls.	ALT. I	ALT. III	ALT. V	CD1 CD200	CD200 DISN	CPU-95	CPU-2000 CPU-XL
JENBACHER	6-8		O	O	R	R		
	12-16		O			R	R	
	18-20		O				R	
KUBOTA	1	R						
LISTER	2-3	R		R				
LORAIN	1	R						
LUFKIN	2	R		O				
MAN	6-12				R	R		
MAN (BRONS-CROSSLEY)	6-18		O				R	
M.E.P.	4-12		O			O	R	
MINNEAPOLIS-MOLINE	4-6	O		O	R			
MITSUBISHI	6-18					R	R	
MWM (DEUZ)	6-16		O			R		
NIIGATA	6-18						R	
NORDBERG	6-16						R	
OILWELL (WHITE)	1-2	R						
PERKINS	6-16					R		
ROLLS-ROYCE (BERGEN)	6-18						R	
ROILINE	6-12		O				R	
RUSTON	6-12						R	
SACM	6-16		O			R		
SCANIA	6				R	R		
SUPERIOR	6-16		O			O	R	
VALMET (SISU)	3-6				R	R		
WAUKESHA	4-6	O		R	R	O		
	6-16		O			R	R	
WORTHINGTON	3-10		O				O	
	12-20						R	

R = Recommended system for application. O = Optional system for application.



ISO 14001  
QMI-SAI Global



## CERTIFIED FOR USE IN HAZARDOUS LOCATIONS

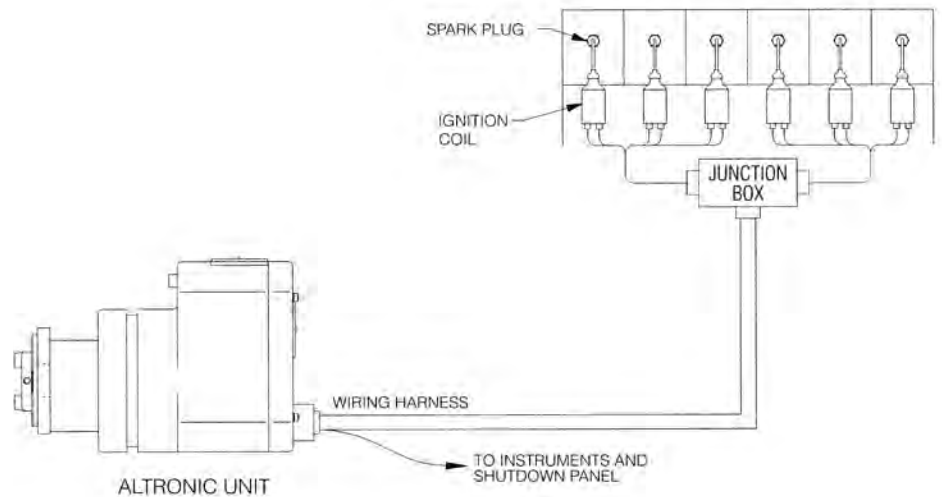
NOTE: Most, but not all, Altronic ignition systems and accessories in this catalog are CSA certified and compliant with the appropriate CE/ATEX regulations. Check each product listing for certification and hazardous area classification.

# Solid-State/Mechanical Systems

Altronic solid-state ignition systems consist of a self-powered ignition unit, a wiring harness and an appropriate number of ignition coils. Operating power is provided by a self-contained, multi-pole permanent magnet alternator that charges an energy storage capacitor. Pick-up coils, triggered magnetically, provide the timing pulses to discharge the capacitor in timed sequence. These low-tension discharges are routed by a distribution system, composed of a rotating magnet and solid state switching components, to the ignition coil of the proper cylinder. Electronics are mounted on easy to replace plug-in modules.

Drive couplings are furnished in synthetic elastomer materials for low wear and long life. They also serve to dampen part of the engine drive train vibration. Combined with the smooth rotational cycle of the Altronic alternator, these features contribute to the long mechanical life designed into Altronic solid-state systems.

- Alternator powered
- Capacitor discharge ignition
- Replaces magneto, breaker points and impulse coupling
- High output at engine cranking RPM
- Extended spark life
- Easy to service with plug-in modules



CERTIFIED  
CLASS 1, DIV. 2,  
GROUP D

## Application Data

IGNITION SYSTEM	POWER SOURCE	CYLINDERS	APPLICATIONS
Altronic I	Self-powered	1-6	Small in-line engines Horizontal 1-3 cyl. engines
Altronic II	Self-powered	3-20	Large bore, slow speed engines
Altronic III	Self-powered	2-16	Medium-sized industrial engines
Altronic V	Self-powered	1-6	Small in-line engines Horizontal 1-3 cyl. engines

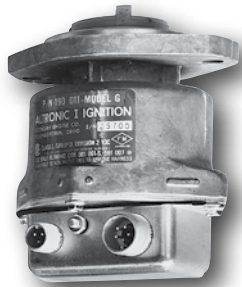
	TYPICAL CYLINDER BORE SIZE (MM)													
	100	125	150	175	200	225	250	275	300	325	350	375	400	425
Altronic I						*								
Altronic II														
Altronic III														
Altronic V						*								

