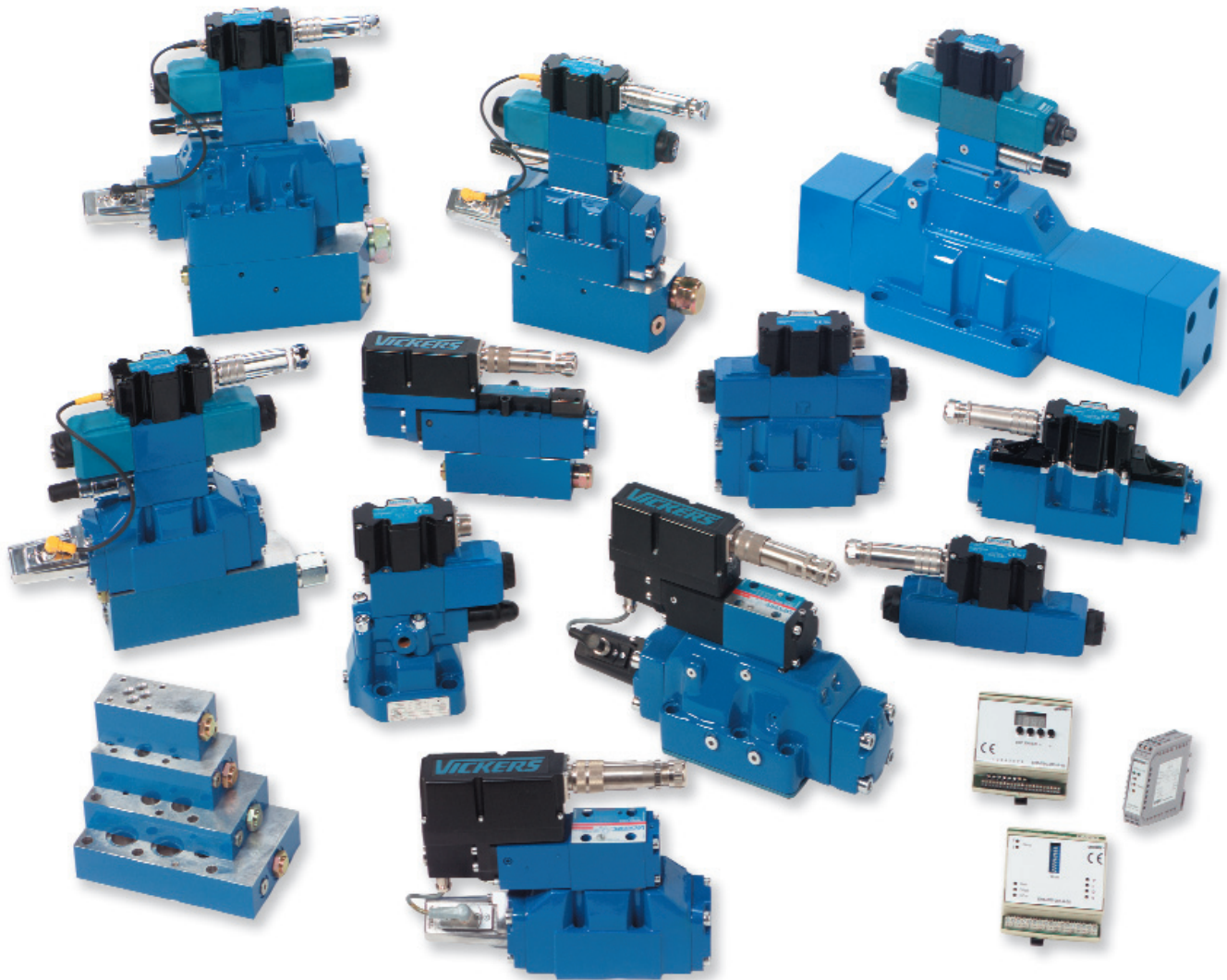


EATON

Vickers

Proportional Valves

Capabilities Brochure

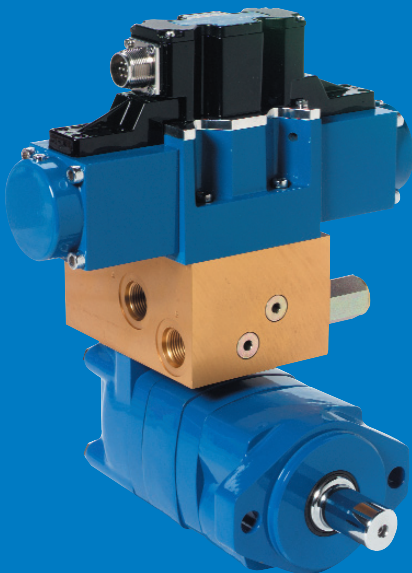


Enabling Creative Solutions

With a wide range of markets serviced, our KB proportional valves are enabling truly creative solutions.

