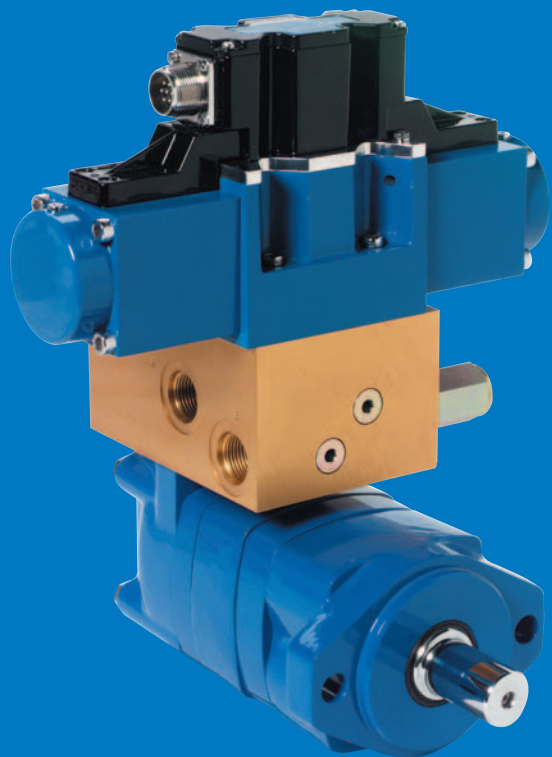


# With a wide range of markets serviced, our KB proportional valves are enabling truly creative solutions.

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



### 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.



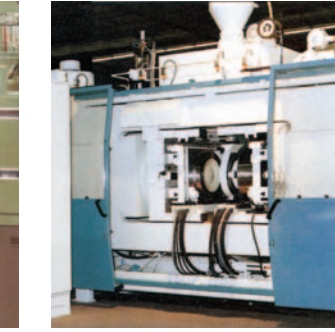
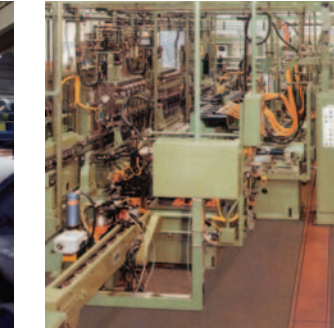
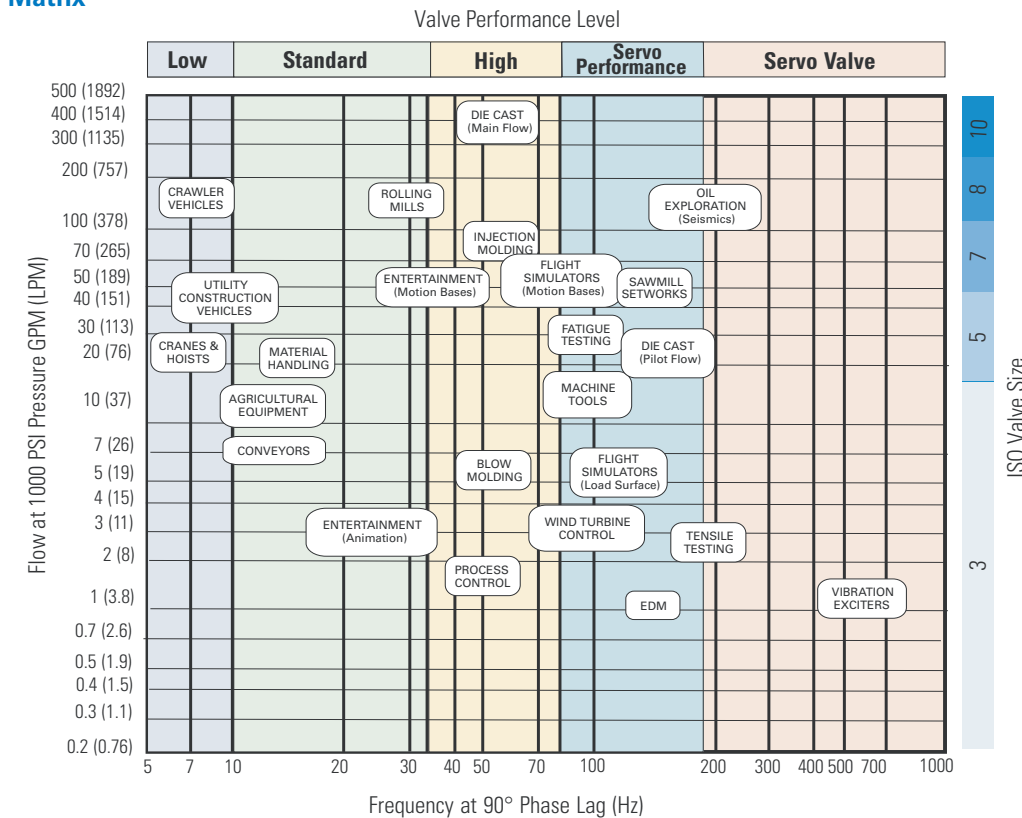
PRIMARY MARKETS	SUBMARKETS	FORCE CONTROL	SPEED CONTROL	POSITION CONTROL	
Machine Tools	Metal Cutting	X	X	X	
	Material handling		X	X	
Automotive	Assembly Parts	X	X	X	
	Metal Cutting	X	X	X	
	Foundry	X		X	
	Plastics	X	X	X	
Molding	Plastics	X	X	X	
	Die Casting	X	X	X	
	Rubber	X	X	X	
	Foundry	X	X	X	
	Ceramic	X	X	X	
Metal Working	Press	X	X	X	
	Baler	X	X	X	
	Shear & Cutting	X	X	X	
	Metal Forming	X	X	X	
	Welding & Joining	X	X	X	
Primary Metal	Ferrous	X	X	X	
	Non-Ferrous	X	X	X	
Processing	Wood Product	X	X	X	
	Pulp & Paper	X	X	X	
	Textile	X	X	X	
	Chemical	X	X	X	
	Glass & Ceramics	X	X	X	
	Concrete and Aggregate	X	X	X	
	Food	X	X	X	

