



# ITT

## Midland-ACS Electro-Hydraulic Valve Actuation

- ONSHORE & OFFSHORE SYSTEM APPLICATIONS
- LINEAR ACTUATION AND CONTROL
- 1/4 TURN ACTUATION AND CONTROL
- RING MAIN & SELF CONTAINED SYSTEMS
- DOUBLE ACTING SYSTEMS
- SPRING RETURN ACTUATOR SYSTEMS
- STEPPING FEATURE



*Engineered for life*

**MIDLAND-ACS**

*Severe & Hazardous Area Experts*

[www.midland-ac.com](http://www.midland-ac.com)

## INTRODUCTION

*As a specialist manufacturer of Electro-Hydraulic Actuation equipment we offer comprehensive purpose designed, engineered and manufactured solutions for the operation of choke and control valves installed on and offshore. Ring main & self contained control options incorporating special features including:*

- *Double acting systems for choke valves used for position and modulating control with a fail safe in position, fail safe closed or fail safe open options.*
- *Spring return actuator systems for positioning and modulating control incorporating a preloaded mechanical spring arrangement to provide failure position conditions in the event of electrical power/signal or hydraulic supply failure.*
- *Self Contained Actuator Control Assemblies - For installation where existing hydraulic supply is not available. Integral hydraulic power unit and control equipment.*
- *Stepping feature - Available on all systems providing positioning control with extended operating times associated with choke valves. Fail safe in position and fail safe open or closed options available.*

*Special purpose design systems available on request, including:*

- *Hydraulic control cabinet assemblies*
- *Solar power self contained systems*



# ELECTRO-HYDRAULIC VALVE ACTUATION



## **Hydraulic Actuation**

### **Linear Piston Type**

- Double or single acting

### **Construction**

- Tie Rod or Bolted Assembly

### **Materials**

- Piston rods - Stainless Steel with hardchrome plate
- Pistons, End Caps and tubes - Carbon Steel with Stainless option
- Tie Rods & Fixings - Stainless Steel
- Protective Finish - All external surfaces protected against harsh environmental conditions with 2 pack epoxy paint system to project specification requirements.

### **Position Feedback Device**

- In cylinder Potentiometric Intrinsically Safe
- In cylinder LVDT/transmitter EExd or EExia with voltage or current signal
- Independent externally mounted position transmitter EExd, EExia, HART or Foundation Fieldbus

### **Mechanical Position Stop**

- To provide adjustment for open and closed valve position limitations

## **Hydraulic Control**

### **Manifold Assembly**

In Stainless Steel comprising;

- ~ Solenoid control valve
- ~ Pressure Filter with pop up indicator
- ~ Speed control valves
- ~ Components - check valves, pressure gauge, pressure control & optional relief valve

### **Solenoid Valves**

- Solenoid valve EExme, EExd & EExia intrinsically safe
- Power - 8 watts & 3.5 watt and 1 watt EExia

### **Control Cabinet**

- 316 Stainless Steel
- Provides IP66 / Nema 4x housing protection and safety

### **Operating Fluids**

- Mineral Oil
- Water based / Water Glycol
- Synthetic Fluids

### **System Pressure**

- Up to 350 bar

### **Operating Thrust**

- Up to 22,500 kg.f (50,000 lb.f)

## ELECTRO-HYDRAULIC VALVE ACTUATION

### Operation of Linear and Quarter Actuators

#### Double Acting

- Providing high operating thrusts with fail in position control
- Double Acting Actuator Control Action to provide Fail Fix in position on loss of hydraulic supply, loss of electrical supply, or loss of Command Signal.

#### Single Acting - Spring Return

- Providing fail to position control by mechanical spring with installed load to provide valve seating thrust.
- Fail action - open/close
- Spring Return Actuator Control Action to provide Fail to Open or Fail to Close valve position on loss of hydraulic supply, loss of electrical supply, or loss of Command Signal.



CERTIFICATION OPTIONS AVAILABLE



# ELECTRO-HYDRAULIC VALVE ACTUATION

## **Self Contained Actuator Control Assemblies Systems**

For installation where existing hydraulic supply is not available.

Integral hydraulic power unit and control equipment.

