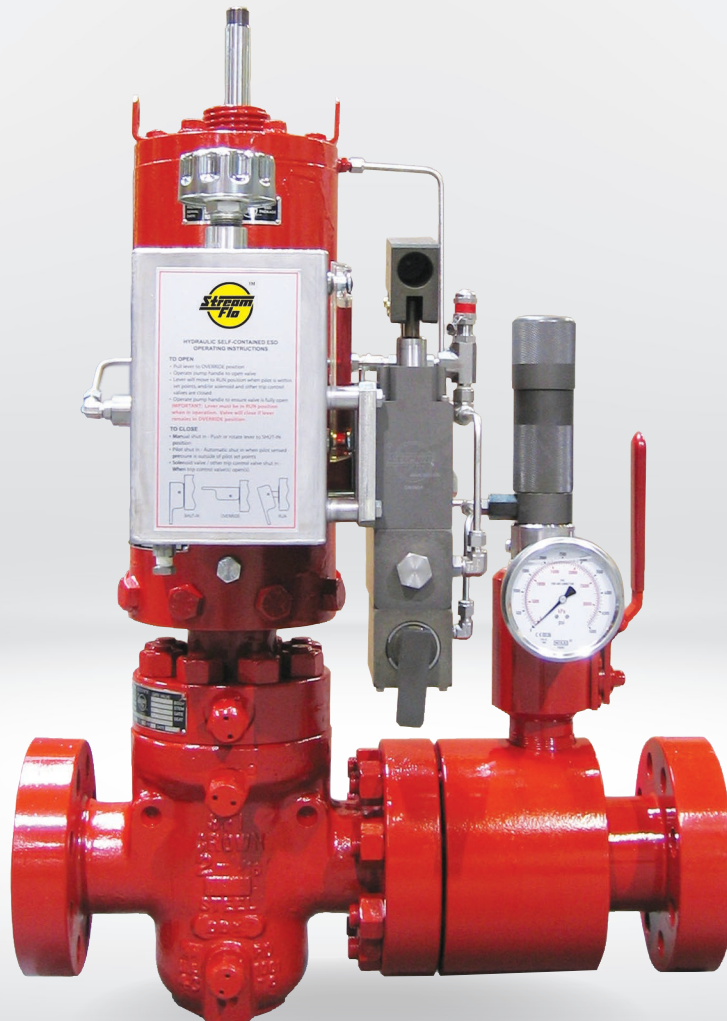




Crown Actuated Valves & Controls

Protecting Your Personnel, Facilities, Environment, and Natural Resources



Crown Self-Contained Hydraulic Valve Actuation System

Stream-Flo's Crown self-contained hydraulic valve actuation system is used for the automatic operation of actuated ball valves and gate valves on wellheads and flow lines under emergency conditions. The system consists

of a hydraulic actuator, a manual hydraulic pump and control assembly, and, in the case of an SSV, a reverse-acting gate valve.

Crown Hydraulic Actuator and Reverse-Acting Gate Valve

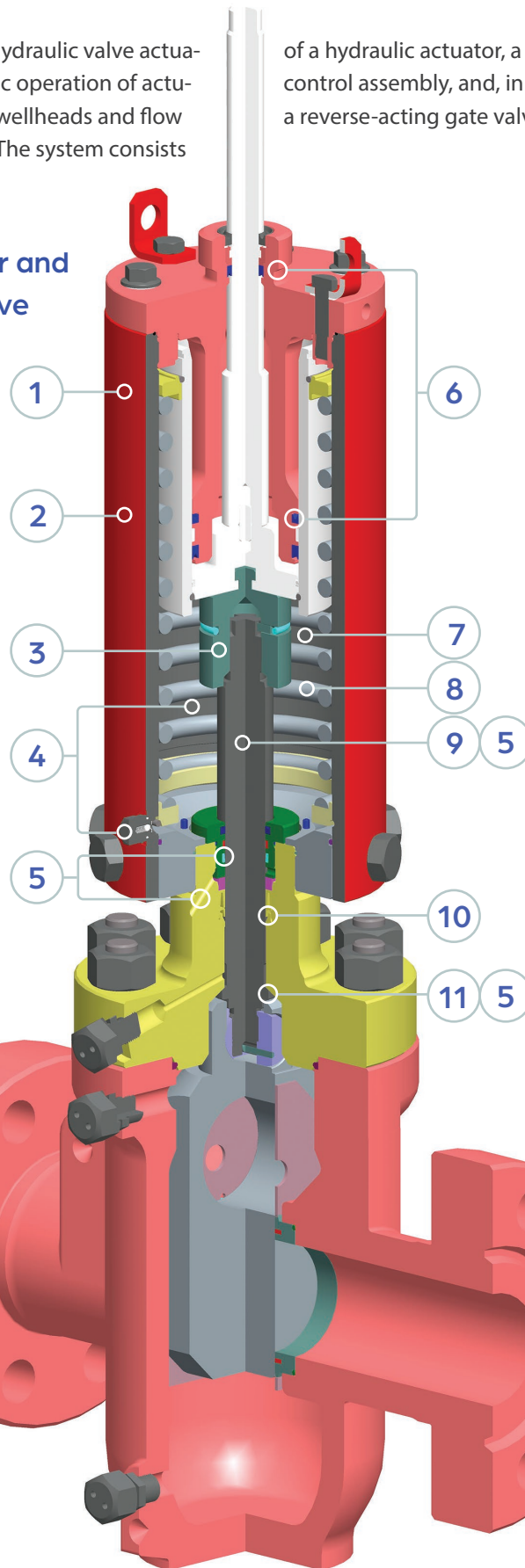
1 Modular actuator is independently assembled and tested, enabling easy and quick replacement with minimal downtime.

