Self-Contained Electro-Hydraulic Systems

Introduction

Originally developed for the offshore Oil & Gas Industry, Paladon Systems Self-Contained Electro-Hydraulic Control Systems provide a rugged and reliable valve automation solution. Typically used in applications in which external pneumatic or hydraulic power sources are unavailable, unreliable or uneconomical, these fully customizable systems provide:

- The same simplicity and low cost installation as provided by electric actuators
- Fail safe or fail last operation
- The power, precision and compact size of hydraulic systems
- Industry leading control options and system diagnostics

Applications

Fully customizable systems are available for practically any application and environment; however, common ones include:

- Partial valve stroking
- Onshore and offshore ESD valves
- Wellhead choke valve positioning
- Control & globe valve positioning
- Water reservoir level systems
- Suction and discharge pump metering stations
- Gas pipeline linebreak shutoff systems
- Ballast systems for FPSOs
- Refinery fire control systems
- Tanker loading/offloading facilities
System Overview

Paladon Systems Self-Contained Electro-Hydraulic Control Systems are integrally mounted to the actuator, and typically consist of the following basic system components:

- Non-Pressurized Hydraulic Reservoir
- Electric Pump/s
- Hydraulic Accumulator/s
- Electro-Hydraulic Control System
- Hydraulic Valve Actuator/s
Key Features & Options

- On/off and modulating operation
- Partial valve stroking
- Compatible with biodegradable fluids
- Compact design
- Direct acting zero leakage solenoid valve for proportional control with accuracy and fast response
- Manifold construction to eliminate pipework and increase system reliability and ruggedness
- Precise valve positioning capabilities using Paladon’s unique TVC Hydraulic Positioner
- Manual override
- Hydraulic accumulators to provide fast valve operation and back-up valve control on loss of main power supply source
- Systems flushed to NAS1638 Class 8 as standard, NAS1638 Class 6 available
- Full diagnostic capabilities and communication with all industry standard protocols
Operating Ranges

- Electrical Power Supplies
  - 24VDC
  - 115/220 VAC, 50/60 Hz, Single Phase
  - 380/415 VAC, 50/60 Hz, Three Phase
- Hazardous Area Certification
  - ATEX Zones 1 and 2
- Hydraulic Pressure Output
  - 3045 to 5075 psi
- Ambient Operating Temperature
  - -76°F to +140°F (-60°C to +60°C)
- Actuator Output
  - 1,770 to 4,435,000 lb-ins
  - Up to 49,907 lb

Diagnostics

- Pump Running Operational & Standby
- Pump Fault Operational & Standby
- High Oil Pressure
- Low Oil Pressure
- Low Low Oil Pressure
- Low Oil Level
- High Oil Temperature
- Filter Condition
Positioning Systems

The TVC Hydraulic Positioner is designed specifically to provide precise positional control of hydraulic actuators with on-off or proportional solenoid valves. The TVC can accept position feedback from a three wire potentiometer or a position transducer with a current output. Key features include:

**Basic System**
- Zone 1 / 2 Infrared communication interface using an Exia keypad
- Large graphics LCD with comprehensive status and data display
- Three way galvanic isolation – command in, actual position out and power supply
- Selectable sinking or sourcing actual position 4-20mA output
- Local / remote configuration enable input and open drain status output
- Selectable solenoid drive sense for failsafe operation
- Selectable default operation on command signal/feedback signal break
- ESD solenoid output - 24VDC open drain
- Fault output - 24VDC open drain
- Hydraulic pump drive controlled by demand or external pressure sensors
- External fault contact monitoring
- Selectable interlock between ESD and fault outputs
- Stepping mode with adjustable ON and OFF times
- Low power - normal operation less than 2W plus solenoids

**Enhanced System**
- HART communication channel on re-transmitted actual position signal
- Foundation Fieldbus interface
- 3 analog inputs for hydraulic system monitoring and condition monitoring
- Performance logging with USB download
- 2.5A proportional solenoid drive with PID control
- Partial stroke valve testing with logging
Additional Products

- **PN & HY-Series Scotch-Yoke Actuators**
  PN & HY-Series actuators are high performance pneumatic and hydraulic scotch-yoke actuators designed to operate any quarter-turn mechanism in both double-acting and spring-return configurations.

- **PNL & HYL-Series Linear Actuators**
  PNL & HYL-Series are high performance pneumatic and hydraulic actuators designed to operate any linear valve or mechanism in both double-acting and spring-return configurations.

- **Positional Control Systems**
  Paladon’s Electro-Hydraulic Positional Control Systems are suitable for the accurate positioning of Choke, Control, Globe or Ball Valves; either for continual modulation or stepping functions.

- **GH-Series Gas-over-Oil and DG-Series Direct Gas Actuators**
  GH-Series and DG-Series actuators are typically used in gas pipeline applications. For GH-Series, the hydraulic supply pressure is provided by the pipeline gas pressure acting on oil within the tanks in the control system. For DG-Series, the pipeline gas is used directly to power the actuator.

- **Subsea Actuators**
  The rugged and flexible design does not require pressure compensation for depths down to 650 ft (200m). For deeper applications, a pressure compensated design is available for depths down to 6,500 ft (2,000m).

- **Autonomous Shutdown Valve (ASV)**
  The ASV is designed to be applied to pipeline loading systems, Calm Buoy, SLS and similar systems. The ASV provides full automatic fail-safe operation of subsea valves to isolate pipelines from flexible risers.