\* Also applies to larger bore, horizontal 1-3 cylinder engines

# Solid-State/Mechanical Systems

## Altronic I for Small Engines, 1-6 cylinder In-Line and 1-3 cylinder Horizontal

Altronic I, first introduced in 1966, brought the advantages of capacitor discharge ignition to industrial gas engines. It consists of a small permanent magnet alternator with a plug-in electronic module attached. Timing is set by one or more remote mounted pick-up



sensing magnets referenced to the engine crankshaft. On horizontal engines, these are typically mounted on the

flywheel; on in-line engines, a magnet disc is used. The alternator performs no timing function and can thus be either belt- or coupling-driven. The only moving part is the alternator's sealed, underloaded ball bearing.

Over 60,000 Altronic I systems have been sold. The system's simplicity and long record of field reliability have made it the ignition of choice for operators of low-horsepower industrial engines.

## Altronic II for Large Gas Engines, 3-20 cylinders

Altronic II provides a self-powered, capacitor discharge system for large-bore, slow-speed gas engines. With four different internal gear ratios, base or flange mounting, and three drive coupling choices, Altronic II can be readily specified to replace most

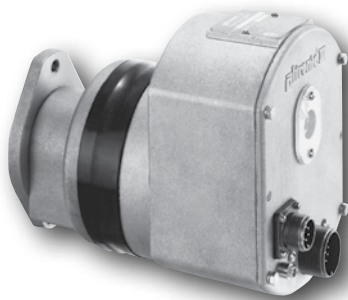


older magneto or breaker-point ignition systems. Altronic II can be used on engines with either one or two spark plugs per cylinder.

With an operating base of thousands of units, Altronic II has a proven record for reliability. Users can also easily upgrade to the Altronic II-CPU system while retaining the Altronic II alternator section to supply system power requirements.

## Altronic III for Medium-Sized Engines, 2-16 cylinders

With over 40,000 units in the field, Altronic III has become the industry standard system for medium-sized stationary gas engines. Altronic III is



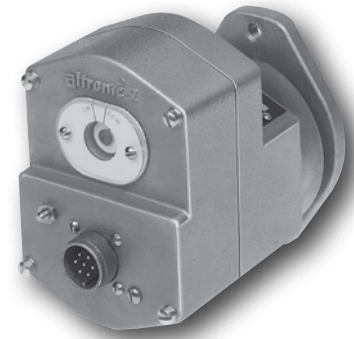
offered with seven mounting variations and six internal gear ratios to fit virtually any application in its class. Three types of electronic timing control are also offered: dual timing settings, timing

vs. RPM and timing vs. 4-20 milliamp signal. Ease of service is assured by the replaceable back cover, which contains all the system electronics.

Other options include a choice of standard or long spark duration coils in both unshielded and shielded versions. Altronic III can also be upgraded to the benefits of crankshaft-referenced, electronically-controlled timing — refer to the Altronic III-CPU system.

## Altronic V for Small In-Line Engines, 1-6 cylinder

Altronic V offers the same design features, installation ease, dependability



and serviceability that are built into Altronic III, but in a smaller package. Six mounting variations and a dual-position electronic timing option are additional features.

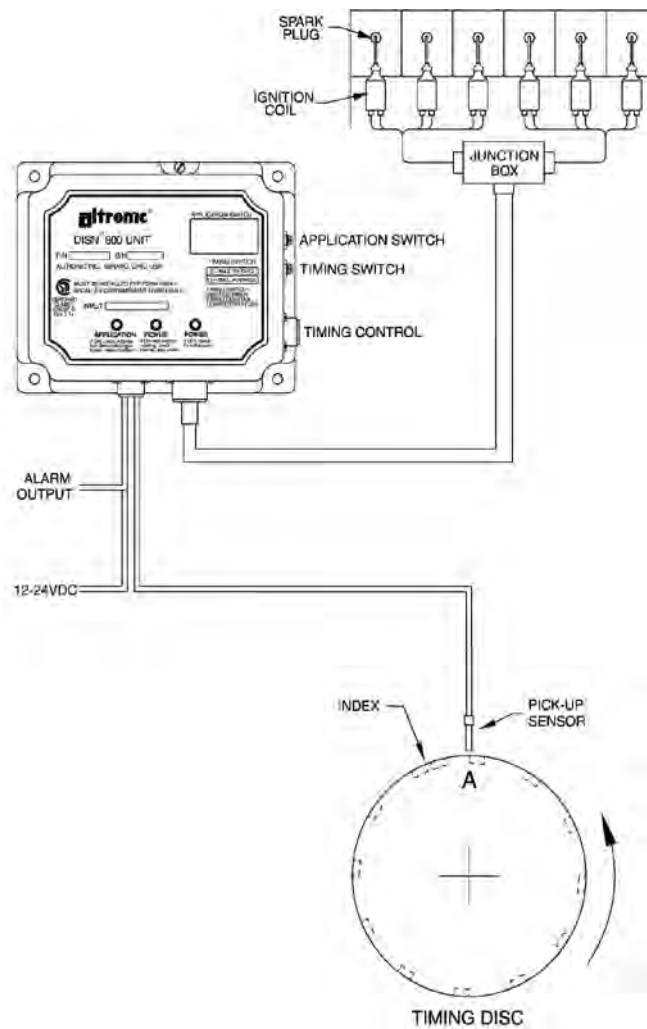
Altronic V affords small engine users a cost-effective replacement for obsolete and maintenance-intensive breaker-point magneto systems.

