

High Pressure Steam

Electro-hydraulic Actuators

Applications

The HP Steam Actuator family of linear electro-hydraulic actuators is designed to provide the linear actuation force to operate steam turbine control valves or valve racks. This integrated actuator is intended for use on mechanical drive or generator-drive steam turbines, and uses a high-pressure hydraulic oil source to provide its output shaft force and tripping action.

Independent actuators for either Control or Stop function offer redundant operation of critical applications.

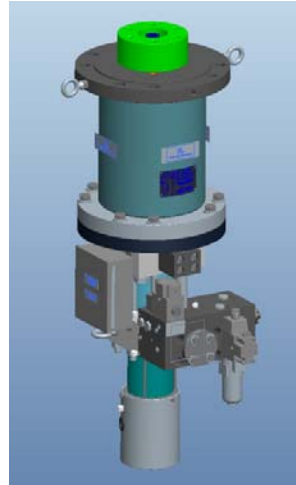
Control Actuator—The superb accuracy and resolution of the Control Actuator make it ideal for steam turbine valve control and related turbine speed and load control. The Control Actuator's redundant features make it ideal for critical steam turbine applications where turbine up-time and availability are essential. This linear actuator can be supplied with simplex, dual-redundant, or triple-redundant servo valve demand inputs.

Stop Actuator—The high speed failsafe action of the Stop Actuator makes it an ideal solution for safe operation of the steam turbine. The Stop Actuator includes discrete inputs and position feedback for fast closure of the steam valves. Precise and stable steam valve control directly relates to improved steam turbine speed and load control and reduced system mechanical wear. The actuator's fast trip time of 16 ms/cm (40 ms/inch) (of shaft travel) allows applied generator or compressor drive turbines to quickly respond to loss of load or emergency shutdown events.

Description

The HP Steam Actuators utilize a double-acting or single-acting power cylinder (part number dependent) with integrated servo valve and position feedback sensors to precisely control steam turbine valves or with discrete demand and feedback for high speed stop valve applications.

The product family includes models with different force, stroke, and redundancy features. This actuator is available with standard bore diameters, standard stroke ranges, and with single-acting (spring return) or double-acting (pressure return) operation.



- Control Actuator with precise position control
- Stop Actuator for high-speed failsafe operation
- Failsafe Spring Operation sized for each application
- Multiple cylinder bore and stroke options
- Multiple input voltages for fast acting solenoid
- Up to 635 mm/s (25 inches per second) trip rate
- Hydraulic Pressure Range (124 to 165) barg / (1800 to 2400) psig
- Integrated Position Sensing