As technology continues to improve, so does the engineering Eaton builds into its proportional valves. Vickers KB proportional valves are a good example of Eaton continued commitment to designing and manufacturing market-leading products. Vickers KB proportional valves are manufactured, backed and sold throughout the world with the high quality you expect from Eaton.

1. Control function – direction, flow, and pressure
2. Performance level – standard, high, and servo
3. On-board-electronics – with (KB model) and without (K model)
4. Complete size range – D03-D10 (NG6-NG32)
5. Wide variety of supporting electronics



Port Crane



Civil Engineering

Designed for Better Performance

Previous models of Vickers proportional valves featured control amplifiers built and pre-wired directly onto the valves for simple installation. Integration of the two produces a product that can be cost effective over previous models.

The KB proportional valve takes the electronics integration concept a step further, by placing external electronics wiring inside the valve. This makes Vickers KB proportional valves less susceptible to failure.

Integrated Amplifiers Mean "Plug and Play"

Integrated amplifiers are factory preset and eliminate any adjustment of gain, deadband compensation, or dither required for separate card and valve combinations. Plus they eliminate the need for field adjustments and separately wired and mounted cardholders. Replacement valves can be fitted without adjusting or changing the control signals.



New Design Means New Applications

With Vickers KB proportional valves, design engineers now have a viable new control package that they've never had before...a new generation of integrated valves that redefine and expand industrial application design capabilities.

Vickers proportional valves are much easier to understand and install than previous models using separate drive amplifiers. The only electrical inputs required are a power supply and a voltage command signal.

Built to Last

For durability, you can't beat a KB proportional valve. The amplifier is housed in a durable metal enclosure, sealed against environmental contaminants such as cutting fluid spray, direct, water and fluid wash down. Seven-pin electrical mating connectors are supplied as standard. They are reliable, rugged and provide easy access for test equipment.

Consistency of quality is assured with the KB proportional valve. Each valve/amplifier combination is tested and calibrated as a total assembly with a variation of less than 5% from valve to valve.

You can trust Vickers KB proportional valves to do the job as specified and perform consistently and reliably for years.





Rubber Press



Entertainment



Primary Metal



Die Casting

PRIMARY MARKETS	SUBMARKETS	FORCE CONTROL	SPEED CONTROL	POSITION CONTROL
Machine Tools	Metal Cutting	X	X	X
	Material handling	X	X	X
Molding	Plastics & Rubber	X	X	X
	Die Casting	X	X	X
	Foundry	X	X	X
Metal Forming	Ceramic & Glass	X	X	X
	Press	X	X	X
	Baler	X	X	X
	Shear & Cutting	X	X	X
	Bending Machine	X	X	X
	Punching Machine	X	X	X
Primary Metal Processing	Ferrous	X	X	X
	Non-Ferrous	X	X	X
Processing	Wood Product	X	X	X
	Pulp & Paper	X	X	X
	Concrete and Aggregate	X	X	X
	Food	X	X	X

PRIMARY MARKETS	SUBMARKETS	FORCE CONTROL	SPEED CONTROL	POSITION CONTROL
Power Generation	Water Turbine	X		X
	Steam Turbine	X		X
	Wind Turbine	X		X
	Solar	X		X
Test & Simulation		X	X	X
Mobile	Construction	X	X	X
	Mining	X	X	
	Agriculture	X	X	X
Oil & Gas		X	X	X
Marine		X	X	X
Civil Engineering		X	X	X