- To provide all operating all operating characteristics for Double Acting, Single Acting and Stepping Options
- Linear and ¼ turn options

### Supply Voltage

- Typical voltages - 24VDC, 110v, 220v 1 Phase 400v 3 Phase 50/60Hz

### General

- Certified for Zone 1, Class 1 Hazardous Areas
- ATEX 94/9/EC
- Manifold mounted solenoid and speed control valves with hydraulic supply pressure filter and pressure gauge
- 316 Stainless Steel hydraulic control components
- Optional Stainless Steel control cabinet
- Interface designed to suit the standard valve top works
- Wide range of positional controllers available



### Optional Features

- High/low temperature applications
- Open/close end position indication
- Mechanical position stop for opening & closing limitation
- Independent position transmitter with HART/F.F and EExd/I.S options



CERTIFICATION OPTIONS AVAILABLE



## STEPPING POSITIONAL CONTROL



- *Providing extended opening and closing operating speeds with all optional features associated with the Double Acting, Single Acting and Quarter Turn options*
- *Remote switching to activate/deactivate stepping function*

### General Description

The Electro-Hydraulic actuator provides a cost effective alternative solution to the traditional mechanical ratchet style mechanism often used for the positioning control of choke valves.

The electro-hydraulic actuator assembly incorporates a hydraulic control system that is activated by an 'on board' electronic position controller in conjunction with a 4-20 mA command signal. The hydraulic control system is connected to a ring main pressure and return hydraulic header or may incorporate a self-contained electro-hydraulic power supply within the actuator assembly.

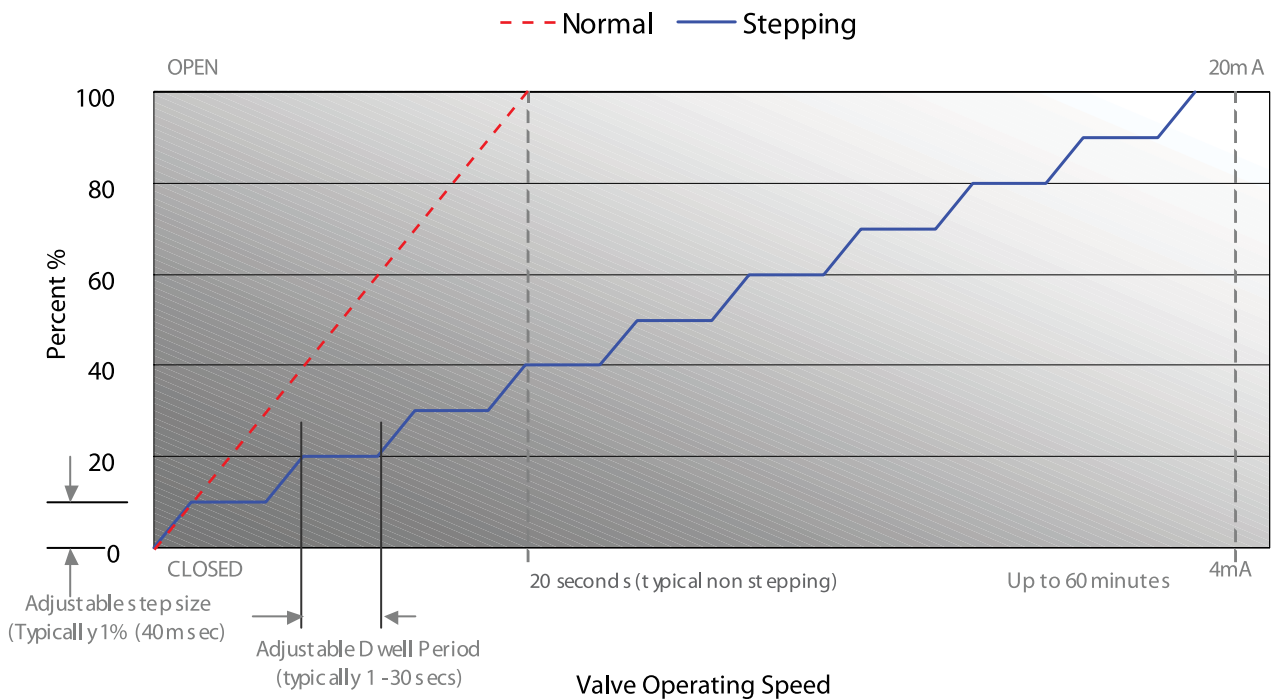
### Standard Features

The hydraulic control system comprises manifold mounted solenoid valves and speed control valves with hydraulic supply pressure filter and pressure gauge. Components are manufactured in 316 Stainless Steel and may be housed within a Stainless Steel control cabinet to provide additional environmental protection and security. The actuator assembly is designed with an interface to suit the standard valve top works.

### Operation

With the control system connected to the hydraulic supply, a change in command signal will cause the valve to operate by energisation of the respective solenoid operated control valves in a series of pulses until the selected position is reached.