2 No external tie rods, eliminates corrosion and improve safety.

3 Drift adjuster allows easy drift setting and locking, independent of actuator.

4 Relief valve ensures that spring canister is non-pressurized, enhancing personnel safety.

5 Safeguards to prevent produced fluid from entering actuator: metal-to-metal back seat; self-energized stem packing; bonnet assembly vent; additional upper stem seals.



6 Replacement of actuator seals requires only the removal of the actuator head with no actuator removal needed.

7 Sealed spring canister and internals eliminate corrosion and reduces maintenance, spare parts and downtime.

8 Spring has one of the highest preloads for reliable shut in and is safely encapsulated within the spring canister to ensure the safety of personnel.

9 Optimized valve stem diameter providing reliable fail-safe valve operation.

10 Stem packing is self-energized ensuring reliable, long term maintenance free and bubble tight sealing.

11 Metal-to-metal stem backseat provides additional back-up sealing in the event of fire damage to the valve stem packing.

This valve actuation system is self-contained and releases no emissions to the environment. It requires no flow line pressure, compressed air, gases, nor electricity for power, and instead utilizes its own clean, contaminant-free, closed-loop hydraulics to power and control the actuation system. Instead of the control fluid being released into the atmosphere

or emptied onto the ground, our system's hydraulic fluid is continually recycled and reused, protecting both operators and the environment. As a self-contained system, it is ideal for use in remote applications or in applications where a power source for an actuation system is not available, unreliable or is very costly to produce and/or maintain.

