

Maritime Dynamics marine controls

...custom manifolds and system design.

Hydraulically Controlled Stabilizing Fin



5HP Marine Hydraulic Power Unit



Problem:

Maritime Dynamics needed a compact hydraulic power unit and control valve system that could withstand the rigors of the sea and be easily serviced anywhere in the world.

Solution:

Engineered and manufactured custom power unit and valve manifold assembly utilizing space efficient components and corrosion resistant materials.

Result:

The compact power unit and manifold assembly weigh less and take up less space, while reducing potential leak points. Maritime Dynamics can troubleshoot the system without having to dispatch a field service technician overseas or send unnecessary parts.



Hydraulically Controlled Thrusters



Custom Hydraulic Manifold

'Why' Advanced Fluid Systems?

While our custom power units and manifolds exceeded Maritime Dynamic's previous designs for power and efficiency in a restricted space, it is the support and assistance that defines our partnership. Hydraulic system review, consultation, and 24-7 technical support are just some of the free services we regularly provide.

Case 1 Study:

'How' we did it:

Designed assemblies and selected components for easy troubleshooting and servicing anywhere in the world. The Sun Hydraulics custom manifold's multiple test points and efficient design permits Maritime Dynamics to troubleshoot more system problems with a phone call rather than a trip overseas. The Sun cartridge valves can be quickly changed and reduce potential leak points because they eliminate the need for hose and pipe connections.

Incorporated marine friendly materials and custom components including light weight aluminum fabrication, marine epoxy paint and a salt water-to-oil heat exchanger. The hydraulic power unit utilizes an efficient layout that encloses many components, such as the pump, filter and heat exchanger inside the reservoir to save space and protect them from the marine environment.

Utilized Sun's 5-axis compound manifold drilling and floating cartridge valve construction for a compact design with fewer potential leak points. The 5-axis manifold drilling process requires less material, no construction plugs and results in extremely low pressure drops. The manifold assembly incorporates multiple Sun cartridge valves, an ATOS proportional control valve and an accumulator in one package resulting in less space and weight, with no external hoses or piping.

The custom 5HP hydraulic power unit and manifold (pictured left) assembly are designed to operate at up to 7 G's, or seven times the force of gravity, for use on Fast Interceptor boats.

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Founded in 1985, Advanced Fluid Systems is a fluid power distributor and systems manufacturer committed to providing quality fluid power products, solutions and services. Built around experienced sales engineers and a culture of employee empowerment, we work closely with each customer to provide the best solution for their application. Our philosophy is simple, "learn the customer's business; build a relationship and a partnership; and provide them the highest quality solutions, products and services". Learn more about us at our web site www.advancedfluidsystems.com or contact us at the phone number listed below for additional information.

Advanced Fluid Systems, Inc.

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Mobile Case Studies in Success

Advanced Fluid Systems, Inc.

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Your Application, Our Responsibility.

Advanced Fluid Systems' solution oriented approach thinks beyond the hydraulic components and assemblies to understand your entire application and how it operates. Fully understanding your application gives us the foundation to design integrated hydraulic, electronic and mechanical solutions that address all of your motion control requirements. Much of our success is attributed to the total commitment we make to each project and the partnership we form with each customer. We build these relationships by taking complete responsibility for design and implementation at a fixed price, while providing state of the art engineering and innovative, quality components. Our responsibility to you doesn't end with an invoice. We provide support anywhere you need us - 24 hours a day, 7 days a week. The following case studies are a few examples of the expertise and commitment we bring to every application, regardless of size or scope. Each case demonstrates a problem identified, solution implemented and a result realized. Ask us how we can help you find your result.



Intro: Design and Engineering Capabilities.

Modern advances in hydraulic and electronic controls offer many affordable options for improving your mobile application. Some of these design and engineering capabilities we employ include:

- Programmable motion and logic controls designed and programmed by our in-house engineering.
- Multi-axis joystick, LCD touch screen and radio remote user interfaces seamlessly incorporated into your application.
- Custom manifolds combining integrated cartridge valves, diagnostic ports, face mounted valves, and more; while reducing size, weight and costs.
- Hardware and software integration for J1939 engine management and feedback.
- Manual and electro-proportional control valves that permit pressure compensation, load sensing and other control options independent of each section.
- Corrosion resistant materials and manufacturing techniques for marine applications and other harsh environments.

Problem: Shramm Inc's drill rig controls required the user to constantly monitor engine horse power and manually adjust the hydraulic actuated levers while drilling to maintain proper system load and drill speed.

