HS Interval Control Valves

OPTIMIZE RESERVOIR PERFORMANCE IN DEEPWATER AND HPHT ENVIRONMENTS

OVERVIEW

From the leading provider of intelligent completion technology, the HS interval control valve (HS-ICV) enables deployment of Halliburton SmartWell® systems in more extreme environments. The HS-ICV is debris-tolerant and designed for high-pressure, deepwater environments.

The HS-ICV's eight-position standard gas/liquid flow trims have been characterized to provide optimum production/injection at various positions. Optional onboard sensors track the movement of the flow trim. These position sensors provide the operator with real-time feedback to confirm valve movements.

BENEFITS

- Remotely control flow into or out of the reservoir in challenging environments such as deepwater and HPHT
- Eliminate the potential for wellbore debris to be trapped inside the tool and consequently prevent valve movement or impact sealing integrity
- Obtain real-time confirmation of remotely actuated valve movements using optional position sensors
- Unload at a maximum differential pressure of 5K psi without the threat of any valve damage – the highest unloading capacity in the industry

FEATURES

- Proprietary, debris-tolerant, metal-to-metal seal
- Customizable gas/liquid flow trim
- Can be used in simple on/off intervention avoidance applications or in more versatile advanced reservoir management choking applications with the Accu-Pulse™ module

How HS-ICV Works

Hydraulically actuated, the HS-ICV is operated remotely from surface using Halliburton's reliable Direct Hydraulics or Digital Hydraulics™ downhole control systems. The premium thermoplastic hydraulic chamber seals are designed to operate under high actuation pressures and over temperatures ranging from 40°F (4°C) to 330°F (165°C). The valve has also been subjected to a stringent qualification program, including temperature, pressure, debris and erosion tests.

The body of the HS-ICV has slots to accommodate two ¼-inch dedicated instrument wires for position sensors, and allows bypass of up to six ¼-inch bare hydraulic control lines or wires, all without compromising valve body rating or working envelope.

Debris-Tolerant Design

The HS-ICV has been designed and tested such that the flow trim will ensure complete metal-to-metal (MTM) seal integrity even when exposed to heavy wellbore debris. A one-moving-piece valve mandrel design eliminates the potential for wellbore debris to be trapped inside the tool and consequently prevent valve movement.

Proprietary MTM Seal

The HS-ICV houses a proprietary metal-to-metal interference fit seal that enables the valve to unload at a maximum differential pressure of 5K psi without the threat of any valve damage – the highest unloading capacity in the industry. Any additional tubing or annulus pressure acts on the seal to further ensure its integrity. The seal has been rigorously tested and qualified at low- and high-pressure differentials.

Pressure-Balanced Valve Mandrel

A pressure-balanced valve mandrel design eliminates the need for a latch mechanism to hold the trim closed or the need to maintain hydraulic pressure on the close chamber to keep the flow trim shut. This balanced sleeve design also prevents drifting of the sleeve in the incrementally open position. The valve mandrel design also includes a shifting profile that allows the sleeve to be mechanically shifted in the event that hydraulic control has been compromised, or if sleeve momentum is not achievable due to scale build-up inside the ICV.

Simple On/Off or Choking Applications

The HS-ICV is available in on/off or choking options for use in conjunction with the Accu-Pulse™ module or surface positioning system.

For the choking application, the HS-ICV comes fitted with a liquid or gas flow trim, depending on the well application. These trims can be customized to suit the injection or production goals for a particular well. Tungsten carbide is the material of choice for these flow trims, in order to combat the threat of erosion due to high flow rates.

Position Sensor

The HS-ICVs can be fitted with onboard position sensors which track the movement of the flow trim. These sensors provide the operator with real-time feedback to confirm remotely actuated valve commands.

Shrouded and deflector versions are available.

Specifications

HS-ICV	On/Off	Choking
Available Sizes (in.)	2 7/8 3 1/2 4 1/2 5 1/2	2 7/8 3 1/2 4 1/2 5 1/2
Number of Positions	2	10 (w/ Accu-Pulse™ Module)
Number of Choke Positions	N/A	8 (w/ Accu-Pulse™ Module)
Working Pressure, psi	7,500 / 10,000 / 15,000*	7,500 / 10,000 / 15,000*
Max Hydraulic Actuation Pressure, psi	10,000	10,000
Max Differential Opening (equalization), psi	5,000	5,000
Max Flowing Differential, psi	up to 2,000	up to 2,000
Operating Temp, °F	40–330**	40–330

* 15,000 psi HS-ICVs available in 3 1/2-in. and 4 1/2-in. size and rated to 68-300°F

** Not all ICVs cover this temp range, please see specific ICV Engineering Data Sheet for details

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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