Proportional Valve Application Matrix

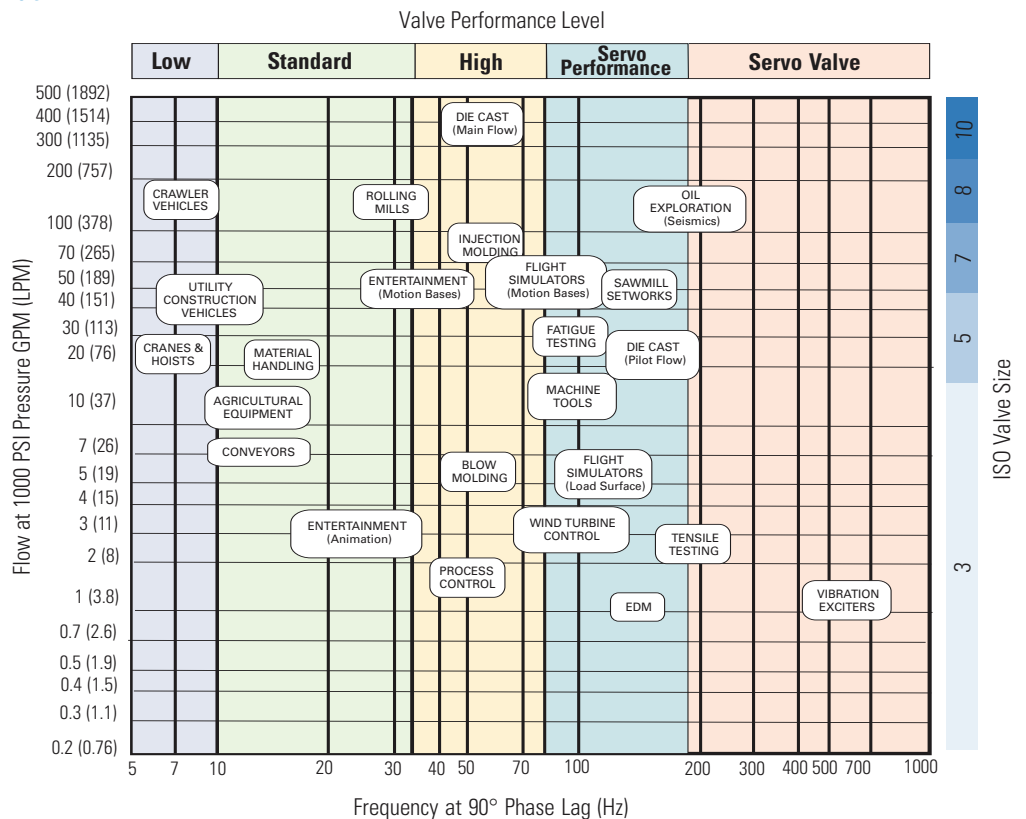
The application matrix to the right provides a “quick” guidance for many industrial applications. Simply locate your application (or one very nearly like it) on the chart, then read off the Valve Performance Level (Standard, High, or Servo Performance) at the top and the ISO Valve Size (Size 3, 5, 7, 8 or 10) on the right side.

For example:

What size valve and what performance level should I choose for my Sawmill Networks?

Sawmill Networks applications generally require Servo Performance type valves. The valve size could be either a Size 5 or a Size 7 depending upon the flow requirements of the application.

The matrix uses “Frequency Response” as the primary determinant for valve performance. This is not the only parameter of importance in all applications, but it does serve as a good first reference.

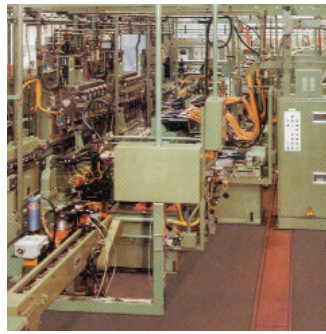




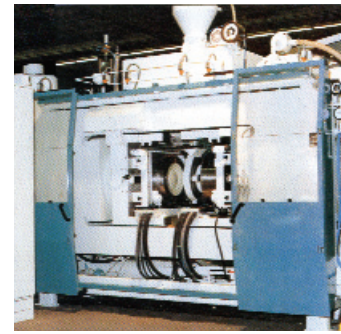
Press



Paper Machine



Machine Tool



Ceramic Press

Specifications, Features and Benefits of KB Prop Valves

SPECIFICATIONS/FEATURES

IP65 and 67 (best in class)
 Valve enable
 Ramp adjustment (digital OBE)
 Shock and vibration tested
 Digital OBE (KBDG, KBFDG5V, KBCG, and KBXG)
 EMC CE marked
 +/-10VDC & 4-20 mA command input options
 Output monitor
 Integrated on-board-electronics (OBE)
 Factory preset gain & dead band
 Factory calibration
 Industry standard 7-pin connector
 SMD techniques used in OBE
 24VDC with wide tolerance (21V to 36V)
 Canbus (available on KBFDG5V-5/7/8/10)

BENEFITS

Superior moisture resistant
 Easy to achieve interlock control
 Ability to fine tune on site
 Reliability and durability in harsh environment
 Setup and test done through software
 Passport selling to EU
 Flexibility to match customer controller
 Easy setup and diagnosis
 Less wiring & more reliable
 Plug and Play
 No setup needed for replacement
 Interchangeability & ease of customer wiring
 More compact design
 Less demanding for power supply
 Better diagnose capability

Blue fonts mean Eaton's product superiority over competitors'.