# Disc-Triggered Digital Ignition Systems

The Altronic disc-triggered digital ignition systems consist of an ignition unit, a magnetic or Hall-effect pickup, a timing disc mounted to the engine crankshaft or camshaft, wiring harnesses, and an appropriate number of ignition coils. These systems employ a cylinder position sensing design, typically using a single pickup and one trigger event per cylinder, which may be derived from an Altronic timing disc or holes/protrusions in the engine flywheel or camshaft gear. The pickup and timing disc provide accurate timing reference signals to the ignition unit, which calculates the correct ignition timing point. The systems feature high-energy, capacitor-discharge output supplying over 40KV with spark duration up to 600 microseconds.

These innovative and reliable systems can be applied to a variety of engines, including heavy-duty vehicular applications as well as engines incorporating lean-burn technology. Timing discs are manufactured to an accuracy of 0.1 degree, thus eliminating variations caused by drilling timing holes in the field.

- Single pickup operation
- Precision-machined timing disc accurate to 0.1 degree
- Incremental manual timing switches for known adjustments
- LED diagnostics for power, pickup, application faults
- Suitable for lean-burn engines
- 12-24Vdc powered
- Full output at engine cranking RPM



CERTIFIED  
CLASS 1, DIV. 2,  
GROUP D  
NOTE: Hazardous  
area certifications  
do not include the  
CD1 or non-shielded  
CD200 systems.

## Application Data

IGNITION SYSTEM	POWER SOURCE	CYLINDERS	SPECIAL FEATURES
CD1	12-24Vdc or DC alternator	1-8	Universal, low cost CD200 system available in shielded and CSA certified versions
CD200	12-24Vdc or DC alternator	1-16	Unshielded or shielded industrial system, CSA certified
DISN 800C	12-24Vdc or DC alternator	4-16	Unshielded or shielded industrial system, CSA certified

	TYPICAL CYLINDER BORE SIZE (MM)													
	100	125	150	175	200	225	250	275	300	325	350	375	400	425
CD1														
CD200														
DISN 800C														

# Disc-Triggered Digital Ignition Systems

## CD1 for Small Engines to 8-cylinders

The Altronic CD1 Digital Ignition System has been developed for application on small, stationary industrial engines up to 8 cylinders. This moderately-priced, easily installed system utilizes a low-cost magnetic pickup sensing drilled holes (usually in the engine flywheel) to determine the angular position of the crankshaft. LED indicators give diagnostic signals regarding input power, the pickup signal, and correct ignition unit operation. Individual ignition coils are used with the CD1 system.



## CD200 for Small and Medium-Sized Industrial Engines

The Altronic CD200 family is a micro-processor-based series with three variations providing substantial additional features over the base CD1 and the older DISN800C products. The CD200-70 and -80 are designed as successors to the CD1 model, while



the CD200-90 fulfills the same role with respect to the widely-used DISN800C system.

The CD200 family features complete application flexibility through the use of an advanced, ModBus RTU-driven, Windows™-based terminal program. Performance enhancement features resident in these systems include adjustable output energy and automatic timing adjustment curves. Diagnostics associated with system operation, as well as the primary and secondary discharge functions, are communicated via on-board LEDs and a powerful PC-based terminal program. Integral overspeed shutdown protection is also included.

A full assortment of unshielded and shielded harnesses, and other accessories, is available.

	CD200-70	CD200-80	CD200-90
Cylinder Range	1-8	1-8	6-16
CSA Certified	No	Yes	Yes
Signal	MPU	MPU	MPU or Hall-effect
Mounting	Same as CD1	Same as CD1	Same as DISN



## DISN 800C for Medium-Sized Industrial Engines

The DISN is a full-featured industrial ignition system for small- to medium-sized stationary engines up to 16 cylinders. The DISN system is intended for compression-stroke firing and usually uses a single pickup sensing, precision-machined timing disc rotating at engine camshaft speed. If crankshaft-referenced timing is desired, two pickups are used: one sensing firing magnets placed in the engine flywheel and the second sensing a single index magnet rotating at camshaft speed. DISN offers up to eight firing patterns in a common unit and is available in 8, 12 or 16-output models, each with multiple applications.