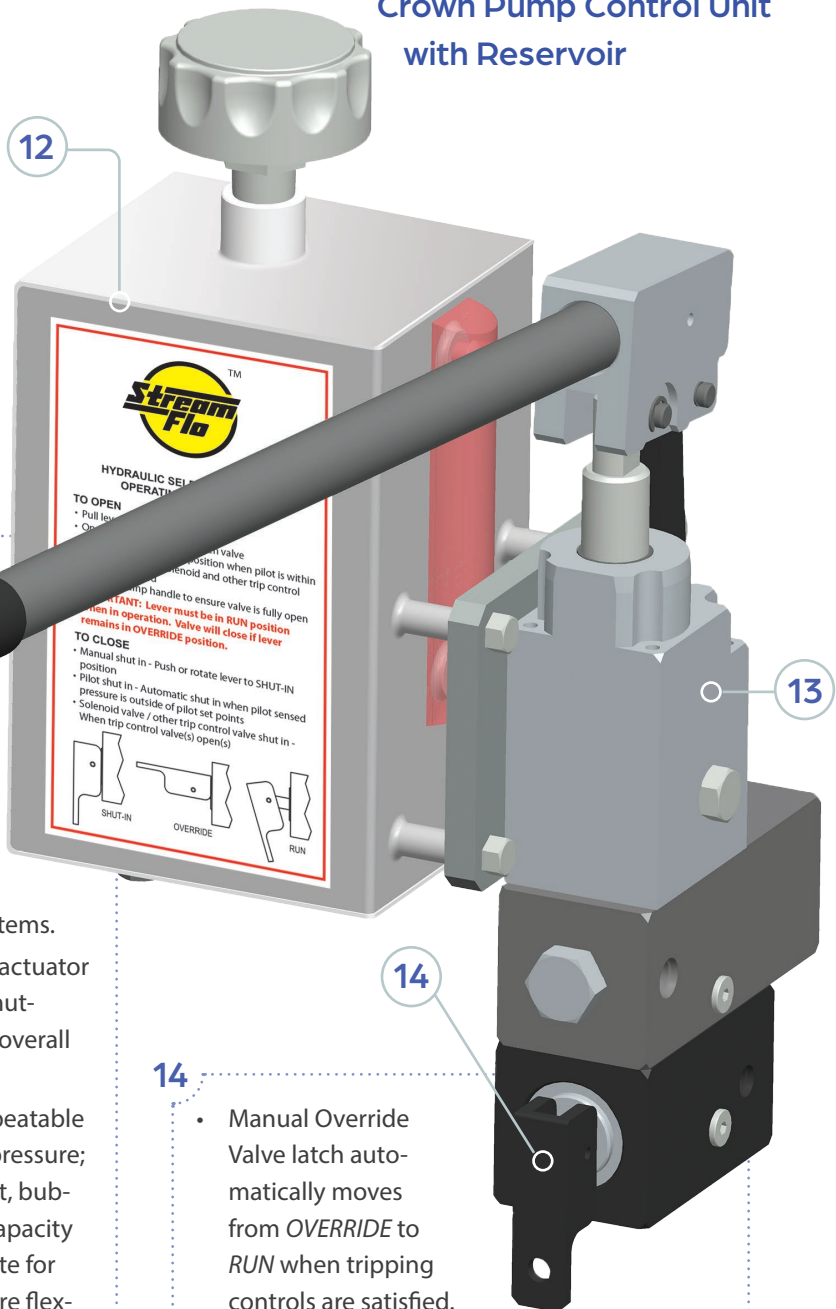
Crown Pump Control Unit with Reservoir

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- Operates with clean non-contaminated hydraulic fluid.
- Bolt on reservoir ensures installation flexibility, enabling local or remote mounting of the Pump Control Unit.
- Closed hydraulic circuit moves clean hydraulic fluid from one component to the other, and does not release any produced fluid into the environment, promoting operator and environmental safety.

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- Self-Contained Pump Control Unit, no external power source required.
- Modular design minimizes external tube and fitting connections.
- Easy change-out design, ease of service and minimizes down time.
- Pump Control Unit can be tripped by wide variety of tripping controls and can be integrated with existing SCADA and telemetry systems.
- Dual pressure circuit (high pressure): Reduces actuator swept volume and provides best unassisted shut-down times in the industry; Reduces actuator overall size; Reduces the accumulator size, if needed.
- Dual pressure circuit (low pressure): Highly repeatable Pilot settings not affected by varying control pressure; Allows use of more readily available, lower cost, bubble tight tripping control components; High capacity built-in mechanical accumulator to compensate for thermal fluid volume fluctuation, allowing more flexibility in the placement of tripping components.
- Stream-Flo manufactured, purpose-built and designed to zero-leakage standards.



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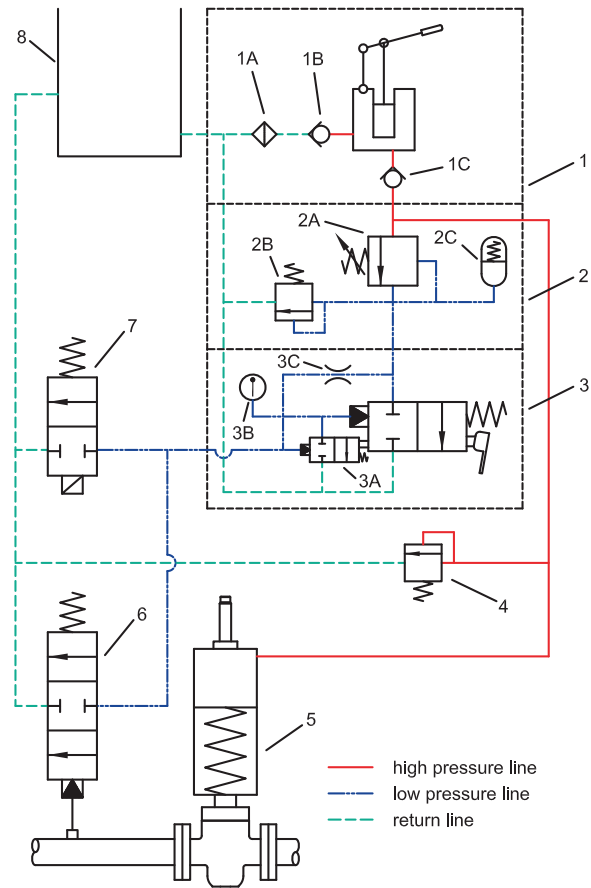
- Manual Override Valve latch automatically moves from *VERRIDE* to *RUN* when tripping controls are satisfied.
- Manual Override Valve will also automatically allow the system to move to the safe position if tripping controls are not satisfied.

