



HYDRAULICS INTERNATIONAL INC.



OVERVIEW

Established in 1976, **HYDRAULICS INTERNATIONAL, INC. (HII)** has over 30 years history of cutting edge support equipment ingenuity and new product technology innovation in three main business units:

- Defense/Aviation/Commercial Ground and Engineering Support Equipment Systems
- Pneumatic driven liquid pump/gas booster/amplifier systems
- Flow metering/analyzing/totalizing systems

HII is one of the few companies having total self-sufficiency in design and manufacture of the systems and components required for its' business units. On-going research and development in all areas has improved operation, quality, and functionality of the business unit products and systems.

MAJOR MILESTONES:

- **1978:** **HII** acquires the Hydraulic System Division of Greer Hydraulics. Since the 1940s, Greer designed and manufactured more Test Stands than all the competition combined.
- **1990:** **HII** introduces the first generation of automated programmable logic controller (PLC) based test stands.
- **1994:** **HII** acquires Flowmetrics, Inc. This acquisition provides **HII** with a broad line of custom engineered flow measurement devices for most liquids and gases.
- **1995:** **HII** establishes the Air Driven Products Group, offering a wide range of liquid pumps, oil-free gas boosters, air pressure amplifiers, and related high pressure controls.
- **1999:** **HII** becomes the leading manufacturer of military aviation armament support products when awarded contracts for next generation Ammunition Loading and Handling Systems.

From complete systems to individual components, Hydraulics International products lead the world in support equipment performance, quality, and reliability.

Hydraulics International, Inc.

Supporting Aviation...From the Ground Up –

INTRODUCTION

FROM COMPONENTS TO SYSTEMS HII
PRODUCTS IMPROVE PRODUCTIVITY WORLDWIDE



MILITARY AIRCRAFT & AEROSPACE

- **Test Equipment** - Stationary or portable for all hydraulic, pneumatic, air-conditioning, lubrication, coolant, or fuel systems.
- **Handling Equipment** - Linkless ammunition loading systems, munitions handling units, engine installation/removal fixtures, trailers, fuel pod skids, and jacks.
- **Missile Guidance** - Servicing and cooling capabilities for all high- pressure gas containing units.

2

COMMERCIAL AIRCRAFT

- **Test Equipment** - Stationary or portable for all hydraulic, pneumatic, air-conditioning, lubrication, coolant, or fuel systems.
- **High-Pressure Gas Boosters & Hydraulic Pumps** - Servicing for airliner emergency slide chute propellant bottles, aviator oxygen system, aircraft jacks, Helicopter Emergency Floatation Systems (HEFS), aircraft shock struts, and accumulator pre-charge systems.

6

GENERAL INDUSTRY

- **High-Pressure Pumps** - Used for downhole and subsea safety valve control, portable tool hydraulics, hydroproofing valves and piping, and BOP backup.
- **High-Pressure Gas Boosters** - Leak testing, helium and oxygen loading for saturation divers, and nitrogen pre-charging of hydraulic accumulators.
- **Turbine Flow Meters**-Utilized in Aerospace, Chemical/Petrochemical, Pharmaceutical/Food, and Laboratory applications.

8

OIL, GAS, PETROCHEMICAL & PHARMACEUTICAL

- **High Pressure Pumps** - for downhole and subsea safety valve control, portable tool hydraulics, hydroproofing valves and piping, and BOP backup.
- **High Pressure Gas Boosters** - for leak testing, helium /oxygen loading for saturation divers.
- **Turbine Meters** - for custody transfer control in pharmaceutical blending, research and ultrapure water flow control.

10

LIFE SUPPORT & RECREATION

- **High-Pressure Oil-Free Gas Boosters** - Charges breathing air into SCBA and SCUBA tanks for recreational or technical divers, fire departments, and law enforcement.
- **High-Pressure Oil-Free Gas Boosters** - Refill oxygen bottles used for ambulance, airline, and private aircraft emergency breathing.
- **High-Pressure Oil-Free Gas Boosters** - Services paintball nitrogen or CO₂ propellant bottles.

12

FACILITIES: CHATSWORTH, CALIFORNIA, USA

- **Our TEAM** of dedicated professionals works together toward the common goal of meeting quality objectives and looking forward to new challenges.
- **Facilities:** Engineering; Machining; Sheet Metal and Welding; Assembly; Quality Assurance and Inspection; Pump and Booster Group; and the Flowmetrics Group.

