



**INDUSTRIAL  
CONTROL DIRECT**  
A B&D Industrial Company



## High Quality / Low Prices

AC Variable Speed Drives for Industry  
0.37-710kW (0.5-950HP)



The drive for perfection



## The drive for perfection

We put more in, so you get more out...

- Better diagnostics - easy to programme in many languages
- Quicker response to dynamic load changes
- Connection to the latest industrial fieldbus systems



**1984**  
VL series: First miniature 3Ø analogue drive



**1986**  
CUB VC150: First low cost analogue 1Ø drive



**1987**  
VL 11-22



**1988**  
CD Mk1: First digital 3Ø inverter with RS485 comms



**2010**  
VXG



**2007**  
VXR



**2004**  
CUB:  
1Ø and  
3Ø series

# IMO Jaguar

**After twenty five years, IMO Jaguar AC variable speed drives continue to deliver innovation and efficiency worldwide.**

The product of twenty five years continuous innovation, today's range of variable speed drives, comprises single and three phase CUB and VXR series from 0.4kW and VXG series up to 710kW, which remains at the forefront of frequency inverter technology.

Today the Jaguar variable speed drive is helping engineers bring significant energy saving, greater efficiency, reliability and performance to their daily operations. The Jaguar drive is being used 24 hours a day, 7 days a week, 365 days a year, worldwide, in applications ranging from simple fans or pumps through to the most demanding and complex machines.

The Jaguar range of drives is allowing engineers to control the speed of their electric motors and pumps with even more accuracy and efficiency. This is resulting in better reliability, as the life of the motor or pump can be extended due to less wear and tear, providing overall improved performance on older more unreliable systems.

The energy saving a Jaguar variable speed drive delivers by controlling the speed of a pump or fan during quieter periods could be significant. As awareness of energy saving has increased IMO has used its twenty five years of inverter technology experience to develop its 5 Stage Pentagon Plan, delivering an unrivalled solution to your energy saving needs.

Just as important, with all this experience behind us, our engineers have the edge in application expertise and sheer drive know-how to help, without hassle, customers achieve their optimum solution. Boasting the largest stock of AC drives in the country, backed as always by our unique five year guarantee, IMO is the only manufacturer in the world to underwrite your energy saving.



**IMO Jaguar. The technology... the support... the drive.**



**1989**  
CUB VCD series:  
First 1Ø digital  
inverter

**1990**  
CD 11-30

**1991**  
DX and CD  
45-90 HVAC

**1992**  
CDS and  
CD MK2

**1993**  
Dinverter:  
First DIN rail  
mountable  
micro drive

**1994**  
DXE: First  
sensorless  
vector control  
system

**1995**  
VX: Torque  
Vector  
series

The only inverter in the world to underwrite  
your **Energy Saving!**



**2003**  
TE: IP54  
and LE:  
Lift/hoist  
specific



**2002**  
Over 5 million  
installed world-wide



**2001**  
VXSM



**2000**  
VXM and CUB CM:  
First closed loop  
Dynamic Torque  
Vector Jaguar



**1998**  
Common  
fieldbus  
options



**1997**  
CUB C



**1996**  
VXS: Compact low cost  
Torque Vector series



# Which is the right Jaguar Drive for you?



From our market leading CUB, VXR and VXG range of drives with varying functionality and power, IMO has the right frequency inverter to meet the needs of your application, whatever it might be. From a simple small pump or fan through to the most complex large scale hoists, you can be assured that IMO has the drive and the knowledge to meet your application needs.

The IMO CUB features a full range of functions, a compact body, simple operation, wide model variations and global compatibility. It will meet the needs of higher performance machines and equipment such as conveyors, fans, pumps, centrifugal separators and food processing machines, as well as the needs of system integration, energy saving, labour saving and total cost reduction.

With an extended range of functions, the IMO VXR features connectivity, compact body, wide model variations and global compatibility. The VXR with Dynamic Torque Vector Control sets new standards for vector controlled drives. It will meet the needs of high performance machines and equipment such as pumps, fans, conveyors, material handling machines, packaging, special machines and textile machines.

The high performance VXG, multi function inverter. boasts state-of-the-art technology, with control performance that has evolved to a new dimension. Control methods now include: PG Vector control, sensorless vector control, dynamic torque vector control and V/F Control. It meets the need of the most demanding drives applications such as hoisting, packaging, material handling, wood, textile and process machinery.

The IMO Jaguar range is ready to answer your needs, providing the highest performance levels in the industry and redefining the common sense of general-purpose inverters.