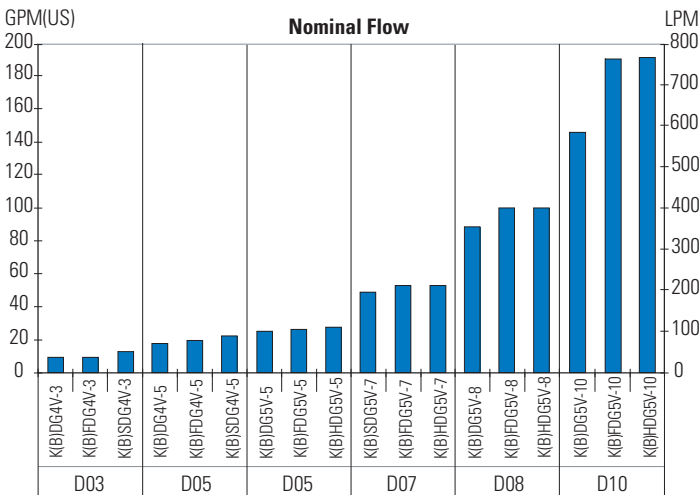
OBE Proportional Valve Comparison

SPECIFICATIONS/FEATURE	EATON	BR	PARKER	ATOS
Environmental Protection	IP65 and 67	IP65	IP54**	IP65
Ramp adjustment	Yes*	Not across board	No	Not across board
Valve Enable	Yes	Not across board	No	Not across board
OBE Position	Pilot stage	Mostly on main stage	Main stage	Pilot stage
EMC Qualification	CE marked	CE marked	CE marked	CE marked
Command Input option	+/- 10V & 4-20mA	+/- 10V & 4-20mA	+/- 10V & +/- 10mA	+/- 10V & 4-20mA
Output Monitor	Yes	Yes	Yes	Yes

* Digital OBE valve: KBD(T)G4V, KBDG5V, KBFDG5V, KBX(C)G, KBCG, **IP65 on limited number of families

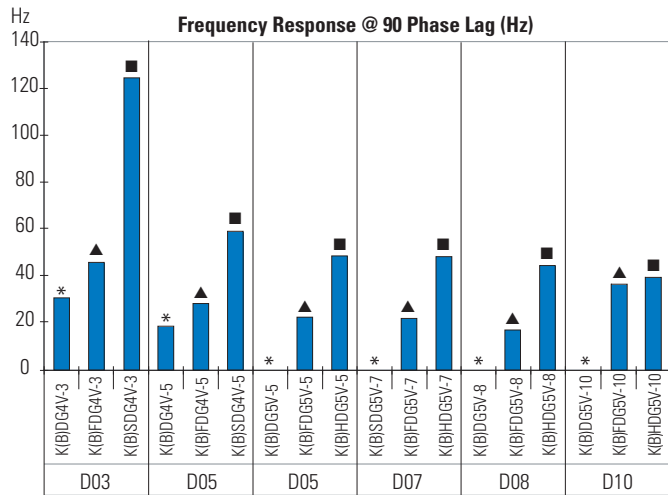
Blue fonts mean Eaton's product superiority over competitors'.

Flow Capability





















Nominal flow rated @ 5 bar delta P, single path except for K(B)SDG4V-3/5 valve rated @ 35 bar delta P, single path

Frequency Response



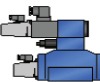
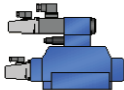
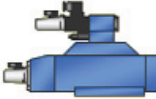





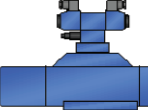





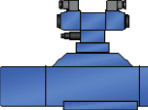


* Standard Performance ▲ High Performance ■ Servo Performance

Proportional Directional Valve with On-Board-Electronics (OBE)