14

MILITARY AIRCRAFT & AEROSPACE

PORTABLE TEST EQUIPMENT

- **The Portable Hydraulic Test Stand** provides the required flows and pressures for operational testing of aircraft hydraulic fluid systems and components. The test stand is also fully equipped to perform the following operations:
 - Drain and fill aircraft hydraulic systems
 - Filter aircraft hydraulic systems; Perform testing of aircraft hydraulic systems and sub-systems
 - Pressure check aircraft hydraulic systems for internal and external leakage
 - Provide a source of hydraulic power for static-proof pressure testing of aircraft systems and components at pressures up to 6000 PSI.
 - Single, dual, or triple output systems
 - Electric or diesel powered

STATIONARY TEST EQUIPMENT

- **PHT Series for pneumatic components** - Operates/Tests with Nitrogen or shop compressed air.
- **Universal Component Test Benches** - Tests pumps, motors, actuators, and valves per DoD specifications with completely autonomous or manual control modes.
- **Easy to program software interfaces** allow the user to customize the testing environment and parameters.
- **Hydraulic hose and tube hydrostatic test benches** - Provides proof and burst testing pressure up to 30,000 PSI of aircraft hoses and tubes.
- **Centralized hydraulic power systems** - Provides flight lines or aircraft assembly facilities with centralized hydraulic power.





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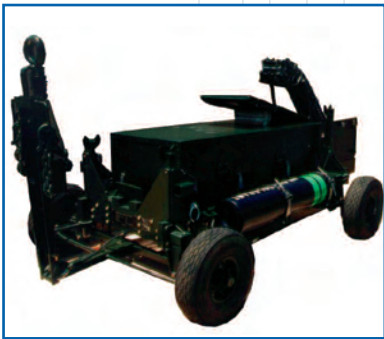
B



SHOP AIR
FOR DRIVE



HIT AIR DRIVEN
GAS BOOSTER



MILITARY AIRCRAFT & AEROSPACE (Cont.)

GROUND SUPPORT AEROSPACE

- The Space Shuttle **Internal atmosphere control unit** ensures that no earthbound bacteria or contaminants penetrate any of the internal compartments between launches.
- Automated medium range ballistic missile **launch pads** provide rapid release of the missile during the launch sequence.
- **Missile guidance systems and I/R seeker** sections are serviced using high-pressure argon, helium, or nitrogen gas boosters.

MUNITIONS LOADING EQUIPMENT

- USN **Linkless Ammunition Loading System (LALS)** is used to store, transport, load, and download 20mm ammunition from F-14 and F/A-18 M61A1 gun systems. The USN version utilizes a manual drive interface for loading and downloading.
- USAF LALS is used to **store, transport, load, and download** 20mm ammunition from F-15, F-16, and F/A-22 aircraft gun systems. The USAF version utilizes either a manual or pneumatic drive interface for loading and downloading.
- MHU-83 D/E “Jammer” is a **self-propelled munitions** handling unit with a diesel driven hydrostatic system also supplying the lift boom functions of lift, yaw, tilt, and roll rated to 7,000 pounds. The MHU-83 is qualified and certified by the USAF for handling nuclear munitions. Units are also available in an electrical version powered by rechargeable batteries. CE certified.
- MJ-1C is a diesel driven **self-propelled aerial stores loader** rated to 3,000 pounds on the bomb table through a range of 78”. Units are also available in an electrical version powered by rechargeable batteries. CE certified.





ADDITIONAL EQUIPMENT

- **Cabin Leakage Tester:** Electric or diesel driven. Cabin pressure test ranges from small fighter to large transports.
- **Corrosion Control Carts:** Facilitates engine washes, corrosion prevention, and engine gas path cleaner.
- **Air Conditioning Units:** Provides cooling air for cockpits, avionics, and cabins during ground operations.
- **Fuel Component Test Equipment:** Tests all fuel related components, injectors, pumps, and valves.
- **Aircraft Jacks and Assembly Fixtures**



COMMERCIAL AIRCRAFT

SUPPORT EQUIPMENT PORTABLE OR STATIONARY

- **Universal hydraulic test benches** service and test the hydraulic functions for current and next generation emerging mid- to large-body aircraft.
- The Portable **Hydraulic Test Stand** provides the required flows and pressures for operational testing of aircraft hydraulic fluid systems and components. The test stand is also fully equipped to perform the following operations:
 - Drain and fill aircraft hydraulic systems
 - Filter aircraft hydraulic systems; Perform testing of aircraft hydraulic systems and sub-systems
 - Pressure check aircraft hydraulic systems for internal and external leakage
 - Provide a source of hydraulic power for static-proof pressure testing of aircraft systems and components at pressures up to 6000 PSI
 - Stainless steel housings for compatibility with Skydrol fluid
- Aircraft Cabin **Leakage Testers** are manufactured to include comprehensive instrumentation to monitor temperature flow and pressures. Special Flowmetrics rotometers are used to detect air leakage at very low pressures.