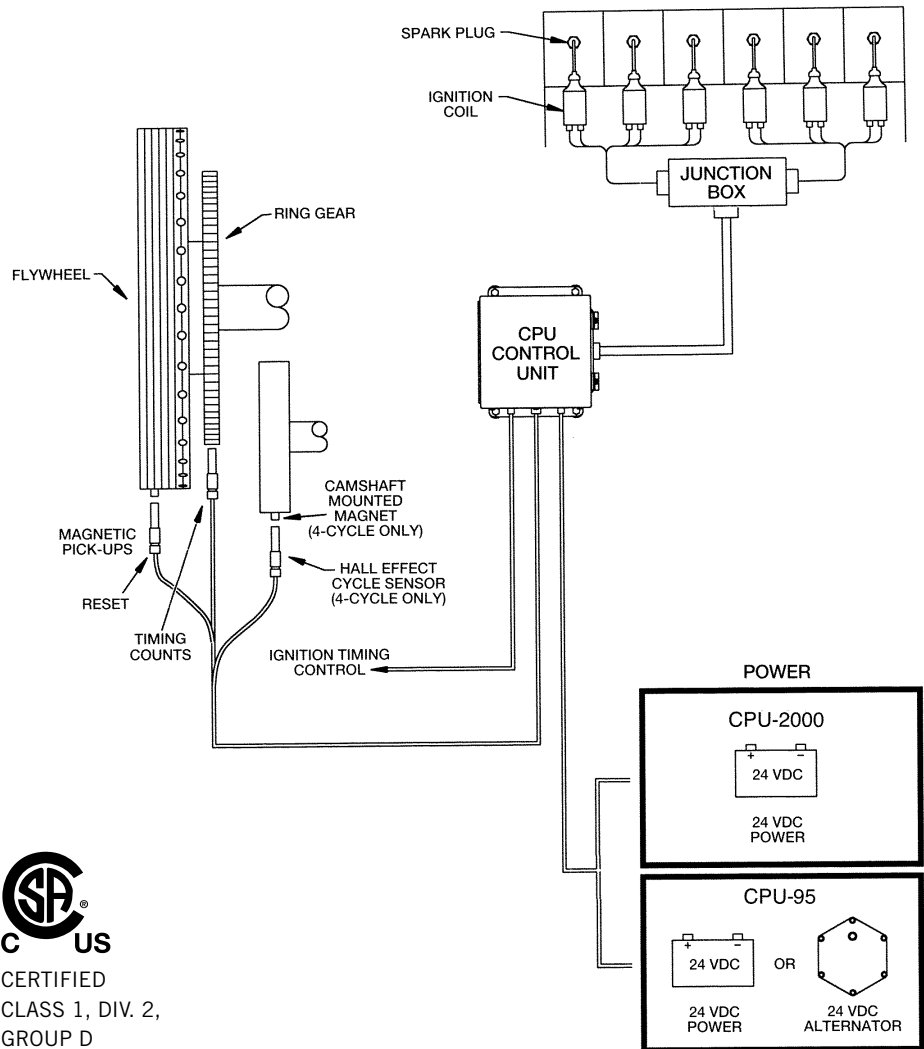


The DISN systems also incorporate four advanced timing control options: manual 16-position timing switch, one-step timing change, remote potentiometer timing control or control from a 4-20 milliamp analog signal. Three LED diagnostic indicators give an instant indication of the basic incoming power and pickup signals. The cast housing offers superior protection in harsh environments.

# Crankshaft-Referenced Digital Ignition Systems

The Altronic CPU crankshaft-referenced systems consist of an ignition unit, two magnetic pickups and cables, a primary wiring harness and an ignition coil for each spark plug. They employ a continuous crankshaft-sensing design. One magnetic pickup inputs signals from the engine ring-gear or holes drilled in the flywheel; the second pickup senses a revolution/reset event giving precise information on the location of the crankshaft. On 4-cycle engines, a reference signal at engine camshaft speed is used to determine the compression cycle. A replaceable memory chip, programmed with the engine's application data, operates with the CPU's digital circuitry to output precise firing pulses to the ignition coils.

Altronic CPU systems eliminate mechanical wearing parts — gears, chains, couplings, etc. Ignition timing is precise in all cylinders due to crankshaft-referenced timing. All CPU systems feature manual timing adjustment, one-step timing capability and electronic timing control from a 4-20 milliamp signal.



CERTIFIED  
CLASS 1, DIV. 2,  
GROUP D

## Application Data

- Single pickup operation
- Precision-machined timing disc accurate to 0.1 degree
- Incremental manual timing switches for known adjustments
- LED diagnostics for power, pickup, application faults
- Suitable for lean-burn engines
- 12-24Vdc powered
- Full output at engine cranking RPM

IGNITION SYSTEM	POWER SOURCE	CYLINDERS	SPECIAL FEATURES
CPU-95	24Vdc or DC alternator	3-18	Adds display of operational and primary/secondary diagnostic features
CPU-2000	24Vdc	3-30	Adds operational and diagnostic displays: multi-strike feature

	TYPICAL CYLINDER BORE SIZE (MM)													
	100	125	150	175	200	225	250	275	300	325	350	375	400	425
CPU-95														
CPU-2000														



# Crankshaft-Referenced Digital Ignition Systems

## Altronic CPU-95 for Medium Stationary Engines

The Altronic CPU-95 is a DC-powered, capacitive discharge digital ignition system for medium-sized industrial gas engines to 20 cylinders. The Display Module, typically mounted in the engine control panel, gives the user convenient access to critical operating information such as ignition system mode, engine speed, system diagnostics and setup functions, and the value of the 4–20mA signal being used for automatic timing control and the timing of the ignition system. State-of-the-art combustion enhancement tools, including multistrike (two full-energy spark events), and automatic spark energy adjustment (incrementally raising required spark energy) help to minimize misfire and thus improve fuel economy and reduce exhaust emissions. Individual cylinder timing control strategies can also be incorporated.