	SINGLE STAGE DO3/NG6	DO5/NG10	TWO STAGE DO5/NG10	DO7/NG16	DO8/NG25	D10/NG32
Servo Performance Valve with Dual Spool Feedback	KBSDG4V-3 	KBSDG4V-5 	KBHDG5V-5 	KBHDG5V-7 	KBHDG5V-8 	KBHDG5V-10 
High Performance Valve with Single Spool Feedback	KBFDG4V-3 	KBFDG4V-5 	KBFDG5V-5 	KBFDG5V-7 	KBFDG5V-8 	KBFDG5V-10 
Standard Performance Valve without Spool Feedback	KBDG4V-3 	KBDG4V-5 	KBDG5V-5 	KBDG5V-7 	KBDG5V-8 	KBDG5V-10 

Proportional Directional Valve without On-Board-Electronics (Non-OBE)

	SINGLE STAGE DO3/NG6	DO5/NG10	TWO STAGE DO5/NG10	DO7/NG16	DO8/NG25	D10/NG32
Servo Performance Valve with Dual Spool Feedback	KSDG4V-3 	N/A	KHDG5V-5 	KHDG5V-7 	KHDG5V-8 	KHDG5V-10 
High Performance Valve with Single Spool Feedback	KFDG4V-3 	KFDG4V-5 	KFDG5V-5 	KFDG5V-7 	KFDG5V-8 	KHDG5V-10* 
Standard Performance Valve without Spool Feedback	KDG4V-3 	KDG4V-5 	KDG5V-5 	KDG5V-7 	KDG5V-8 	KDG5V-10 

* Substitute with KHDG5V-10 in place of KFDG5V-10

AMPLIFIER (EURO CARD MOUNTING)

Model Code	Proportional Valves
EEA-PAM-513-A/B/D-32	KCG-3, KCG-6/8, KX(C)G-6/8, H coil
EEA-PAM-523-A/B/C/D/E/F-32	KD/TG4V-3, KDG5V-5/7/8/10, H coil
EEA-PAM-525-A/B/C/D/E/F-32	KDG4V-5, H coil
EEA-PAM-533-A/B/C/D/E/F-32	KFD/TG4V-3
EEA-PAM-535-A/B/C/D/E/F-32	KFD/TG4V-5
EEA-PAM-541-A/D/E-32	KHDG5V-5/7/8/10, zero lap spool
EEA-PAM-553-A/D/E-32	KSDG4V-3
EEA-PAM-561-A/B/C/D/E/F-32	KFDG5V-5/7
EEA-PAM-568-A/B/C/D/E/F-32	KFDG5V-8
EEA-PAM-571-A/B/D-32	CVU-**-EFP1
EEA-PAM-581-A/B/D/E/F-32	KHDG5V-5/7/8/10

Notes:

A - with 2 ramps
 B - A plus on-board command inputs
 C - B plus additional 2 ramps
 D - C plus PID module
 E - A plus stripe guidance module
 F - A plus CNC adaptation module

AMPLIFIER (DIN-PLUG MOUNTING)

Model Code	Description
EHH-AMP-702-D/J/K-20	Power Plugs for Proportional Valves, 24VDC
EHH-AMP-712-D/G-20	Power Plugs for Proportional Valves, 12VDC


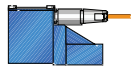
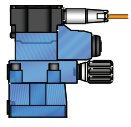
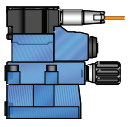

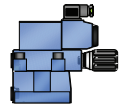
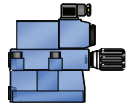
FUNCTIONAL MODULE (DIN-RAIL MOUNTING)

Model Code	Description
EHD-DSG-201-A-10	Demand signal generator
EHA-PID-201-A-20	Electronic PID controller
EHA-CON-201-A-20	Signal converter module
EHA-RMP-201-A-20	Ramp generator module
EHA-PSU-704-A10-20	Power supply, 24V DC, 10A Max. Output
EHA-PSU-201-A-10	Power supply, +/-10 and 15VDC output

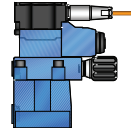
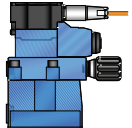
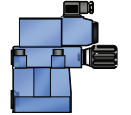
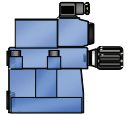
OTHERS

Model Code	Description
EHA-TEQ-460-A-10	Portable test box for K & KB proportional valves