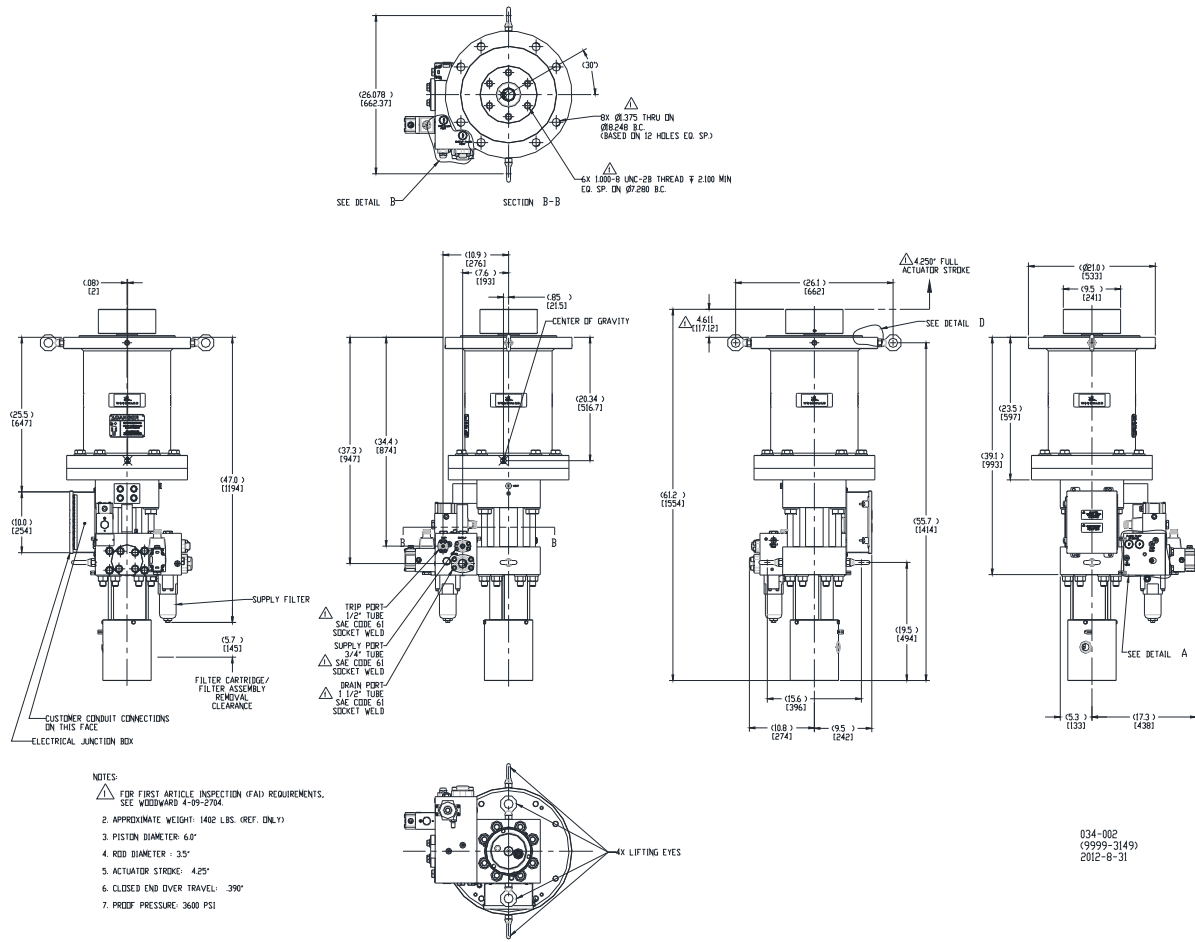


Figure 1. Stop Actuator Outline Drawing

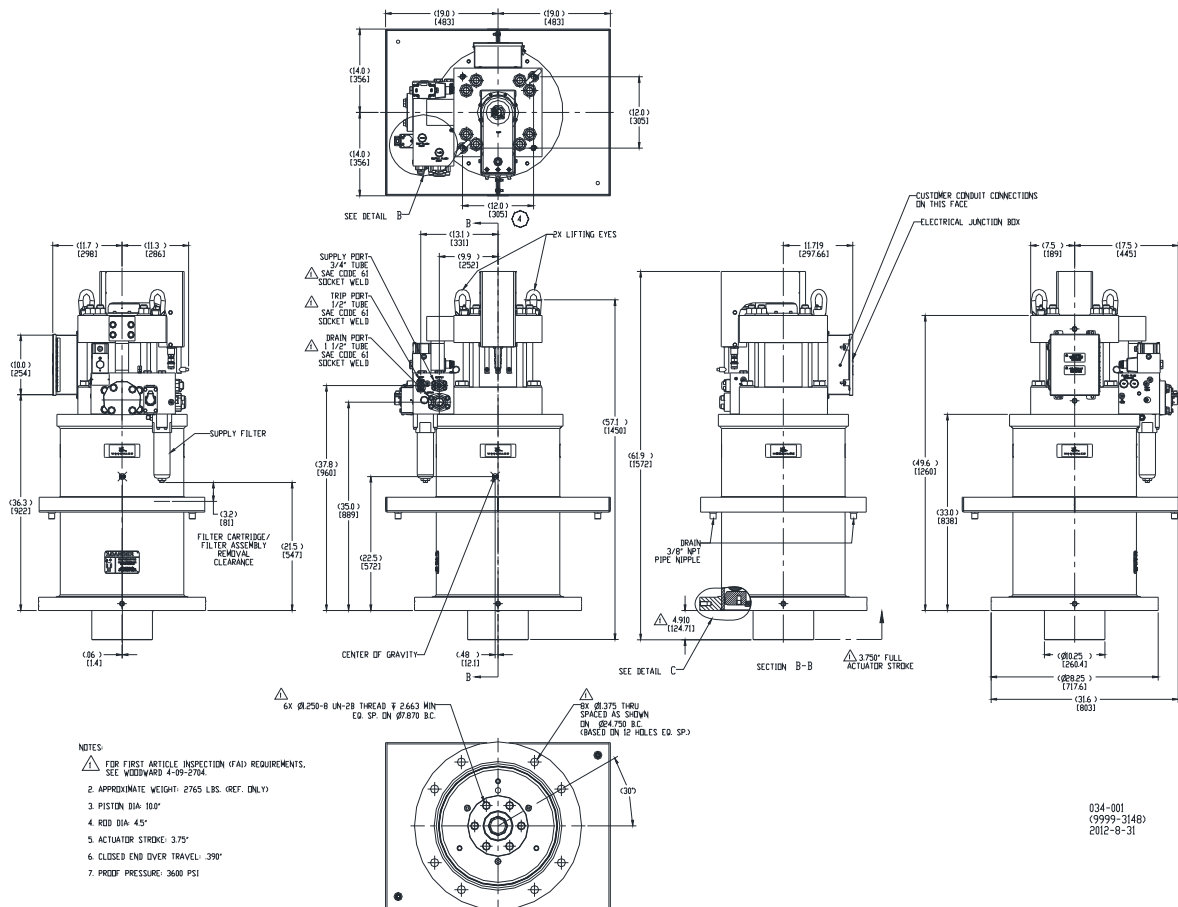


Figure 2. Control Actuator Outline Drawing

Specifications

Performance

Fail-safe Operation:	Internal return spring
Open Slew Rate:	> 25 mm/s (1 inch/s)
Close/Trip Slew Rate:	635 mm/s (25 inches/s)

Physical

Stroke Lengths:	(determined by model number)
Max Stall Force:	(determined by model number)
Cylinder Dimensions:	(determined by model number; see outline drawings)
Cylinder Types:	Single-acting or double-acting (determined by model number)
Fail-safe Direction:	Extend or retract (determined by model number)
Actuator Dimensions:	(determined by configuration)
Weight:	(determined by model number)
Mounting:	Any attitude (bolt patterns & sizes are determined by model number)

Environmental

Operating Temperature Range:	(-28 to +71) °C / (-20 to +160) °F
Operating Oil Temperature Range:	(18 to 71) °C / (65 to 160) °F
Maximum Valve/Actuator Interface Temperature:	204 °C / 400 °F
Ingress Protection:	IP56 per EN 60529

Electrical

Servo Demand:	±48 mA for triple redundant servo; other options available
Feedback Device:	Linear Variable Displacement Transducers (LVDT)
Input Supply for Fast-acting Solenoid Valve:	(110 to 120) V (ac) or (220 to 240) V (ac); energized-to-trip and de-energized-to-trip options available

Hydraulic

Supply pressure Range:	(124 to 165) barg / (1800 to 2400) psig
Fluid Types:	Mineral or synthetic based oils may be used (including phosphate esters)
Recommended Oil Cleanliness:	ISO 4406 14/11 (NAS 1638 Class 5)
Recommended Viscosity:	(20 to 100) cSt
Fluid Ports:	SAE J518 Code 61
Steady State Oil Consumption Max:	1.9 L/min / 0.5 US gal/min
Return/Drain Pressure:	Maximum: 10 barg / 145 psig

Regulatory Compliance

European Compliance for CE Marking:

EMC Directive:	2004/108/EC
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Other European/International Compliance:

Machinery Directive:	Compliant as a component with 98/37/EC
Pressure Equipment Directive:	Compliant as "SEP" per Article 3.3 to 97/23/EC