# STEPPING POSITIONAL CONTROL



## Control Options Available

- Double Acting Actuator Control Action to provide Fail Fix in position loss of Hydraulic Supply, loss of Electrical Supply or loss of Command Signal.
- Spring Return Actuator Control Action to provide Fail to Open or Fail to Close valve position on loss of Hydraulic Supply, loss of Electrical Supply or loss of Command Signal.

## Hydraulic Actuators

Operation – Double Acting and Single Acting

Construction – Bolted or Tie Rod

Materials – End caps and tubes - carbon steel or Stainless Steel

Piston Rod – Stainless Steel with hard chrome plate

Protective Finish - 2 Pack Epoxy paint System for severe offshore environment

CERTIFICATION OPTIONS AVAILABLE



## POSITIONAL CONTROL

### **Hydraulic Supply**

#### Hydraulic Ring Main system

- Centralised hydraulic header
- Actuator control components selected for compatibility with system hydraulic fluids - mineral oil, water glycol or synthetic types.

#### Self-Contained Hydraulic system

- Integral hydraulic power unit.

### **Positioner Controller (Located on valve/actuator assembly)**

#### ACS604EX

24vDC supply for Zone 1. Provides full range positional control in accordance with 4-20mA signal and 24vDC solenoid operated control valves.

#### ACS603IR

24vDC supply for Zone 1 & 2 with EExd enclosure. Provides full range of positional control in accordance with 4-20mA command signal and 24vDC solenoid operated control valves. Special feature infrared hand held key pad to enable manual operation and calibration of valve without interruption of EExd housing.

#### ACS604EExia

Intrinsically safe version for Zone 0 mounted in Stainless Steel enclosure. Provides full range positional control in accordance with intrinsically safe 4-20mA command signal and intrinsically safe solenoid operated control valves.





# POSITIONAL CONTROL

## ACS604EX HART

24vDC supply for Zone 1 & 2 when housed in EExd enclosure. Controlled by HART, 4-20mA command signal and providing HART position feedback. Provides full range of positional control in accordance with HART protocol 4-20mA command signal and 24vDC solenoid operated control valves.

## **Positioner Controller Enclosure Hazardous area classification - EExd, EExe & EExia**

### Electrical Supply

EExd 24vDC standard - option for power transformer when used with alternative power supply.

### Housing Materials

EExd -

- Cast Iron (painted)
- 316 Stainless Steel (painted)
- Aluminium (low Copper, marine grade Aluminium alloy with offshore protective finish)