Schematic & Specifications



Typical Hydraulic Schematic

No.	Part
1	Manual pump
1A	Suction filter
1B	Suction check valve
1C	Discharge check valve
2	Pressure reducing valve c/w accumulator
2A	Pressure reducing valve
2B	LP pressure relief valve
2C	LP accumulator
3	Manual override valve
3A	Trip valve
3B	Fusible element
3C	Flow restrictor
4	HP pressure relief valve
5	Hydraulic actuator
6	High/low pressure pilot (optional)
7	Solenoid valve (optional)
8	Hydraulic reservoir



General Specifications*

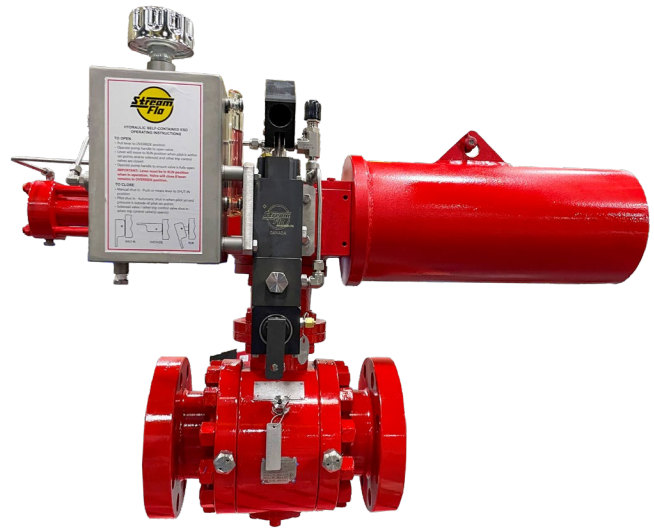
Actuator (SSV only)	Maximum operating pressure Temperature range Operating media	3500 psi -50°F/-46°C to +180°F/+82°C Clean hydraulic fluid
Valve & Bonnet Assembly (SSV only)	Sizes API rated working pressures Temperature classifications Material classes Performance requirements Product specification levels Special requirements	1-13/16" to 11" To 20,000 psi K -75°F/-60°C to Y +650°F/+345°C AA to HH 1 and 2 (Annex F) 1, 2, 3, 3G and 4 Annex I (6AV1) Fire-safe design SIL 3 capable
Pump Control Unit	Temperature range Seals Component materials	-50°F/-46°C to +180°F/+82°C Teflon, polyurethane and nitrile Anodized aluminum and stainless steel

*General specifications only. Please contact Stream-Flo for other requirements.

Stream-Flo's valve actuation system is designed to shut down a well or flow-line automatically in the event of abnormal pressure fluctuations in the piping due to fire, ruptured or plugged lines, surface equipment faults or failures, damaged wellheads or piping, high vibration, or other causes.

Accessories

- Crown Access Tee
- Crown Hi/Lo Pilot Isolation Valve
- Gas/Air to Hydraulic Interface Relay
- Lock open device (fusible and non-fusible)
- Solenoid Valve
- Limit switches
- Electrical Termination Enclosure
- Position transmitter
- Crown electro-hydraulic Pump Control Unit
- Crown valve actuation system / surface controlled subsurface safety valve Pump Control Unit
- Crown remotely mounted Pump Control Unit
- Indicator rod protector
- Custom engineered spool piece
- Theft proof enclosure
- Rotary Gear Pump (RGP)
- Custom packaged actuation system
- Dedicated micro-controller (RTU)



Crown Rotary ESDV

The system can be triggered to ESD in multiple ways, with the most common trigger being flow-line/process pressure.

Other triggers include:

- High and/or low pressure sensor
- Rate of pressure drop sensor
- Solenoid valve
- Temperature sensor
- Fire/heat sensor
- SCADA signal
- Vibration sensor
- Flood sensor

General Applications



Surface Safety Valve and Emergency Shut-Down Valve Applications:

Conventional Wells:

- High Pressure
- High Temperature

Injection Wells:

- CO₂ Injection
- Steam Injection
- Miscible Flood Injection
- Water Disposal
- Water Flood

Gas Storage Wells

- Natural Gas
- Hydrogen
- Carbon Capture

Other Actuated Valve Applications:

- Blow-down Valves
- Flow Lines and Gathering Lines
- High Integrity Protection Systems (HIPS)
- SIS Requirements (SIL Capable)
- Manifolds
- Production and Test Skids

Wellhead Control Panel Applications:

- Self-contained hydraulic or electro-hydraulic
- For single or dual completion wells
- For single or multiple surface actuated valves and/or surface controlled subsurface safety valves



Self-Contained Hydraulic System with Flanged Isolation Valve Sensing Connection



Wellhead Control Panel



PwrPAK Electro-Hydraulic System



PwrESD Electro-Hydraulic System



Config 2 Packaged System



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