### Proportional Valve Application Matrix

The application matrix to the right provides a "quick" valve sizing approach 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.



### Specifications, Features and Benefits of KB Prop Valves

SPECIFICATIONS/FEATURES	BENEFITS
IP67 (best in class)	Superior moisture resistant
Valve enable	Easy to achieve interlock control
Ramp adjustment (digital OBE)	Ability to fine tune on site
1.2A rated current (digital OBE)	Less power consumption
Shock and vibration tested	Reliability and durability in harsh environment
Digital OBE (KBDG, KBFDSV, KBCG, and KBXG)	Setup and test done through software
EMC CE marked	Passport selling to EU
+/- 10VDC & 4-20 mA* command input options	Flexibility to match customer controller
Output monitor	Easy setup and diagnosis
Integrated on-board-electronics (OBE)	Less wiring & more reliable
Factory preset gain & dead band	Plug and Play
Factory calibration	No setup needed for replacement
Industry standard 7-pin connector	Interchangeability & ease of customer wiring
SMD techniques used in OBE	More compact design
24VDC with wide tolerance (21V to 36V)	Less demanding for power supply

\* 4-20 mA only available on digital OBE, KBD(T)G4V, KBDG5V, KBFDSV, KBX(C)G, KBCG

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

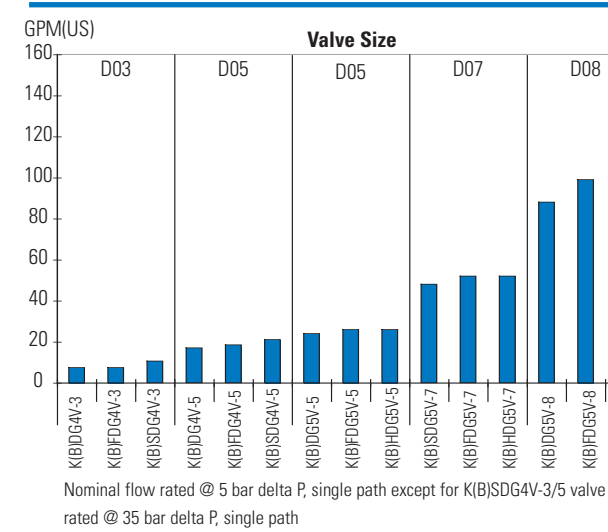
### OBE Proportional Valve Comparison

SPECIFICATIONS/FEATURE	EATON	BR	PARKER	ATOS
Environmental Protection	IP67	IP65	IP54	IP65
Ramp adjustment	Yes*	Not across board	No	Not across board
Rated Current	1.2 A*	1.6A	3.2A	3.2A
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 (not across board)	+/- 10V & +/- 10mA	+/- 10V & 4-20mA
Output Monitor	Yes	Yes	Yes	Yes

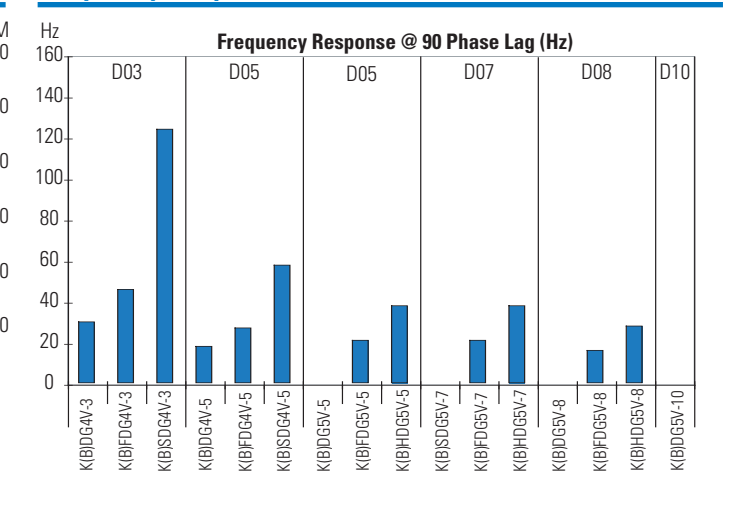
\* Digital OBE valve: KBD(T)G4V, KBDG5V, KBFDSV, KBX(C)G, KBCG

