

TOGETHER, WE GET THE JOB DONE.



:: SOURCE PRODUCTS





SOURCE PRODUCTS

Utilizing the industry-leading INOVA vibrators ensures improved productivity, reduced mechanical-related downtime, and better coupling during source operations.

Source Products Portfolio

INOVA offers a complete portfolio of vibrators and source controllers that have been used worldwide for more than forty years and are compatible with all acquisition systems on the market today. Utilizing the INOVA line of source technology ensures accurate force, sweep amplitude, phase, and timing. Our source products are designed to operate efficiently in all environments while reducing maintenance related downtime in the field. INOVA continues to invest in research and development of new technology to support tomorrow's acquisition challenges, today. To further improve field productivity, INOVA's controllers, Vib Pro™ and Shot Pro™ II, have been seamlessly integrated with our recording systems, G3i® HD, ARIES® II, and Hawk®.

Vibrators

Providing a variety of configurations and a comprehensive selection of vibrators to accommodate any terrain or environment, our high quality vehicles are manufactured to support low maintenance, high productivity vibroseis operations. INOVA offers several options to meet imaging and operational requirements in the form of five different actuators (PLS-326, PLS-334, PLS-362, PLS-364, and PLS-380). Our complete line of vibrators includes:

- **UNIVIB® 2 (PLS-334)** – INOVA's newest 34,000 lb (15t) peak force small vibrator offers improved low frequency sweep performance, a more powerful and environmentally-compliant engine, and an advanced cab design that emphasizes safety, ergonomics, and on-board diagnostics
- **UNIVIB® (PLS-326)** – INOVA's 26,000 lb (12t) peak force small vibrator is engineered with a smaller frame for easier mobility through environmentally sensitive areas
- **AHV-IV™ Commander (PLS-364)** – INOVA's most advanced 61,800 lb (28t) peak force vibroseis technology complete with a newly designed stiffer baseplate and re-engineered hydraulic system delivering a greater, more consistent and predictable force over a broader bandwidth
- **AHV-IV™ Renegade (PLS-380)** – INOVA's 80,000 lb (34t) peak force vibrator is ideal for single-source fleet configurations such as Distance Separated Simultaneous Sweeping or when surveys require greater peak force output
- **AHV-IV™ (PLS-362)** – the industry workhorse widely recognized and utilized on most surveys today available in 61,800 lb (28t) peak force capacity

INOVA's AHV-IV series of vibrators includes a variety of customizable features to accommodate any imaging target or terrain objective.

UNIVIB 2

The newest small-scale vibrator from INOVA, the UNIVIB 2, delivers up to 34,000 lbs of peak force and is still agile enough to maneuver through dense terrains or sensitive environments with minimal impact. The newly engineered PLS-334 actuator allows operators to perform sweeps more consistently across a frequency bandwidth from 1 Hz to 400 Hz. Whether you are imaging deep reservoirs or shallow subsurface areas, the UNIVIB 2 offers the highest force-energy penetration in the industry for a vehicle of its class.

The UNIVIB 2 is built with a high performance, 173 HP John Deere diesel engine that is available in Tier 3, Tier 4i, and Tier 4 Final options. This rugged engine provides enough power for the vehicle to effortlessly navigate through challenging terrains utilizing tires or tracks. When the engine is combined with an emission reducing after-treatment technology, the vibrator becomes certified to meet EPA Tier 4 Final and EU Stage 4 emissions regulations.

With the operator in mind, INOVA designed the new cab to be more ergonomically comfortable while adding improved safety features and on-board diagnostics. The spacious cab is integrated with an operator escape hatch and a rollover protection structure (ROPS) that minimizes safety risks when operating the vehicle in hazardous environments. The cab also features a new CAN Bus based diagnostics tool that will provide real-time monitoring of the vehicle's health during source operations. With this tool, operators can feel more confident knowing their vehicle is performing within specifications. If potential issues should arise, they have the ability to quickly diagnose problems on-site or remotely to prevent downtime.

UNIVIB

The UNIVIB was specifically designed for source operations in environmentally restricted or heavily urbanized areas generating lower ground pressure while still outputting frequencies down to 1 Hz. This lighter, smaller, and mobile vibrator is built with the same quality and reliability of our traditional, full-size AHV-IV vehicles.

