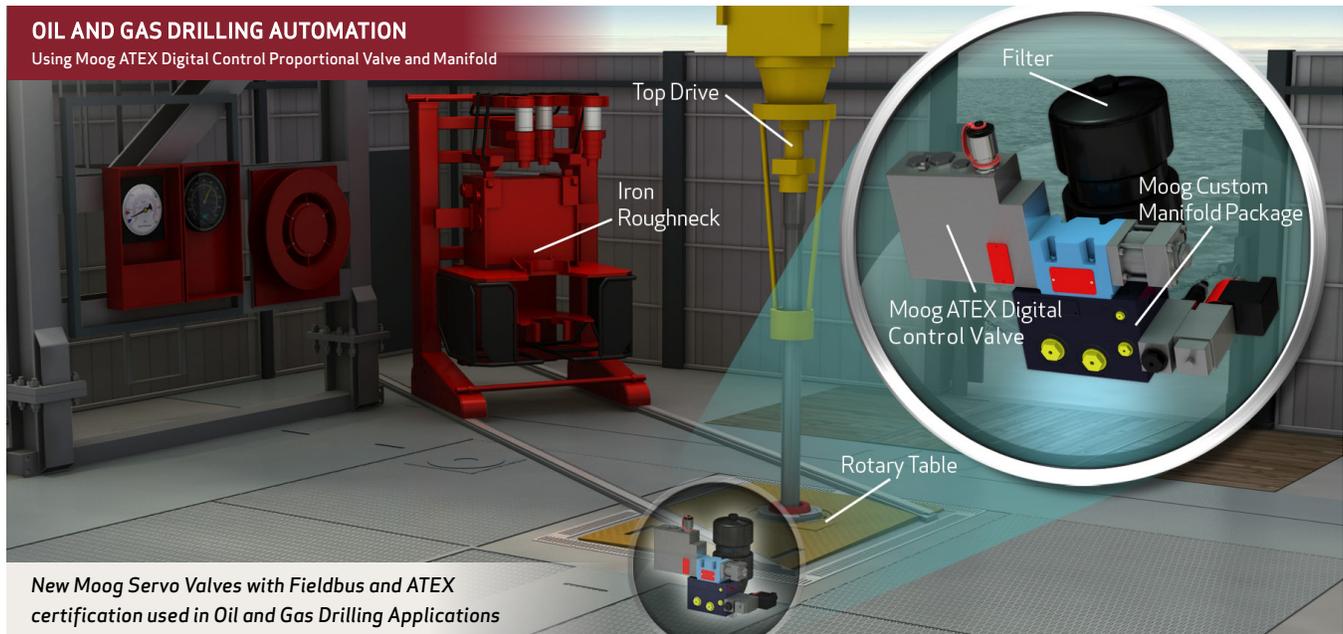


PRECISION MOTION CONTROL GIVES MACHINE BUILDERS THE EDGE WHEN DESIGNING FOR HOSTILE OPERATING ENVIRONMENTS.



Oil and gas drilling represents one of the world's most extreme operating environments. Reaching deep below the surface, under heavy use and constant vibration with the looming potential to release underground gas pockets takes a significant toll on drilling subsystems. To offer machine builders better options in motion control technologies, Moog expanded its successful family of servo valves certified for potentially hazardous environments to include the Digital Control Proportional Valve with advanced functionality designed to meet the rugged requirements for applications in hazardous environments such as oil and gas drilling.

Problem statement

Servo-hydraulics on drilling and offshore systems for hazardous area installations are challenging to design for many reasons. A particular challenge involves obtaining repeatable response characteristics. A specialized skill set is required from technicians to tune feedback from external pressure sensors or to adjust potentiometers to the precise gain setting needed for a stable but responsive actuator. Repeatability from system to system is difficult to achieve without significant time and skill invested in careful adjustments, often requiring an oscilloscope. Other considerations include finding reliable motion control hardware with suitable certifications for the specific, potentially hazardous area where your application will occur and ensuring compliance for any country-specific requirements.