SERVICING EQUIPMENT ONBOARD GASES

- Aviator's Breathing **Oxygen (ABO) transfer booster** packages charge flight bottles directly from ABO supply cylinders without cascading. Boosters are pneumatically driven and controlled, are non-lubricated, and are hydrocarbon free. The package can operate unattended while charging multiple units to a pre-adjusted final pressure.
- **Portable gas booster** package with controls and connecting hardware that works directly from a nitrogen cylinder can be used for nitrogen top-off for shock struts, accumulators, and tires.
- **Slide chute propellant bottle charger** is powered by shop air to deliver nitrogen CO₂ mixtures at any selected output pressure to propellant bottles in the shop or on the aircraft.

HYDRAULIC TOOL SUPPORT

- Air driven **high-pressure pumps** are hand portable or cart mounted for precise control of tripod or landing gear jacks.
- Air driven, **high-pressure, hand portable** packages are available with a hand pump option for in-shop powering of crimping, cutting, and swaging tools.





GENERAL INDUSTRY

FLUID POWER HYDRAULIC OR PNEUMATIC

- Hydraulic accumulators maintain a nitrogen gas precharge with **gas boosters**.
- Isostatic presses provide 50,000-80,000 PSI with **high-pressure pumps**.
- Machine tools maintain critical forces at hydraulic clamp stations with **high-pressure pumps** at stall.
- Filter presses lock up rams with **high-pressure pumps** at stall.
- Pneumatic powered production machines are assured of ample air pressure with **air pressure amplifiers** powered by marginal plant air pressure.

AUTOMOTIVE INPLANT OR R&D

- Air bags-production charging of high-pressure inert gas mixture into actuator bottles with multi-stage **gas booster systems**.
- Flow measurement research for fuel, coolant, brake fluid, transmission fluid, and power steering fluid is accurately accomplished with **Flowmetrics turbine flow meters**.

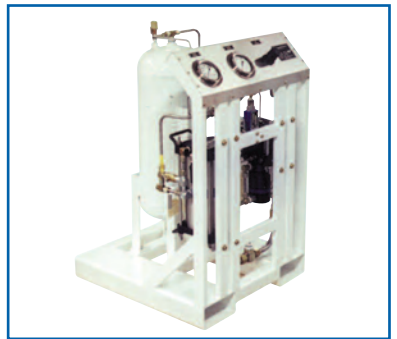
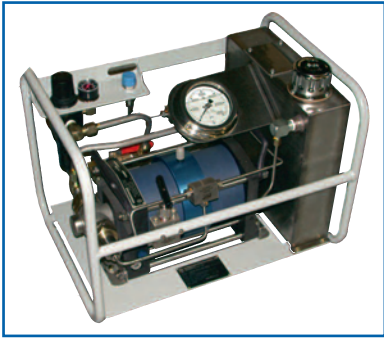
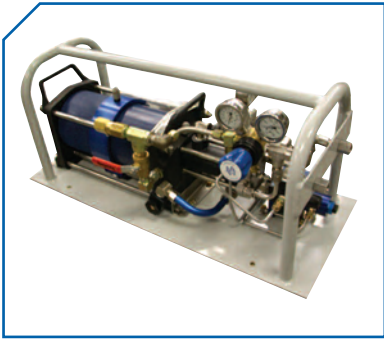
PLASTICS

- Gas injection into molding presses with either **high-pressure pumps** delivering liquid phase to vaporizers or **gas boosters** directly injecting the gas.

ENERGY

- Flow monitoring of cooling water through gas turbine driven generators with Flowmetrics turbine flow meters.
- Transfer and scavenge of liquefied dielectric SF₆ gas with air-driven piston pumps.
- Hydroelectric power-plant water flow control **gate actuators-automated** hydraulic power systems.