Proprietary diagnostic capabilities for monitoring the system, as well as the primary and secondary discharge diagnostic functions, are built into the CPU-95. These patented diagnostics offer users a means of continually monitoring spark plug wear and combustion stability



without the addition of special ignition coils or high voltage probes. Special CPU-95 models:

- **CPU-95C** — Developed for use on SI Controller-equipped Caterpillar 3500-series engines, the CPU-95C system replaces both the existing Altronic III unit and AIB box. Its installation allows for full access to the critical operational and diagnostic information and enhanced spark characteristic control resident in standard CPU-95 systems.
- **CPU-95 VariSpark™** — an innovative variant which uses capacitive-discharge ignition technology to deliver a long-duration spark, typical of an inductive ignition system. This model is of particular interest to operators of large bore, low-BMEP engines that exhibit ignitability or combustion stability problems.

## Altronic CPU-2000 for Large Stationary Engines

The DC-powered CPU-2000 system is designed for application on all large-bore stationary gas engines and can accommodate virtually any engine firing pattern. A single, universal CPU-2000 Logic Module can be used in conjunction with either a 16 or a 32-output Ignition Output Module thus minimizing the number and variety of ignition components. A simple terminal program allows one unit to fit all applications, and a field-replaceable memory minimizes overall engine downtime in the event that the ignition system requires replacement.

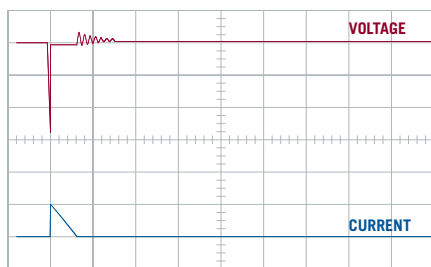
This second-generation digital crankshaft-referenced system also integrates sophisticated combustion enhancement tools and communications capabilities. The quad-strike function (four full-energy strikes), present in the CPU-2000, is highly effective in igniting lean mixtures for lower exhaust emissions, and improved fuel economy on engines that suffer from poor air/fuel mixing and scavenging. An on-board RS-485 serial port with MODBUS capability for integration into planned or existing control systems is also available.

Comprehensive system diagnostics, with primary and secondary discharge monitoring functions, are built into the CPU-2000 Diagnostic Module. This innovative diagnostic method patented by Altronic requires no additional probes or special ignition coils, yet offers users effective tools for monitoring spark plug wear and other ignition or combustion abnormalities. This spark demand monitoring capability can be used to automatically raise the delivered energy as the spark plugs wear calling for higher voltage.



# Crankshaft-Referenced Directed Energy Digital Ignition Systems

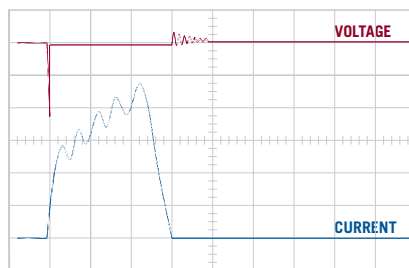
The capacity of a conventional capacitive-discharge (CD) ignition system to deliver voltage and current to the spark plug and air/fuel mixture has traditionally been governed by the design of the ignition system and the associated ignition coil (transformer). The standard CD ignition system uses a capacitor charged to full voltage. When triggered, it is fully discharged during each spark event. This spark is characterized by a peak of both voltage and current during the breakdown phase with both declining through the ionization, duration, and ring-down phases.



The above diagram depicts a conventional CD spark breakdown event. A duration of approximately 300µsec is determined largely by the coil characteristics. The energy in the ring-out pattern following the breakdown phase represents lost energy. If additional energy is supplied from the ignition driver in the form of a higher primary voltage, some additional duration is achieved but the conversion efficiency is increasingly lower.