The rugged engine, durable framework, and serviceable design enable operators to increase operational efficiency and lower the cost of ownership. With a smaller vehicle footprint, the UNIVIB can navigate more freely through natural and man-made surroundings than larger vibrators. Furthermore, obtaining permitting access becomes less difficult for contractors since the environmental impact is reduced.

AHV-IV Series

INOVA proudly represents the durable, low-maintenance AHV-IV family of vibrators with the latest advances in source technology implemented in the industry standard Articulated Hydrostatic Vehicle (AHV) design. We offer a variety of configurations and a comprehensive selection of customizable options on our AHV-IV product line to accommodate variations in terrain, environment or imaging requirements. Each AHV-IV model includes:

- Interchangeable tire or track capacity on PLS-362, PLS-364, and PLS-380 models
- Articulated steering for superior maneuverability ensuring higher productivity
- Reinforced rectangular baseplate for improved ground coupling in comparison with I-beam configurations
- A patented Pre-Loaded Stilt Structure (PLS) design to create a stronger, more reliable actuator that dramatically prolongs the life of parts
- Advanced reaction mass assembly and limited hoses and fittings for simplified infield maintenance and troubleshooting
- Certified roll-over protection and a lower center of gravity
- Variable/variable transmission for faster move-up times between VPs



The small-scale UNIVIB 2 vibrator shown with the new PLS-334 actuator can deliver up to 34,000 lbs peak force and can navigate easily through challenging terrains.



"With over 87 AHV-IV vibrators in our fleet, field maintenance and durability are of extreme importance to our crews."

– Pat Ryan, Equipment Manager
Global Geophysical Services

::SOURCES & SOURCE CONTROLLERS



INOVA's AHV-IV Renegade has a V/V transmission that improves move-up time between VPs thereby increasing field productivity.



Source Controllers

INOVA supports vibroseis and dynamite operations with rugged encoders and decoders equipped with GPS positioning and timing and improved crew safety features. Vib Pro and Shot Pro II controllers are seamlessly integrated with our acquisition systems Hawk, ARIES II and G3i HD, streamlining QC and enabling the observer to focus on one display for system and source productivity and quality. In addition, Vib Pro and Shot Pro II are available and compatible with all acquisition systems, vibrators and detonators on the market.

Vib Pro

With its field-proven reliability and the capacity to generate accurate sweeps, whether operating in sand or hard surface environments, Vib Pro sets the industry standard for vibrator source controllers and remains the most commonly utilized controller in the industry today. In addition, Vib Pro enables seismic contractors to generate highly accurate source signatures demanded by oil & gas companies in order to deliver seismic images of the highest quality.

Vib Pro's system architecture supports reliable, highly productive operations. Specific features of the system's architecture and telemetry system enable:

- Patented Harmonic Distortion Reduction (HDR™) technology
- Accurate fundamental ground force control
- Redundant storage of QC data eliminating missed sweep information
- Management of multiple vibrator fleet operations
- Parameters to be configured from the recording truck
- Optional integrated GPS

Optimizing Productivity for High-Density Acquisitions

AHV-IV Renegade Delivers 80,000 Pounds of Efficiency

Challenge:

Mobilizing and maintaining a vibroseis fleet to cover high-density, 3D acquisitions can be labor and time intensive. A Global Geophysical crew operating in Oman conducted a 2,793 sq km survey in a continuous recording environment.

The Solution:

A source-driven acquisition utilizing seventeen AHV-IV Renegade vibroseis vehicles with 80,000 pounds of peak force in a single source fleet configuration. The AHV-IV Renegades enabled the crew to conduct the industry's first-ever Distance Separated Simultaneous Shooting (DS³) operation.

The Results:

Improved field productivity with minimal downtime and simplified infield maintenance. The crew successfully acquired over 842,324 VPs with a record production day of 12,200 VPs recorded. The program was conducted over 151 days with 95% vibrator uptime in 24-hour operations.