GENE



OIL, GAS, PETROCHEMICAL & PHARMACEUTICAL

PRODUCTION

- Sub-sea safety shutdown valve actuators require oil pilot control from **high-pressure pumps** on the platforms.
- **High-pressure pumps** are used for chemical injection into gas or oil flow lines.
- **High-pressure pumps** are used for hydroproof testing of components and piping to API specifications. Follow-on leak testing is performed using HII **gas boosters**.
- Saturation divers performing maintenance on sub-sea installations depend on helium/oxygen blends as a breathing gas. This gas is handled by oil-free high-pressure **gas boosters**.

DRILLING

- Blowout preventers (BOP) provide immediate shutdown if the downhole pressure exceeds maximum limits. The rotary pump's hydraulic power systems may become inoperative due to electrical interruption. Backup is always provided with air-driven high-pressure pumps.
- Throttling "choke" actuators in mud lines and flow lines also use high-pressure pumps for hydraulic control.

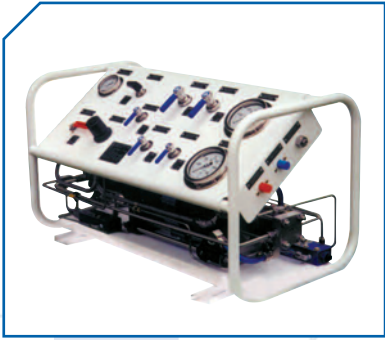
PETROCHEMICAL & REFINERIES

- **Flowmetrics** turbine flow meters provide 1% accuracy for flow measurement throughout the blending process and for custody transfer.
- High-pressure pumps with intrinsically safe drives carefully control bolt tensioning and torque with hydraulics up to 60,000 PSI.

PHARMACEUTICAL

- **Flowmetrics** turbine flow meters provide accurate flow measurement of ultra-pure water for drug research.
- High-pressure pumps are used with ultra-pure water to blast eyeglass lenses clean prior to coating.





LIFE SUPPORT & RECREATION

FIRE DEPARTMENTS & EMERGENCY MEDICAL SERVICE (EMS) FACILITIES

- Self-contained breathing apparatus (SCBA) requires high pressure oil-free air as high as 6000 PSI using **gas boosters**.
- Oxygen bottles used for medical emergencies need repeated recharging from supply cylinders or LOX vaporizers using oil-free **gas boosters**.

RECREATIONAL SPORT DIVING & TECHNICAL DIVING

- Dive store air stations compress air for SCUBA tanks into storage cylinders. The stored air is boosted on demand into dive tanks using **gas boosters**.
- Technical divers enrich their air with oxygen, helium, or argon for various types of dives using a **gas booster** blending systems.

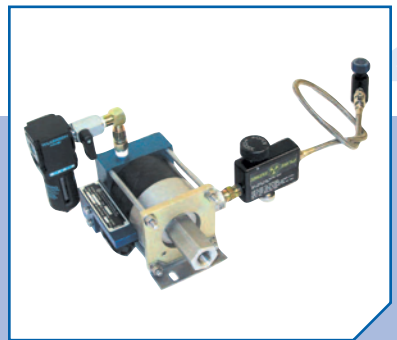
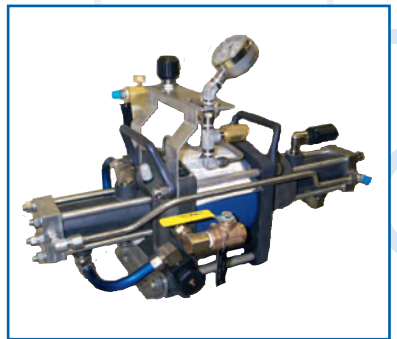
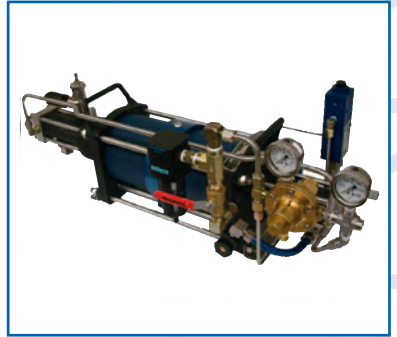
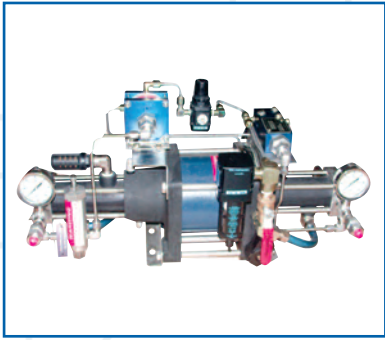
PAINTBALL COURSES & TOURNAMENTS

- Paintball courses use high-pressure gas to propel each shot. The propellant gas bottle requires continual recharging with liquid CO₂, Nitrogen, or **high-pressure air using high-pressure pumps or gas boosters**.