A Directed Energy System takes a different approach. Instead of fully discharging the (very large) capacitor, a measured amount of current and voltage

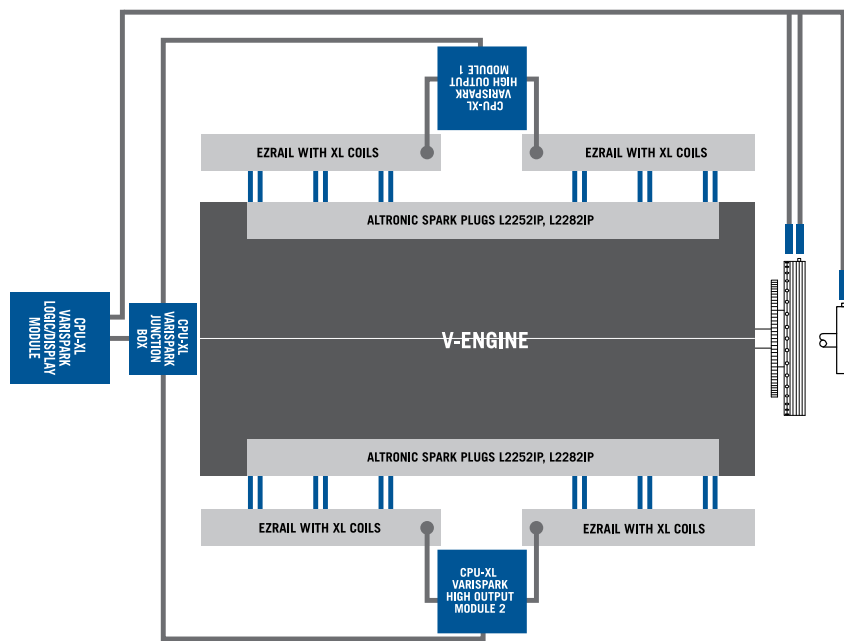
is discharged into the ignition coil/spark plug during each spark event. This allows for a specified, pre-fabricated spark profile—inclusive of both delivered voltage and current, as well as multiple strikes. The result: delivered energy (voltage, current, and number of strikes) to the air/fuel mixture in the cylinder that assures combustion.



The above diagram illustrates that the rules associated with a CD spark no longer apply with a Directed Energy System—

including the traditional peak of current registered during the breakdown phase and a general decline in the delivered current through the duration portion of the spark event. Through a modulation of the applied spark energy, the realizable spark voltage can reach 50,000 volts and the delivered energy per spark event can reach as high as twenty times that provided in a conventional spark. The concept of “shaping the spark” to dynamically optimize the performance of the engine and to provide combustion assurance for fuel economy, emissions, and operating reliability is a reality. Multiple strikes of varying duration, single strikes with escalating current, long duration single strikes and combinations of all of the above are made possible by the Directed Energy technology.

## CPU-XL VariSpark System Diagram



# CPU-XL VariSpark Advanced Digital Ignition System

The Altronic CPU-XL VariSpark is a 24-VDC-powered digital ignition system for large gas engines and integral compressors. It combines the reliability and operating simplicity of first- and second-generation ignition systems such as the II-CPU and CPU-2000, with Altronic's newly-patented spark control capability and system diagnostics.

Combustion assurance across a wide range of operating and in-cylinder conditions is the goal of the CPU-XL system. The CPU-XL system stretches the envelope of successful operation, allowing combustion to take place under difficult circumstances, such as operating near the lean misfire limit for emissions, under lighter loads, or on engines that mix the air/fuel charge poorly. This is possible through the introduction of a controllable, selectable spark profile, optimized for those conditions, a Directed Energy spark. By choosing one of eight waveforms, including several which can deliver secondary current levels as much as twenty times that of a conventional capacitive discharge spark, the second-

ary voltage and current delivered to the spark plug and air/fuel mixture can be matched—and dynamically adjusted—to meet the operating requirements and conditions of the engine, thus assuring combustion. Supported by Altronic's discharge diagnostics, the CPU-XL VariSpark system delivers an unparalleled combination of features and capabilities.

To insure a high level of convenience and a minimum level of new product training, the operating philosophy and functionality is very similar to other Altronic digital ignitions, including the CPU-2000. The CPU-XL VariSpark incorporates modular system construction, including standard system harnesses with a unique ignition coil/EZRail combination. The availability of all of these components as purchased parts limits on-engine fabrication and allows for simpler system troubleshooting.



- Innovative and patented (U.S. Patent 7,401,603) Directed Energy spark control capability optimizes performance on emissions-controlled engines as well as on applications experiencing wide variations in operating and ambient conditions
- Incorporates an engine-specific ignition coil/EZRail system rail for cost-effective installation and operation
- Comprehensive system and spark discharge diagnostics help to insure the swift identification of operating issues and to minimize associated engine downtime
- System timing, spark profile, and access to all other system options and diagnostics are available from the system keypad and graphical display, as well as remotely via Modbus RTU communications
- State-of-the-art, crankshaft-referenced digital ignition system for natural-gas fueled integral compressor engines
- CSA-certified for Class 1, Division 2, Groups C & D hazardous areas

## Combustion Assurance for:

- IMPROVED FUEL PERFORMANCE
- IMPROVED EMISSIONS
- IMPROVED RELIABILITY

# Ignition System Accessories

## Ignition Coils

The ignition coil supplies the high voltage spark, and is therefore one of the most critical components in the ignition system performance chain. Available in several electrical and physical configurations, Altronic ignition coils are designed and produced in a new, state-of-the-art manufacturing facility in Ohio—the most advanced in the world dedicated to production for use exclusively on stationary industrial engine applications.