EExe - 316 Stainless Steel

EExia - 316 Stainless Steel

### Cable Entries

M20 - M25

½" NPT - 1" NPT

Options available to meet project specification requirements

### Certification

Standard ATEX, IP66, to meet project specification requirements

### **Actuator Mounting**

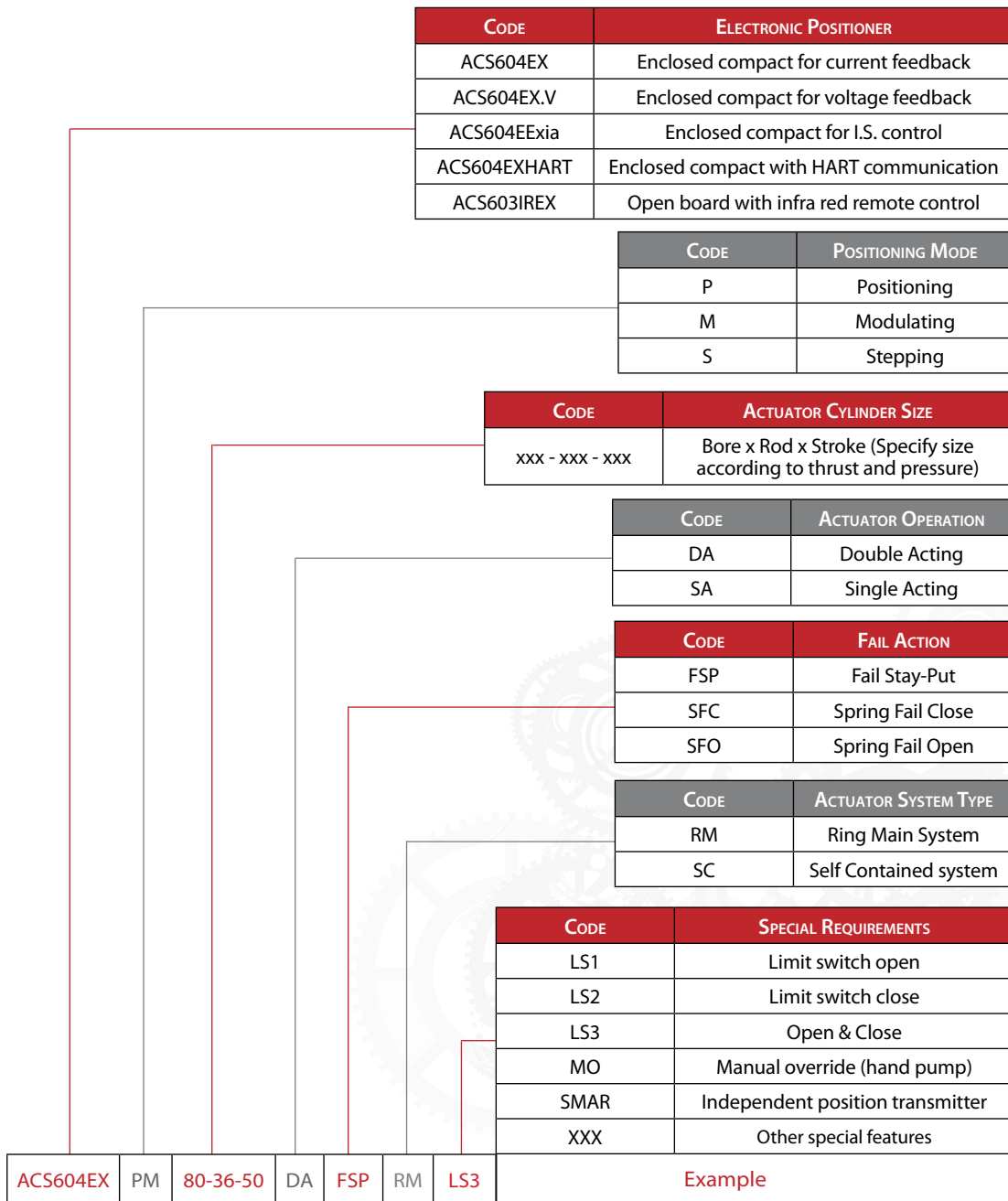
Precision machined fabricated yoke to ensure alignment between actuator and valve top works.

Stem coupling - split type manufactured in Stainless Steel to provide connection of actuator and valve stem incorporating local visual indication of valve position.

CERTIFICATION OPTIONS AVAILABLE



## CODING CHART



## MIDLAND-ACS

Midland-ACS is a premier designer and manufacturer of 316 Stainless Steel control valves and control systems supplied predominately to the rigorous and safety conscious oil and gas industry. With our head office located in the UK, two additional offices in Canada and Houston and a worldwide distribution network, we have easy access to our customers in all international markets.

In September 2007 we became part of the ITT group of companies. ITT is a \$12 billion global leader in the transport, treatment and control of water, waste water and other fluids. Known globally, ITT is by no means a newcomer to the oil and gas industry. Their oil and gas group, which Midland-ACS is a key element in, consists of 8 companies with a turn over in the region of \$400 million.

With the full support that being part of the ITT group provides, we are well placed to assist in developing projects, offer technical assistance in product development and modification. With even more ambitious plans to take us into the future, we are as confident as ever that our next half century will be just as successful as our last.



For a full project reference list including the below companies and more please contact our UK headquarters



**MIDLAND-ACS**



**ITT**

**ACCURACY AND COMPLETENESS OF INFORMATION**

All information in this literature regarding products and services provided by Midland-ACS is subject to change without prior notice. Reasonable efforts are taken to ensure the accuracy and integrity of all information provided here, but Midland-ACS is not responsible for misprints, out-of-date information, or errors. Midland-ACS makes no warranty, express or implied, or assumes any legal liability or responsibility for the accuracy or completeness of any information contained in this literature.

[www.midland-acs.com](http://www.midland-acs.com)

*United Kingdom Headquarters*

**Midland-ACS**

Patrick Gregory Road,  
Wolverhampton, WV11 3DZ  
United Kingdom

Tel: +44 (0)1902 305678

Fax: +44 (0)1902 305676

Email: [midland-acs@itt.com](mailto:midland-acs@itt.com)

*North American Offices*

**Midland-ACS North America**

P.O. Box 422, Ontario  
L3M 4H8, Canada

Tel: (905) 309-1834

Fax: (905) 309-1835

Email: [rjthake@aol.com](mailto:rjthake@aol.com)

**ITT Midland-ACS**

309 Briar Rock Rd,  
The Woodlands, Houston  
TX 77380, USA

Tel: 1 281 210 1055

Fax: 1 281 210 10755