AUTOMOBILE RACING

- Many Import Tuner and race vehicles rely on injected nitrous oxide (N₂O) to increase horsepower. The vehicle's on-board nitrous bottles can be recharged with special **high-pressure liquefied gas transfer pumps**.





FACILITIES: CHATSWORTH, CALIFORNIA, USA

QUALITY ASSURANCE & INSPECTION

- Programmable coordinate measuring machine (CMM)
- Laser topography measuring device
- Optical comparator with digital readout
- Micro-air gauging to 25-millionths of an inch
- ISO 9001:2000 DoD Certified Quality System
- On-Site Government DCMA inspector
- Selected products conform to CE and ATEX directives

ENGINEERING

- Individual component or complete system design and analysis utilizing Pro-E, AutoCAD, and Solid Works 3-D solid modeling software.

MACHINING

- Fully integrated and diversified capability covering CNC control, multi-axis live tooling, vertical and horizontal pallet machine centers, honing, lapping, O.D. grinding, gear hobbing, and EDM. **HII** operates and maintains over 70 modern machining tools.

SHEET METAL & WELDING

- Complete in-house facility for building various types of system cabinets and enclosures. Major area include flying-bridge water-jet cutting, laser cutting, press brake capability up to 175 tons. Fully equipped and capable of fabrication using steel, aluminum and exotic stainless-steel alloys.

CLEAN ROOMS

- HII maintains two clean room units. One unit is a class 10,000 and the second unit is a class 100,000.

PUMP & BOOSTER ASSEMBLY

- Performance testing of every unit with test results documented and retained.
- High-pressure oxygen to 5,000 PSI.
- With an inventory exceeding \$1M, **HII** can provide a selection of over 320 models of air-driven pumps, gas boosters, air-pressure amplifiers, and high-pressure directional and pressure control valves.
- Integrated systems packaging with high-pressure tube assembly fabrication to 100,000 PSI.

FLOW METRICS, INC. SINCE 1994

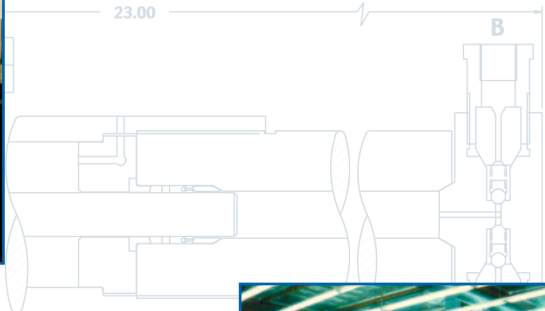
Integrated in-house capability includes:

- Liquid flow calibration for oil to 100 GPM and 220 F; For water up to 100 GPM and 200 F
- Computer controlled Bell Prover for gas flow
- Viscosity blending calibrator
- Tubular glass forming – 1/8" to 41/2" inner diameter with length up to 600mm

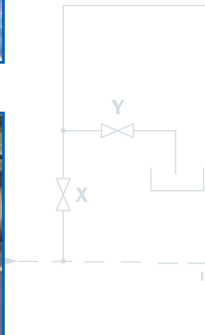




HII AIR DRIVEN
PUMP



MODEL
IA100K3



FACIL



FACILITIES: CHATSWORTH, CALIFORNIA, USA



- CORPORATE HEADQUARTERS AND OFFICES, SALES, ADMINISTRATION, FABRICATION AND ASSEMBLY



- ENGINEERING, ASSEMBLY AND TEST FACILITY



- MACHINE SHOP FACILITY

CUSTOMERS

REFERENCES

Some Industries Utilizing Hll Products
Include (But Are Not Limited To):

- Aerospace
- Automotive
- Commercial Aviation
- Defense
- Emergency Medical Services
- Energy Creation And Distribution
- Engineering
- Fire Departments
- Fluid Power
- Food Packaging
- Hospitals
- International Militaries
- Law Enforcement Agencies
- Manufacturing
- Oil Drilling
- Paintball
- Petrochemical
Production
- Pharmaceutical
- Plastic & Manufacturing
- Private Aviation
- Railway
- Recreational Diving
- Refineries
- Safety Devices
- Ship Building
- Specialty Automotive
Racing
- Technical Diving
- Textiles
- US Military



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