To insure optimum performance, reliability, and service life, the ignition coil must be designed and matched for use with the selected ignition system. Despite look-alike appearance, non-Altronic coils do not deliver the same performance or reliability.

## Unshielded Round Case Coils

The standard for unshielded coils, the well-known Altronic blue, red and black variations are used in applications not requiring hazardous area certifications.



## Unshielded Square Case Coils

An alternative to the round case design, these coils have extended spark duration.



State-of-the-art coil production facility



Primary winding



Secondary winding



Secondary winding



Coil assembly



Coil assembly



Coil assembly



Coil assembly



Baking eliminates moisture



Sealing with epoxy



Curing in the oven



Testing and validation



Finished coils

# Ignition System Accessories

## Flange Mount Coils

The same internal structure as the unshielded coil packaged in the convenient 3-bolt flange mount configuration. Flange mount coils are designed to mount to the valve covers on a number of popular, modern gas engines.



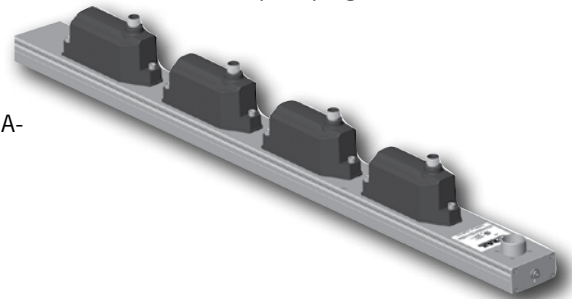
## Integral Coils

Designed to mount directly to special threaded spark plugs, integral coils have stainless steel housings and are CSA-certified for Class I, Division 2, Group D areas. Steel shell primary connectors are used to take the rough handling of industrial market applications.



## Variable Duration/Directed Energy Coils

Altronic's directed energy ignition systems—including the CPU-XL VariSpark system—incorporate a revolutionary ignition coil design and technology. These rail-mounted, state-of-the-art devices are certified for use in Class I, Division 2 hazardous areas, as well as in unrated environments. When used in conjunction with their associated ignition system, they are capable of delivering unprecedented ignition energy levels to the spark plug/air-fuel mixture.



## Shielded Coils

Shielded versions are encased in stainless steel housings and are CSA-certified for Class I, Division 2, Group D areas. Steel shell primary connectors are used to take the rough handling of industrial market applications.



Note: To maintain the CSA system certification, all coils (shielded or integral types) and all primary and secondary components must be CSA-certified Altronic parts.

COIL TYPE	DURATION	ALTRONIC I, III, V CD1, CD200 CPU-90/95 DISN	ALTRONIC II II-CPU CPU-2000 D.I.S.	ALTRONIC CPU-XL VARISPARK
Unshielded, round case	Standard Extended	501061 591010	— 291001	— —
Unshielded, square case	Extended Extended	591040 591050	— —	— —
Flange, 3-bolt	Standard Extended	591018 591012	— —	— —
Shielded	Standard Extended Variable	501061-S 591010-S —	— 291001-S —	— — 591401-1
Integral, 1"-20 x 5.6" 13/16"-20 x 6.1" 13/16"-20 x 10.8" 13/16"-20 x 11.3"	Standard	591007 591011A 591011B 591011C	591008 — — —	— — — —

# Retrofit Ignition/Control Package for Caterpillar® 3500 Engine

Many operators of the Caterpillar 3500 engine seek a cost-effective means of upgrading their legacy SI and EIS ignition and control systems with an Altronic-based ignition and instrumentation solution. This need has been driven by a desire for standardization with other Altronic-equipped engines, improved access to operating information and diagnostics, cost-effective access to service parts, and long-term product support.

Altronic has developed an integrated, pre-engineered solution using proven off-the-shelf components and a number of products specific to 3500-series engines. Available either as individual components, as part of a stand-alone Altronic Controls panel, or as part of a larger panel incorporating additional functionality, this package is designed with variants for each engine model—8, 12, and 16-cylinder configurations—to provide a maximum level of added capability and operating reliability, while minimizing installation costs and associated downtime. These systems feature the standard CPU-95 ignition system and all of its performance and diagnostic features, the Altronic DET-1600 for advanced detonation and misfire control, and a DSG-1682DUPS Digital Setpoint Gauge to assist in effectively emulating the configuration and function of the existing OEM systems. Engine-specific harnesses are provided for the ignition system and for the accelerometers installed on each power cylinder, along with an EZRail junction module.