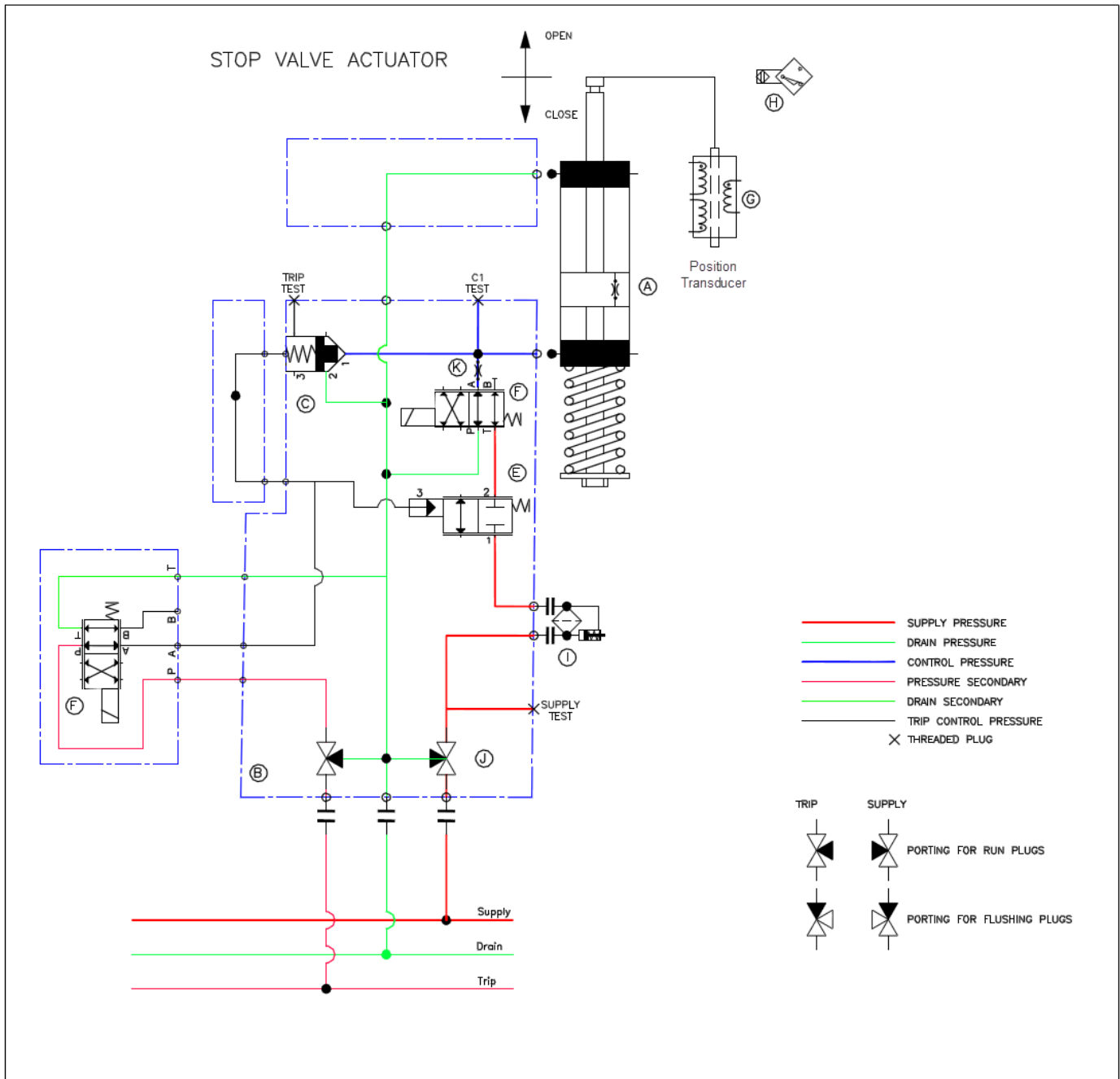


Figure 3. Stop Actuator Hydraulic Schematic

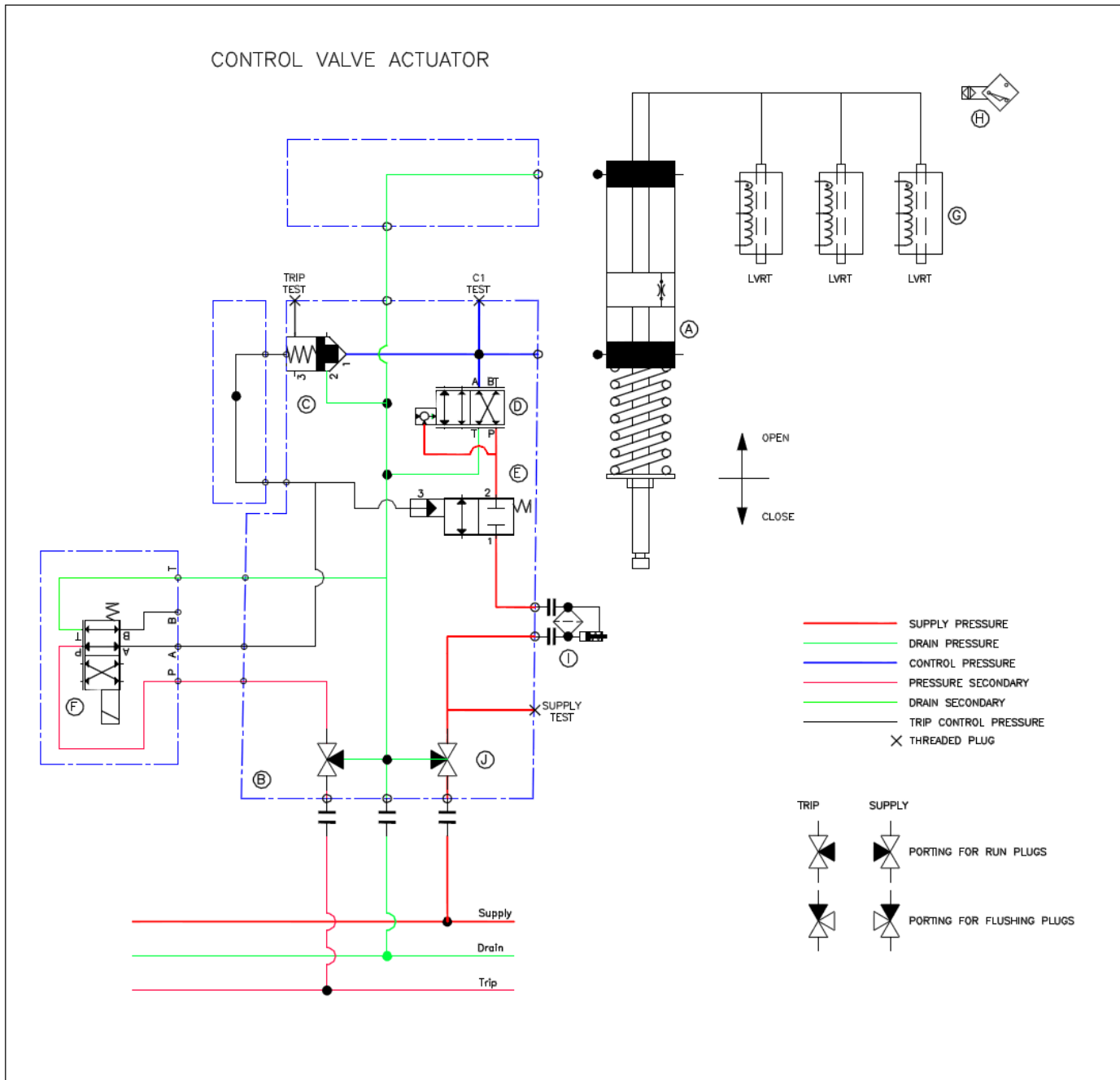


Figure 4. Control Actuator Hydraulic Schematic



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