Solution: Utilized electro-proportional controls and a digital interface to automate the drilling process and provide real-time system and vehicle feedback.

Result: A less experienced field operator can operate the drill rig, and drilling time is significantly reduced. Operating costs and downtime are reduced by extending the drill bit, tooling and engine life.

Case **2** Study:

Schramm, Inc. T455i drilling rig ...system design and automation.

'How' we did it:

Replaced the manual hydraulic valves with digital multi-axis joysticks and custom Sun electro-proportional control valves, allowing for PLC control while simplifying the hydraulic circuit and reducing piping costs.

Designed and programmed PLC logic to automatically and continuously:

- monitor, recalculate and adjust the drill bit speed and force allowing the drill bit to move at the most productive speed possible without damaging the bit.
- regulate the drill rig's cooling fan to the minimum speed adequate to maintain the temperatures of the engine, air compressor, and hydraulic system to reduce fuel consumption and noise.
- report real-time Tier 3 engine data and trouble codes for engine load, speed, and service status via the control panel LCD display.

'Why' Advanced Fluid Systems?

Advanced Fluid Systems wasn't the first to propose drill rig automation to Schramm, but we were the first to take complete responsibility for design and implementation for a fixed price. We took the time to learn how the entire drill rig operated from the ground up, and partnered with Schramm to develop a unique, integrated solution.



Schramm's original control panel required the operator to use a series of levers, knobs and gauges to constantly monitor and manually adjust the load on the system when drilling. The new control panel, with PLC logic and software designed by Advanced Fluid Systems, allows the operator to set the drilling parameters and 'walk away'. The new control system utilizes custom Sun proportional control manifolds and IFM Efector electronics to automatically monitor and adjust the pneumatic and hydraulic load of the system and provide real-time feedback via a color LCD display.

American Lafrance aerial platform ...programmable valve controls and system integration

Problem: American Lafrance needed a compact and reliable hydraulic control system that offered better performance and could integrate into their existing CANbus network.

Solution: Employed Hawe Hydraulics' proportional control valves and custom software to monitor the ladder position and allow more precise movement. Provided data integration, inventory management and remote diagnostics to reduce production costs and vehicle downtime.

Result: The "intelligent" controls allow for faster, safer ladder movement from multiple control stations. Data exchange of different protocols and off-site inventory management reduces production and field service costs.

'How' we did it:

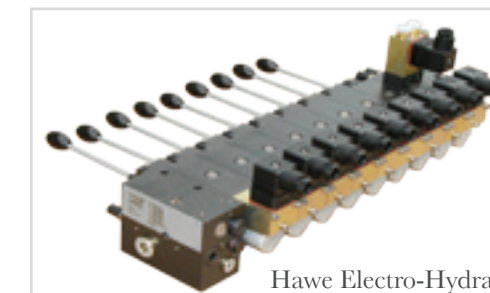
Utilized Hawe electro-hydraulic and manual proportional control valves for ladder, platform and outrigger controls. After evaluating several valves, including Parker/Apitech, Rexroth, and Sauer Danfoss, American Lafrance's testing team unanimously agreed that the Hawe valves performed the best.

Incorporated microprocessor based valve controllers and developed custom software to provide more uniform ladder speed regardless of its position or extension. A Hawe valve controller monitors the ladder elevation (angle) and ladder extension (length) through a series of sensors. When joystick input is received, the Hawe controller and custom software calculate an adjusted valve command, which is then sent to the proportional valve. Some advantages include:

- Smoother, safer ladder control regardless of user input or ladder position.
- Programmable position limits prevent the ladder from hitting the truck or other hard points.
- Ladder loading is calculated in real-time and can be monitored on multiple operator displays.

Provided data integration, remote diagnostic and inventory management services. Integrating J1939 and CANopen protocols on the existing CANbus network allows for operation and monitoring from multiple locations with less wiring. Other services include real-time remote diagnostics via modem and inventory management of components and service parts.

Case **3** Study:



Hawe Electro-Hydraulic Proportional Control valve with manual over-ride.

'Why' Advanced Fluid Systems?

While American Lafrance explored hydraulic control options from various distributors and manufacturers, they chose Advanced Fluid Systems because of our total commitment to each solution, and the responsibility we take for the entire system. We learned the aerial platform challenges first hand and implemented a complete hydraulic and electronic motion control solution as a partner, not a vendor.