Solution

Advanced proportional valves with onboard digital electronics and integral pressure sensors are now available with certifications for use in potentially hazardous areas. One of the primary benefits of digital control valves is the ability to reduce the number of components and complexity of hydraulic subsystems. In addition, valve control signals and sensor input are combined in the onboard electronics and potentiometers have been replaced with internal software-based parameter settings to offer easy tuning. Settings can be entered numerically in the software with each setting value easily confirmed and repeated. Once all of the specific parameter settings are configured during the initial test and calibration, these parameters can be confirmed and the optimized set becomes the standard for all future valves with that part number.

Moog's Digital Control Proportional Valves are simple to tune and ensure repeatable response characteristics compared to adjusting potentiometers. The sensors and related feedback loops are preconfigured within the valve at the factory and can be configured with simple graphical adjustments through Moog Valve Configuration Software, available free from the Moog website. To meet requirements of use in potentially hazardous areas, these valves have been certified to the requirements of ATEX and IECEx for Zone 1, Category 2G locations.

MOOG

APPLICATION SUCCESS STORIES

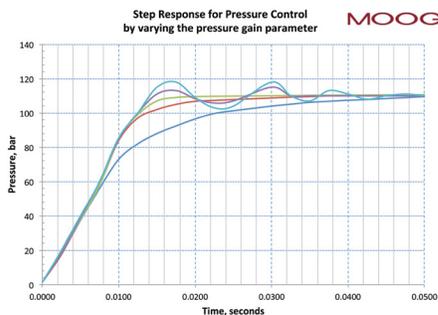
Here are two motion control applications in oil and gas that have seen the greatest improvement because of these valves.

1. Closed-Loop Pressure (p) Control - Drawworks Disc Brake, Hydraulic Calipers



The use of the Moog Digital Control Servo Valve in this application had the following results:

- Eliminated external sensors, amplifier modules, barriers and related enclosures
- Reduced settling time by 60 % for more stable control through multi-loop closure with main spool position feedback and pressure sensor
- Provided improved operator feel on the brake and reduced brake pad wear
- Enabled remote access for troubleshooting and improved system performance through a fieldbus that enabled local- or network-based parameter changes



With an easy adjustment to 1 or 2 set points, the setting time and amount of overshoot can be changed to quickly meet the application requirements for no overshoot.

2. Flow and Pressure (pQ) control - Hydraulic Motor (Rotary Table, Winch & Mooring)



The use of Moog Digital Control Servo Valve in this application had the following results:

- Eliminated the need for separate flow and pressure control servo valves (2 valves), instead incorporating a single valve receiving multiple inputs for flow (speed /velocity) and pressure (force /torque) control
- Reduced hardware complexity for quicker start-up and easier troubleshooting

- Eliminated need for transition from individual valve modes and provided seamless control over both flow and pressure at the same time
- Offered quick configuration for p, Q or pQ control depending on the application requirements, selectable control signals for analog (4-20 mA or +/- 10 VDC) or fieldbus (i.e., Profibus, Ethercat, CanOpen) and optional connectors provided for the addition of other local sensors or to daisy chain multiple valves into arrays

Moog solutions for oil and gas drilling and production



As a global provider of world-class motion control solutions for offshore and onshore topside installations, Moog's focus is on helping our customers eliminate performance problems, timing

lags, component wear from instability and unnecessary complexity to maximize the operational efficiency of their systems. We engineer and build reliable hydraulic solutions that optimize performance in topside applications with robust valve and manifold packages that also reduce wiring and hydraulic connections.



Customers who operate offshore and onshore machinery in potentially explosive environments also need to ensure maximum safety. To provide the highest level of confidence in the safety of our products, Moog obtains international approvals including ATEX, IECEx, FM, UL, ETL, TIIS, and CSA. With a wide range of certified products to ATEX and IECEx for

Zone 1, Category 2G locations, Moog engineers the rugged construction, high performance and special designs for high temperature that customers require for long service life.

There are electric components and solutions that may fit your application needs as well. Check with Moog.

To find a Moog expert near you who can help you find the best product for your needs, visit www.moog.com/oil-gas or call + 1.716.687.4954 or email info.usa@moog.com