The Power of HDR

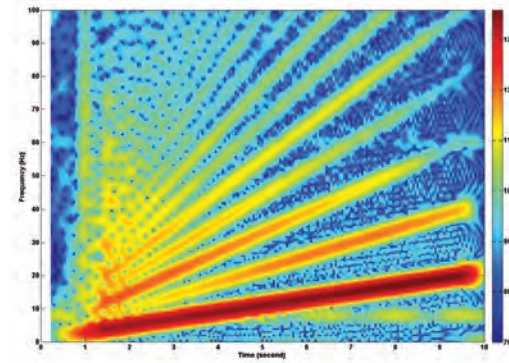
For several years, the Research and Development team at INOVA has diligently been developing and testing advanced vibroseis technology designed to bring unsurpassed reduction in harmonic distortion associated with vibroseis operations. The latest advances include the introduction of the AHV-IV Commander and the Vib Pro with patented HDR Technology.

The AHV-IV Commander is engineered with a new baseplate and hydraulic system design that delivers greater, more consistent and predictable force over a broader bandwidth with improved coupling. The new vibrator design continues to bring the standard durability and simplified maintenance that have made the AHV-IV a household name in the seismic industry.

When utilized in combination with the Harmonic Distortion Reduction Technology (HDR) implemented in the Vib Pro control electronics, observers will obtain further benefits that include improved vibrator control, additional reductions in harmonic distortion, and enhanced signal-to-noise ratio. HDR Technology is a proprietary set of algorithms designed to reduce harmonics caused by nonlinearities in the main-stage servovalve mechanism of the vibrator hydraulic system.

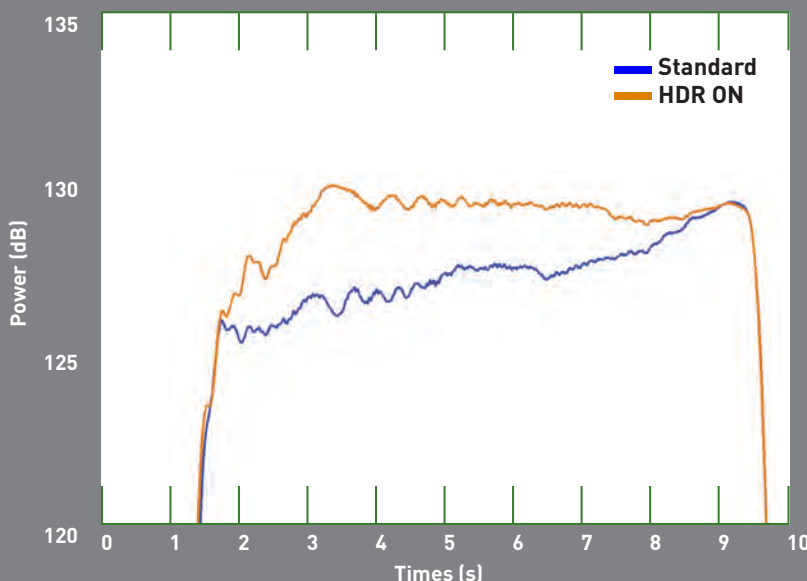


Vib Pro's HDR Technology is the newest enhancement to improve vibrator control while reducing harmonic distortion on any vibrator on the market.

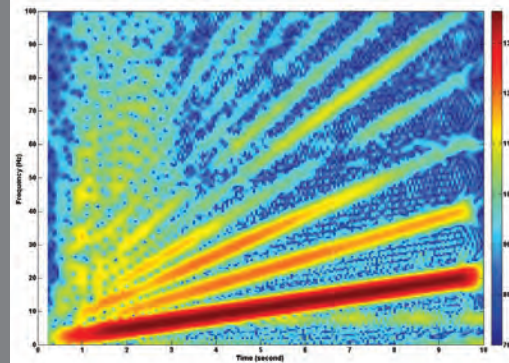


F-T plot from load cell testing of the AHV-IV Commander without HDR Technology implemented. (1-21Hz sweep, 10 seconds)

Fundamental Force Standard vs HDR Technology - 1-21HZ, 10s (AHV-IV 362)



The Vib Pro HDR Technology reduces harmonic distortion and increases fundamental force on any vibrator available on the market. When utilized with INOVA's DR Valve, HDR Technology is further optimized by dampening the earth/baseplate resonance which further improves the linearity and bandwidth of the vibrator's servo-valve.