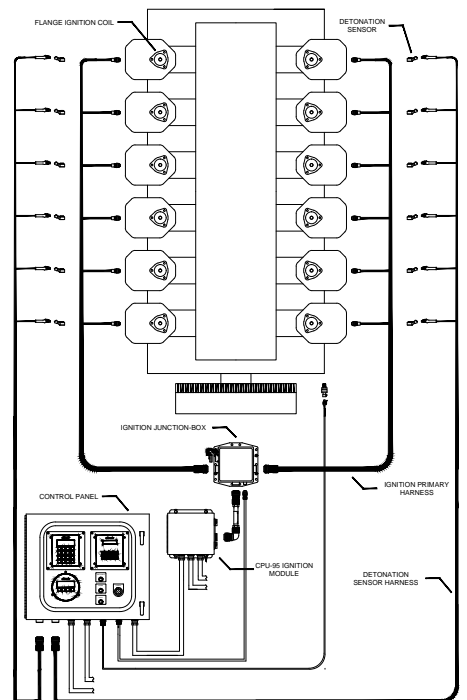
A retrofit of an SI-equipped engine replaces the existing Altronic III, Altronic Interface Box (AIB), and SI panel with the new hardware set—inclusive of new harnesses and an EZRail junction box. All existing ignition coils, valve covers, and secondary components are retained.

While the electronic hardware package is identical for retrofitting an EIS-equipped engine, the retrofit requires the replacement of the existing valve covers, secondary hardware, and ignition coils with those components used in the SI-based solution.

## Theory of Operation

The Altronic SI/EIS Ignition System Retrofit Package is specifically designed to emulate the control parameters of the existing ignition/control system. This is accomplished by biasing the ignition timing vs. engine RPM (internal to the CPU-95), as well as air manifold pressure (AMP), and the DET-1600 detonation control. These latter two inputs (AMP and detonation) are used as inputs into the DSG-1682DUPS and produce a scheduled/integrated 4-20mA output as an additional timing control input to the CPU-95 system. All of the associated RPM switch points, pressure setpoints, and detonation control parameters can be reproduced in the new system from the OEM data. Alternative control strategies, however, are available to the customer to further optimize the performance of their specific application.

- Pre-engineered, engine-specific ignition and control system solution for legacy Caterpillar® 3500-series engines equipped with the SI or EIS ignition systems
- Incorporates custom ignition and detonation sensor harnesses for simple system installation and service
- Delivers expanded user access to system diagnostics and configuration
- Assured future upgrade path and system support from Altronic and its Aftermarket Distributor organization
- Hazardous area certified for Class I, Division 2, Groups C and D



# Ignition System Accessories

## FLASHGUARD®, Shielded, and Safe-T-Lead™ Spark Plug Leads

Altronic offers a complete line of universal and custom Flashguard® spark plug leads. These premium secondary leads are designed with a 5,000-ohm integral resistor and with tight-fitting silicone or Teflon® boots for reduced emitted RFI, minimized flashover, and improved spark plug life.

For those operating in Division 2 hazardous areas, Altronic offers two certified secondary lead styles designed for use with shielded spark plugs. The traditional braided stainless-steel lead is certified as safe for use in Class I, Division 2, Group D hazardous areas. As an alternative, the Altronic Safe-T-Lead™ is a non-metallic lead designed for use in conjunction with shielded ignition coils and spark plugs, but eliminates the corrosion and spark plug life issues associated with traditional metallic leads. The non-metallic nature of the Safe-T-Lead™ lead also enables the user to employ traditional diagnostic tools such as an ignition timing light in troubleshooting the ignition system and the engine.

See the Altronic Industrial Spark Plug and Ignition Accessories catalog for further details.



## FLASHGUARD® Spark Plugs

Altronic offers a series of high quality spark plugs engineered and manufactured specifically for use in stationary gas engines. Incorporating a number of unique design elements, the Altronic Flashguard® spark plugs are available with both massive and precious metal electrodes (including an iridium/platinum model), in 14mm, 18mm, and 7/8"-18 sizes, and in both shielded and unshielded configurations.

All Flashguard® spark plugs feature an extended ceramic insulator and proprietary nose cone design for maximum flashover resistance, and a high ohmic internal resistor for reduced RFI and improved spark plug service life.

See the Altronic Ignition Accessories Catalog for further technical and application details.



## 24VDC Alternator Power Packages

The alternator power packages are designed to deliver up to 70 watts of DC power to users wishing to operate the latest DC-powered ignition systems, instrumentation, and control products, on installations lacking access to electrical service. To promote easy field retrofit, the alternator units are designed to mate directly to various flange-mount magneto drive configurations. A belt-driven version is also available.

Two variations of the power package system are offered:

- **Version I** — Consists of an alternator, voltage regulator, battery pack and cable. This system can furnish up to 4 amps at 24Vdc for powering ignition, instrumentation and controls.
- **Version II** — Consists of an alternator, voltage regulator and cable optimized to make a self-powered ignition system for the Altronic CPU-90 or DISN. No battery is used with the Version II system.



## The HOERBIGER Group

HOERBIGER Compression Technology is a business unit of HOERBIGER Holding AG, Zug / Switzerland. HOERBIGER is active throughout the world as a leading player in the fields of compression technology, automation technology and drive technology. Its 6,400 employees achieve sales of around 1 billion Euro. The focal points of its business activities include key components and services for compressors, gas engines and turbomachines, hydraulic systems and piezo technology for vehicles and machine tools, as well as components and systems for shift and clutch operations in vehicle drive trains of all kinds. Through innovations in attractive technological niche markets, the HOERBIGER Group sets standards and delivers cutting-edge solutions for the benefit of its customers.