Proportional Pressure Relief Valve Family

	SINGLE STAGE		TWO STAGE	
OBE	KBCG-3	EHST-3	KBCG-6	KBCG-8
				
Non-OBE	KCG-3		KCG-6	KCG-8
				







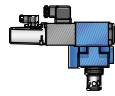
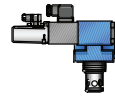
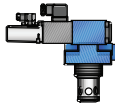
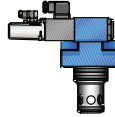
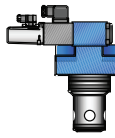
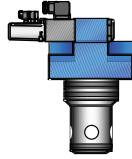

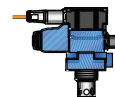
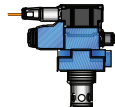
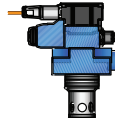
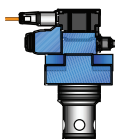
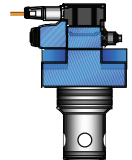
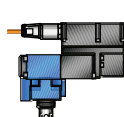
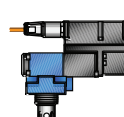
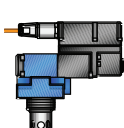
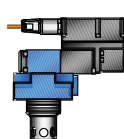
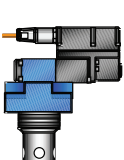
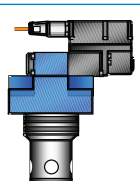
Proportional Pressure Reducing Valve Family

	SINGLE STAGE	TWO STAGE	
OBE		KBX(C)G-6	KBX(C)G-8
			
Non-OBE		KX(C)G-6	KX(C)G-8
			

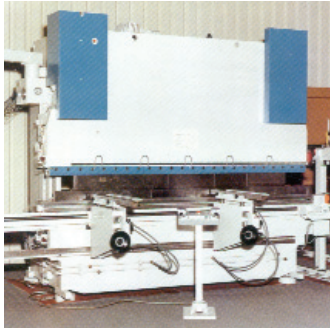
Proportional Throttle Slip-in Valve Family – with Main Stage LVDT Feedback

	NG16	NG25	NG32	NG40
	CVU-EFP1-16	CVU-EFP1-25	CVU-EFP1-32	CVU-EFP1-40
Non-OBE				

Valvistor – Proportional Throttle Slip-in Cartridge Valve Family

	NG16	NG25	NG32	NG40	NG50	NG63
	CVI & CVCS 16*HFV	CVI & CVCS 25*HFV	CVI & CVCS 32*HFV	CVI & CVCS 40*HFV	CVI & CVCS 50*HFV	CVI & CVCS 63*HFV
Non-OBE Pilot (KTG4V-3) Standard Performance						
Non-OBE Pilot (KFTG4V-3) High Performance						
OBE Pilot (KBTG4V-3) Standard Performance						
OBE Pilot (KBFTG4V-3) High Performance						

Major Success Applications



Press Brake

Highly accurate positioning, repeatability of machining cycles, and precise synchronization control of cylinders during the closing movement of the bending tool, are pre-requisites of the hydraulic control system.

Product & System Description

By using two K(B)F/SDG4V proportional valves for small-tonnage machines, or two K(B)HDG5V valves for large-tonnage machines in closed loops, Vickers valves provide the solution to this very demanding application. System control blocks provide full compliance to safety regulations.

Benefits

High bending speed, with precise control of bending depth, results in greater productivity. The design of the safety system blocks reduces production and maintenance costs.



Injection Molding Machine

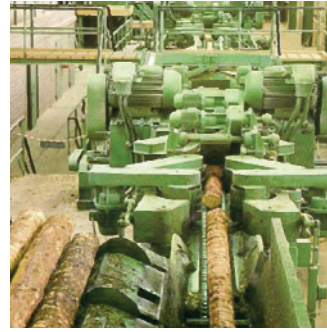
It is critical that the plasticizing process be precisely controlled, which requires accurate, repeatable, and smooth transition from velocity into pressure regulation. It is also imperative to achieve smooth, quick, and precise clamping movement, in order to improve productivity and quality.

Product & System Description

Vickers Servo performance proportional valves K(B)S/HDG and high performance K(B)FDG families with tailored spool design, are the answers for meeting the extremely demanding injection and clamping control requirements, with the excellent dynamic capability of closed loop control on pressure, position, and velocity.