When coupled with Vib Pro's HDR Technology, the AHV-IV Commander delivers even greater harmonic distortion reduction. (F-T plot from load cell testing of 1-21Hz sweep, 10 seconds)

::SOURCES & SOURCE CONTROLLERS



"Deploying equipment that minimizes downtime is critical to success. We were extremely pleased with the performance of the recording system and INOVA's Shot Pro II controllers utilized in this acquisition."

– Yang Jiyou, Chief Geophysicist
Sinopec Second Geo

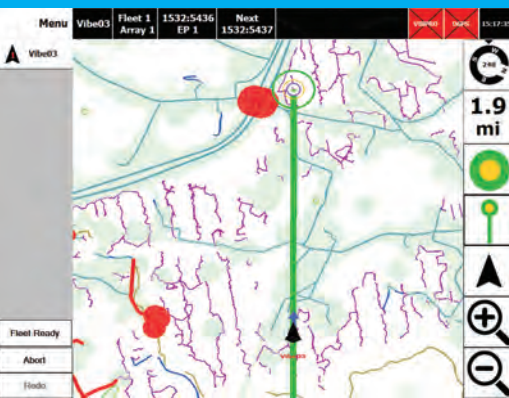
Shot Pro II

The Shot Pro II system provides reliable control over dynamite operations for seismic crews. The compact design is highly portable and easy to handle. The Shot Pro II system consists of a source controller (decoder) unit for each shooter, an encoder unit in the recording truck and proprietary software.

- Operational modes: encoder, decoder, master/slave repeater/air gun
- Supports wire-line shooting
- Compatible with RTI system architecture to ensure close coupling between shot timing and data recording
- Interfaces with most commercial VHF/UHF radios
- Contains an integrated GPS for simplified infield navigation
- Supports airgun operations for transition zone acquisition
- Incorporates common mode protection from electrical impulses on the firing and uphole lines
- Provides encrypted fire commands to prevent the firing of unselected units even when armed

Connex Vib

The new user-friendly standalone system, Connex Vib provides navigation and positioning of vibroseis vehicles with capabilities for integrated stakeless operations. The navigation system can record GPS coordinates, sweep start times, post sweep (PSS) attributes such as force, phase, distortion, stiffness, viscosity, and vibrator source signature (VSS) data. Utilizing this system greatly increases HSE awareness due to clear visualization of hazards, slopes, and exclusions located in survey areas. The Connex Vib system can also be used in high productivity vibroseis operations and is an integral component for some techniques such as Independent Simultaneous Sweeping (ISS).



The Connex Vib navigation system's user-friendly touch-screen interface graphically displays real-time vibrator positioning data, fully integrated with hazards, topographical data and sweep status information.

Customer Care

At INOVA, we understand that downtime can be extremely costly during seismic operations. This is why we implemented customer care centers all around the world with field service engineers on staff in each region. Service calls are answered 24 hours a day, seven days a week to provide timely responses to our clients. Contact our **Customer Care Hotline** at +1.281.568.2002 or via email at customer.support@inovageo.com.

INOVA – Together, We Get the Job Done

INOVA provides a complete portfolio of land acquisition equipment and services, including:

- Hawk® – cableless seismic acquisition platform
- G3i® HD and ARIES® II – cable-based seismic acquisition systems
- AHV-IV™ series, UNIVIB®, and UNIVIB® 2 – vibroseis source vehicles
- Vib Pro™ and Shot Pro™ II – vibroseis and dynamite source controllers
- AccuSeis™, VectorSeis®, and geophones – digital sensors and analog geophones
- Rental equipment services
- Training facilities and customer support worldwide



Houston Headquarters
12200 Parc Crest Drive
Stafford, Texas 77477
p: +1 281 568 2000
f: +1 281 568 2001

Beijing Headquarters
F28, Tower C, Oriental Media Center
Guanghua Road, Chaoyang District
Beijing, 100026 P.R. China
p: +86 10 6598 0799
f: +86 10 6598 0720

www.inovageo.com