## CUB applications include...



- ◀ Small Fans & Pumps
- Woodworking Machines ▶
- ◀ Small Conveyors



## VXR applications include...



- ◀ Fans
- Conveyors ▶
- ▼ Mixers



- ▲ Dosing Pumps
- Chairlifts ▶
- ▼ Palletisers



- Food Processing ▼
- ◀ Shrink Wrappers
- Small Industrial Refrigerators ▶



## VXG applications include...



- ◀ Fans
- Textile Machines ▶
- ▼ Extruders



- ▲ Hoists
- Washing Machines ▶
- ▼ Fillers / Cappers



- Compressors ▼
- ◀ Crushers
- Baggage Conveyors ▶



# IMO Jaguar: saving energy... and money!

As the awareness of Energy Saving has increased, IMO has used its 25 years of inverter technology experience to develop its “5 Stage Pentagon Plan” delivering an unrivalled solution to your energy saving needs.



What are the 5 stages of the IMO Pentagon Plan?



**1. Why should you care about energy saving and its affect on your business?**

Lowering energy usage is a global issue that has been proven to mitigate climate change and increased carbon emissions and lower your operating costs!



**2. How can the IMO Jaguar range of inverters help lower your energy costs?**

A single IMO Jaguar Inverter can deliver significant energy savings and cost reductions by controlling the speed of equipment that is traditionally “dampened” such as a fan or pump.



**3. What could your potential energy savings be and how can you afford them?**

Energy saving products can start providing payback as soon as they have been installed and these savings can be substantial. IMO offers a comprehensive JAGSAVER review of your application to evaluate these savings and works closely with you to identify the best financing solution, including the option of 0% financing from the Carbon Trust.



**4. Can IMO prove that this technology really delivers energy savings?**

Yes. IMO has many examples of customer applications that have generated savings, some as high as €1000 per day.



**5. What do you need to do next?**

Make a difference to your company by taking the action of reducing your energy consumption and lowering your daily energy bills. Contact IMO for a free JAGSAVER review.

The IMO Pentagon Plan is supported by IMO’s position as the only inverter manufacturer in the world to underwrite your energy savings for a minimum of 5 years.





Climate change can be defined as “A regional change in temperature and weather patterns.” Current scientific evidence indicates a noticeable link between climate change over the last century and the increased burning of fossil fuels.

### What is being done and is your business already being effected?

Climate change is recognised as a global problem and nations are working across the world to reduce their greenhouse gas emissions by 5.2% by 2012. The UK’s target is 34% (1990 emission levels) by 2020 and will increase to 42% if international agreement is secured.

The UK is affected by the Climate Change Levy which came into effect on 1st April 2001. This applies to energy used in the non-domestic sector (industry, commerce and the public sector).

### How can an inverter make a difference?

With unstable energy prices that have increased significantly in recent years due to supply worries, it makes sense for industry to focus on applications that are the largest users of electricity. Fans and Pumps make up a significant portion of electric motor applications in industry estimated to be in excess of 50%.

When specifying a new motor, it is common for engineers to specify one that is more than capable of doing the job in the worst circumstances.

A Centrifugal Fan or Pump is one example of where this theory is usually applied. On such variable torque applications, torque (current) varies with the square of the speed and power in proportion to the cube of the speed, often referred to as “Cube Law”. However, speed reduction is usually achieved by “damping”, akin to slowing a car by braking without releasing the accelerator.

By using an inverter to electronically reduce the speed of the fan or pump and applying Cube Law, the power actually reduces by the cube of the speed change. It follows that a 20% reduction in speed equates to a 50% reduction in power.



### What is a Jaguar Drive?

With energy saving payback points typically varying between 12 and 18 months, the IMO Jaguar’s unique FIVE year warranty makes it the only inverter in the world that actually underwrites your energy cost savings.

IMO define the Jaguar Inverter as a product with over 25 years continuous innovation putting you in total control of your motor performance, operation and output.

- IMO Jaguar Inverter sizes:
- Jaguar Cub 0.4kW to 4.0kW
  - Jaguar VXR 0.4kW to 15kW
  - Jaguar VXG 0.37kW to 710kW

Company: IMO Precision Controls		Application name: Jaguar VXM	
Fill in the 'green' boxes for the current or estimated flow rates to get a potential annual cost saving when using IMO Jaguar VSD. Savings are shown against six existing Flow Control options			
Days per week =	5	SELECT EXISTING FLOW CONTROL SYSTEM TO BE REPLACED (enter '1' in the box to indicate current control)	
Weeks per year =	52	Output Damper (or Valve)	34421 kWh/yr
Flow Rate	Hours per day	Flow Damper	29293 kWh/yr
20		Flow Guide Valve	13608 kWh/yr
25		Flow Throttle	3588 kWh/yr
30		Edly Current Coupling	18328 kWh/yr
35		Constant flow - no control	32370.6 kWh/yr
40			
45			
50			
55			
60			
65			
70			
75			
80	12		
85			
90			
95			
100			
Motor size (kW)	30	Cost of Inverter (£)	500
Peak Elec. Cost (£/kWh)	0.075	Cost of Installation (£)	500
		TOTAL RETROFIT COST	£ 2,450
		ENERGY SAVINGS per YEAR	£1,721
		SAVINGS per YEAR	£1,721
		PAYBACK PERIOD	1.4 Years

An IMO engineer is able to offer you our free energy review, using IMO’s JAGSAVER estimator application software. Once complete, your potential energy savings can be quickly identified.