Benefits

Reduced cycle time and costs, with improved process control. One valve with a specially designed spool does all five critical controls of plasticizing, injection speed, holding pressure, decompression, worm return, and suck-back pressure. The "valve enable" feature on the KB line can be used to easily achieve interlock function.



Sawmill

Productivity is king, which transforms to the requirements of overall machine reliability and durability, and precise control, and short cycle time. Harsh environment is another challenge for proportional valves mounted on the machines; robustness against shock, vibration, EMC, dirt, and moisture is a must.

Product & System Description

Vickers Servo performance proportional valves KBS/HDG with fully encapsulated OBE (EN90 version) provide extremely reliable protection in condition of vibrations and shock. Valves with zero lap spool and grounded spool/sleeve pilot stage are characterized by their high-dynamic performance, with low hysteresis and high response sensitivity, to achieve accurate positioning control and speed control.

Benefits

On-board-Electronics (OBE) valves feature "plug and play" to save wiring hassle and tuning time. IP 65 & 67 environment protection provide "best in industry" protection against moisture to make sure the proportional valves work reliably. When coupled with a Vickers LESA servo cylinder, the proportional valves can be mounted directly onto the cylinder to become a servo actuator package.



Wind Power

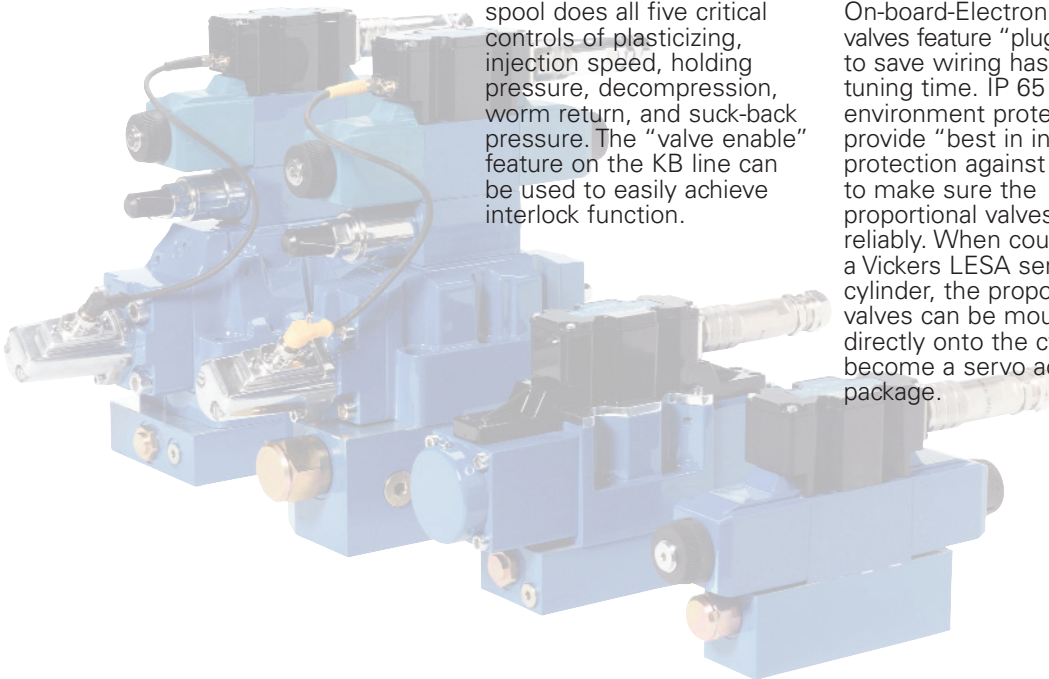
Wind power turbine control is a very demanding application that requires proportional valves to be extremely reliable and durable due to the nature of continuous production process. At the heart of advanced wind turbines is a hydraulic control system that controls the pitch angle of the turbine blades, hence controlling the speed and power production. Challenges are closed loop positioning control for precise pitch angle, and low and high ambient temperatures in extremely harsh environments.

Product & System Description

Coupled with LESA servo cylinders, Vickers high performance proportional valves KBFDG with CAN Bus communication capability (developing) and failsafe feature, provide a compact, rugged, and reliable package solution.

Benefits

Digital On-board-Electronics (OBE) valves feature presetting the parameters with programming, which results better reproducibility and repeatability; it also allows you to fine tune and diagnose the valves remotely through CAN bus. Failsafe feature prevents the equipment from being damaged. IP 65 and 67 protection ratings mean Vickers valves provide better resistance to moisture than any competitors.



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