

# Phoenix

## Next-Generation Combustion Analysis System



### A self-contained, portable combustion analysis system

Phoenix represents the third generation of A&D's popular, proven line of combustion analysis systems. The Phoenix system builds on A&D's 20+ years of experience to offer a complete hardware and software system to assist in refining the combustion process in today's advanced engines.

The new Phoenix system is both easy to set up and simple to use. Other than transducers and encoders, Phoenix includes everything necessary to perform complete combustion analysis, and being pressure-based, it provides a microscopic view of the entire combustion process. This detail can be used to determine piston and crank shaft loads, intake and exhaust runner designs, valve timing, and torque produced by the

burning of the air fuel mixture. Phoenix's small size makes it ideal for in-vehicle applications. The compact, rugged enclosure and built-in DC power supply make it easy to move from the test cell to the vehicle, and features such as crank position sensor processing and internally-powered charge amplifiers reduce the time required to instrument the vehicle. This allows for a quick resolution of in-vehicle issues.

Although designed as a stand-alone system, Phoenix is just as effective when integrated with other test cell systems. When connected to the data acquisition system, Phoenix data can be linked to other engine parameters, providing the basis for automating the engine calibration process.



*Phoenix is a self-contained portable combustion analysis system that is ideally suited for in-vehicle and remote field applications.*

### Application Highlights

Phoenix is ideal for a variety of internal combustion engine applications (diesel, gasoline, natural gas, hydrogen, HCCI, etc.)

#### For Diesel Applications

- Rate of heat release and cumulative heat release
- Injection timing values for up to 10 events per cylinder per cycle
- Combustion noise level measurement

#### For Gasoline Applications

- Knock analysis for cylinder pressure or knock sensor
- Specific support for cylinder deactivation
- Display IMP with corresponding injection event

#### For In-Vehicle Applications

- Small size with easy setup
- Low power consumption
- Real-time crank position sensor processing
- DC power supply
- Internally powered charge amps

### Specifications

#### Combustion Parameters:

- Indicated Mean Effective Pressures (IMEP)
- Mass Fraction Burned and Heat Release
- Knock Intensity and Amplitude
- Polytropic Coefficients
- Peak Pressure and Location of Peak Pressure
- Maximum Rate of Pressure Rise and Location
- Combustion Noise Level
- Spark Timing and Crank Angle of Ignition
- Ignition Start and End Duration
- Ignition Delay and Start of Combustion
- Average, Upper and Lower Signal Envelopes

#### High-Speed Input Channels:

- 12 Analog Inputs
  - 12 @ up to 2MHz (20,000 RPM at 0.1°)
  - 15-bit resolution
  - Input ranges of ±1, ±2.5, ±5, ±10, ±50 volts
- 6 Digital Inputs
- 3 A&D 1104CA charge amp pod inputs

#### Encoder

Input: One for standard encoder or conditioned crank position sensor output

#### Host PC

Interface: 1 Gb Ethernet

Dimensions: 330mm (W) x 200mm(D) x 76mm(H)  
13”(W) x 7”(D) x 3”(H)

Weight: 2.2 kg (5 lbs)

Power Consumption: 50 Watts @ 12 VDC

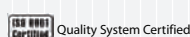
### CAS 4.0 Software

The Phoenix system includes CAS 4.0, our industry-proven combustion analysis software. CAS contains all the capability you need to configure the system, and acquire, display and review your combustion data. Configuration can be performed either online or offline.

- Quick setup feature steps users through system configuration, reducing errors and saving time.
- Navigation window offers quick access to configuration information, making it easier to adjust configurations to suit specific testing applications
- Multiple display objects (oscilloscopes, alarm indicators, strip charts, etc..) allow operators to view activity at a glance
- Multimeter Mode displays what the system is measuring on all analog inputs to verify transducer sensitivity before taking data.



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