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### Flow Capability

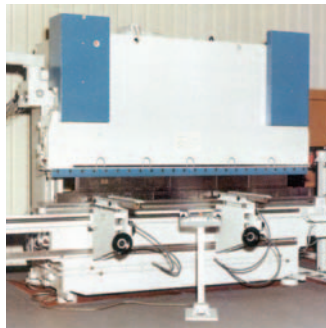


### Frequency Response



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





**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.

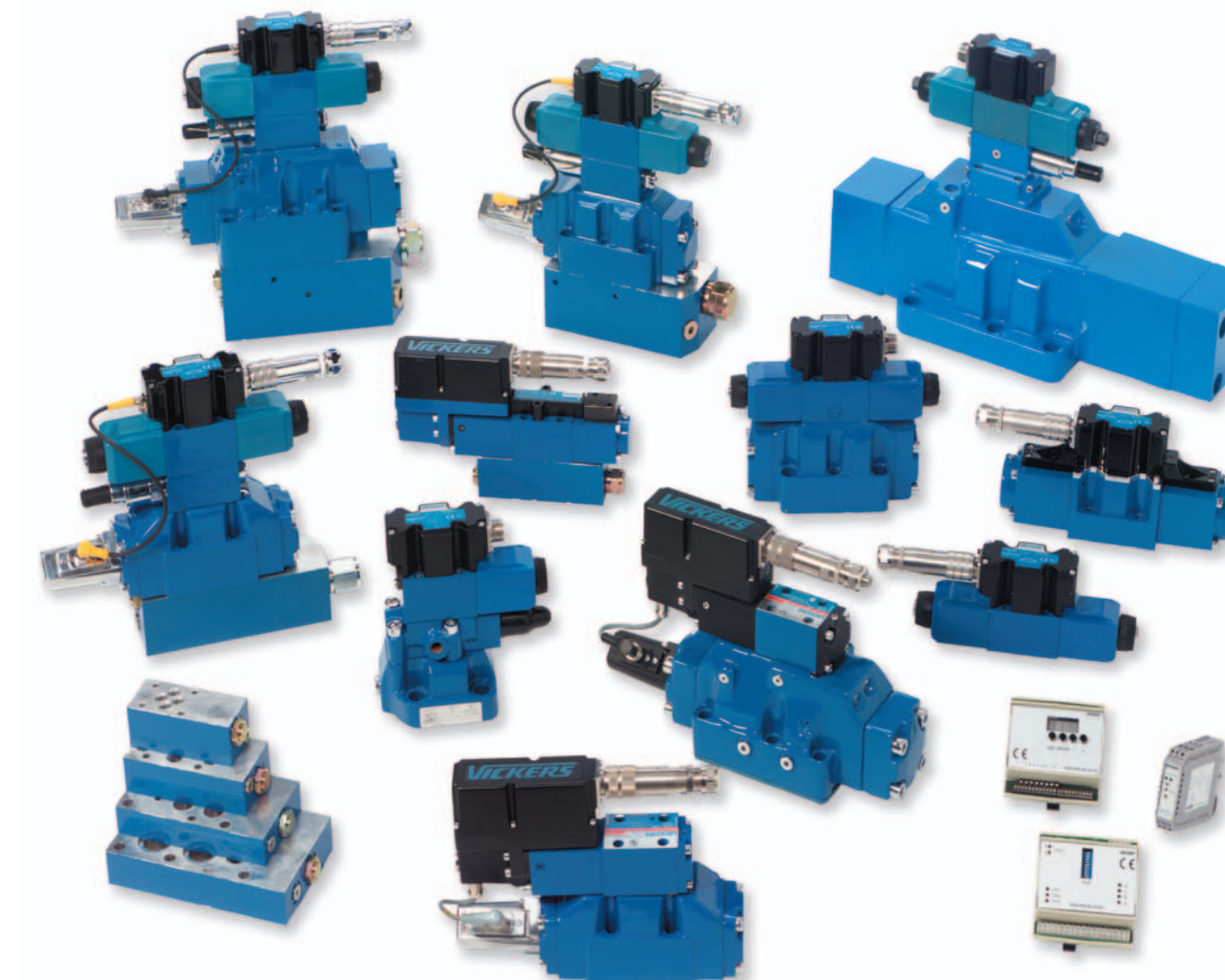
**Benefits**

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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**Proportional Valves**



**Enabling Creative Solutions**