### What savings can you make?

As an example we have taken a typical 75kW motor on a pumping application running 12 hours a day, 350 days per year with a utility rate of 7.5p per kWh.

$$100\% \text{ Speed} = 75\text{kW} \times (1.00) \text{ cubed} \times 12 \text{ hours} \times 350\text{days} \times \text{£}0.075 = \text{£}23,625$$

$$80\% \text{ Speed} = 75\text{kW} \times (0.8) \text{ cubed} \times 12 \text{ hours} \times 350\text{days} \times \text{£}0.075 = \text{£}12,096$$

**This provides the user with a saving of: = £11,529 or 51% and a payback period within 7 months using a Jaguar Inverter.**

### How can you afford it?

Energy savings offered by IMO Jaguar Inverters often means that capital investment is paid back within months. IMO will work with you and other departments within your business to access and complete the finance process.

Energy Efficiency Loans from the Carbon Trust are a cost effective way to replace or upgrade your existing equipment to more energy efficient standards. This delivers immediate benefits in carbon emission reduction and cost savings. If your spend is less than £500,000 on your energy, you could be eligible for an interest free loan from the Carbon Trust.

IMO can provide you with full details of Carbon Trust interest-free loans and assist you through the process of applying for a loan that can range from £3,000 to £400,000 with a repayment period of up to 4 years.

ECAs ( Enhanced Capital Allowances) further reduce the costs of installing qualifying plant equipment. You will find IMO Jaguar on the Qualifying Technologies List ETL at [www.eca.gov.uk](http://www.eca.gov.uk).

For companies that do not qualify, a range of other financial packages are available from IMO that will assist you with your cash flow and enhance your business competitiveness.

### Does the technology work?

One of many examples of IMO enabling manufacturers to fight back against the rapidly rising cost of energy was our work with an Italian manufacturer of paper bleaching agents. The company is now benefiting from savings of €1000 per day in production costs following the installation of 8 – 280kW IMO Jaguar Inverters to grinding mixers at its plant in North West Italy.



Each of the mixing vessels is equipped with a vertically mounted 250kW/400v/4-pole motor, which drives the grinding paddles through reduction gearboxes. These motors are controlled by IMO Jaguar energy-saving inverters.

Working closely with IMO, a local system builder installed the 8- IMO Jaguar VXM280K Inverters.

The result is the original mixers operate at a reduced inverter/motor frequency of approximately 42Hz. This cut in running speed and motor current maintains production quality and provides savings in the order of €1000 per day in production costs.

### Now what do you need to do?

Call us now to discuss your energy projects and thoughts. We are ready and waiting to work with you directly to address these issues and to help reduce your costs.

# IMO Jaguar CUB micro-inverters

1Ø: 0.37-2.2kW (0.5-3HP)

3Ø: 0.37-4.0kW (0.5-5HP)



## Key Features

- IP20 side-by-side mounting
- Optional integrated EMI filtered models
- RoHS, CE marked, UL / cUL approved
- Revolutionary diagnostics
- DC injection braking for fast stopping
- Input and output phase-loss protection
- High performance STV control
- PID control mode as standard
- Impact load stall prevention
- 7 user-configurable preset speeds
- 3 user-defined skip frequencies
- Sink / source logic
- Optional copy unit / remote operator
- Timer / one-shot operating mode
- Loss-of-load output signal
- Inputs configurable for ON/NOT-ON operation
- Life time / service due alarm output
- Internal brake chopper
- RS485/Modbus RTU communication options
- Jaguar Loader diagnostic software

**Ideal for OEM and end users alike, this powerful little inverter uses our latest Simplified Torque Vector open loop control architecture to give optimum torque output from a standard AC motor.**

The Jaguar CUB drives deliver a higher motor starting torque using STV technology, a simplified version of IMO Jaguar's renowned torque-vector control system for consistently powerful operation. Running at 5Hz and employing both advanced magnetic flux estimator and motor slip compensation with auto-boost, starting torque can be as much as 150% or more.

The drive is available in ratings from 0.4kW through to 2.2kW in single phase / 230V, and 0.4kW to 4kW in 3 phase / 400V. Cubs rated 1.5kW and above can be specified with an integral braking resistor, while smaller models can be easily connected to an external bolt-on braking resistor option making it ideal for applications such as stopping higher inertia loads that call for large reserves of regenerative braking power.

By keeping motor loss to a minimum, the Jaguar Cub saves electrical power in fan or pump applications and thanks to its unique technology improves voltage control performance and reduces motor instability at low speed to about a half or less, at 1Hz, than that of a conventional inverter. Even when the motor load fluctuates, the slip compensation function ensures smooth operation.

With its impressively high specification and feature set, the built-in benefits of the CUB make it the perfect choice for small applications such as fans, conveyors, chemical dosing pumps, chairlifts, lab mixers and food processing equipment.



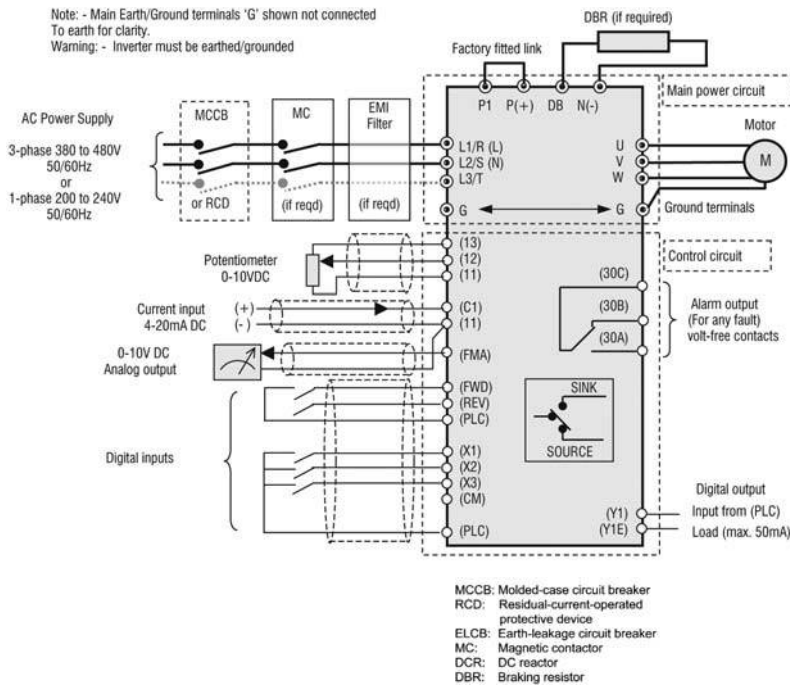


# Options & Ordering



		1 Phase				3 Phase			
Output Frequency	0.5 - 400Hz								
Overload Capacity	150% for 60 secs - 200% for 0.5 secs								
Power Supply Voltage	1 phase, 200-240V, -15% / +10%				3 Phase, 380-480V, -15% / +10%				
Starting Torque	200% at 5Hz								
PWM Switching Frequency	0.75kHz - 14kHz								
Enclosure	IP20								
Communications	RS485 / Modbus RTU								
Dynamic Braking	Inbuilt								
EMC	Class A	External Option	Integrated	External Option	Integrated	External Option	Integrated	External Option	Integrated
	Class B	External Option	Dim	External Option	Dim	External Option	Dim	External Option	Dim
Motor Power (kW/HP)	0.37/0.5	<b>CUB3A-1</b>	1A	<b>CUB3A-1E</b>	1B	<b>CUB1A5-4</b>	2B	<b>CUB1A5-4E</b>	2F
	0.75/1	<b>CUB5A-1</b>	1D	<b>CUB5A-1E</b>	2C	<b>CUB2A5-4</b>	2C	<b>CUB2A5-4E</b>	2G
	1.5/2	<b>CUB8A-1</b>	2E	<b>CUB8A-1E</b>	3G	<b>CUB3A7-4</b>	2C	<b>CUB3A7-4E</b>	2G
	2.2/3	<b>CUB11A-1</b>	3C	<b>CUB11A-1E</b>	3G	<b>CUB5A5-4</b>	2C	<b>CUB5A5-4E</b>	3G
	4/5	-	-	-	-	<b>CUB9A-4</b>	3C	<b>CUB9A-4E</b>	3G

## Power & Control connections



## Dimensions

H	W	Depth	a	b	c	d	e	f	g
120	80	1	95	115	140				
130	110	2		115	139	149	158		
180	140	3			139				182

## Accessories



Additional CUB Keypad

Comms Lead



Brake Resistor



Turn to accessories page for the complete range.