JVL News

JVL ...when motors must be controlled

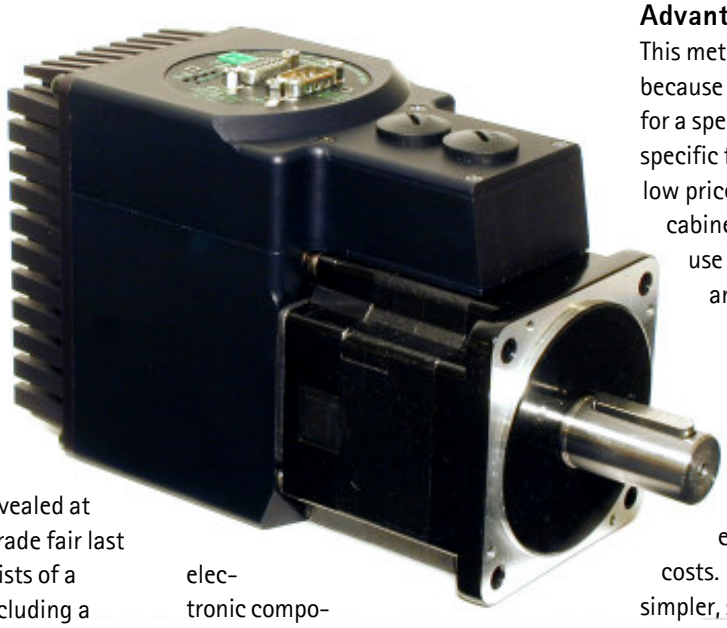
Number 12

A newsletter from
JVL Industri Elektronik A/S

New MAC Motors, 400 and 750W

The AC servo motor with built-in driver/controller is the same size as a traditional servo motor

JVL, which is the European leader in the development of new servo- and step motor technology, has again developed a new, unique product in the field of integrated motor control. JVL's new additions to the fold comprise two complete, recently developed, high-capacity MAC Servo Motors with ratings of 400W and 750W. These new products were first revealed at the Danish *Herning Tech* trade fair last year. The MAC motor consists of a complete servo system, including a high-dynamic AC servo motor, hall-sensor, encoder, power supply, driver and positioning controller, as well as facilities for incorporating various modules such as Profibus, CANopen, Nano PLC, etc.



A new type of motor

The MAC motor sets completely new standards for the performance and appearance of servo controls. With a length of only 175mm for a 2.4Nm/750W motor, the MAC motor matches the size of traditional servo motors that have no built-in driver/controller. This has only been possible through the use of an extremely compact motor and the development of electronics and mechanics that utilise the latest technologies and manufacturing methods. At no point has quality been compromised and the motor and electronic components have been specifically selected to withstand the rigorous demands on quality and lifetime required by industrial use.

Everything is integrated

These large and powerful motors are based on the same concept as JVL's previously introduced MAC motors, which have ratings from 50 to 140W. For applications involving vertical movement or robotic solutions, the larger models can be supplied with built-in electro-mechanical braking. The specific control characteristics of a particular motor are determined by the module mounted in the motor housing. These modules are termed "expansion modules" and are similar to those used in the smaller models of the MAC motor.

Advantages

This method of construction is unique, because you only buy what you require for a specific application and thus gain specific functionality at an extremely low price. Space is saved in the control cabinet, noise induced through the use of long motor cables is avoided, and errors due to cabling and components are reduced considerably. With significantly reduced cabling and 30% of the normal number of components, you can be sure of reducing the number of errors, and save on installation costs. In addition, service is much simpler, since the motor and controller can be replaced as a single integrated unit.

The motor itself is a very powerful, compact, 3-phase AC servo motor that can yield up to 3.9 and 6.8 Nm peak torque. The motor construction is extremely compact, measuring only 175x115x80mm (750W model), which

Expansion modules adapt the motor to the specific application

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corresponds to a normal servo motor without built-in driver. The flange is a standard servo flange, similar to Yaskawa and Omron flanges.

The basic motor offers the following standard features:

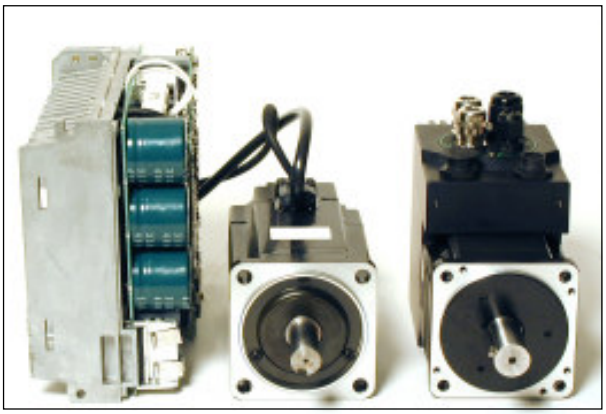
- Operating commands from PC/PLC via RS232/422/485
- Pulse/Direction or quadrature inputs for electronic gearing
- A+B encoder output
- Velocity and torque control, either controlled digitally or via ±12bit, ±10V inputs
- Positioning via digital interface
- Software-controlled end-of-travel stops
- Selection of acceleration, maximum velocity, torque, etc.
- 6th-order servo filter
- Sine commutation with 2000 PPR encoder. (8000 pulses/revolution.)
- Alarm and "in position" outputs
- 3 inputs and 3 outputs for High Speed start/stop and capture applications
- Internal Power Dump

Via the use of expansion modules, the following additional features are offered:

- Profibus DP module, enabling connection to 12Mbit Profibus.
- CANbus/CANOpen module with 6 in/ 2 out for sensors and PLC
- Nano PLC, containing a single controller that can position on the basis of 8 optically isolated inputs. This module can accomplish 80% of positioning applications.
- High-speed serial RS485 interface that enables multi-axis operation so that robotic movements and advanced XYZ operation is possible at high speed. Can additionally interface directly to IEC61131-3 softPLC.
- Expansion modules are available for IP42 (SUB-D) or IP67 (cable glands or M12 connector).
- Other modules are under development, e.g. for DeviceNet and Ethernet, and USB modules both as Bluetooth and WLAN modules for wireless data transmission.

Software

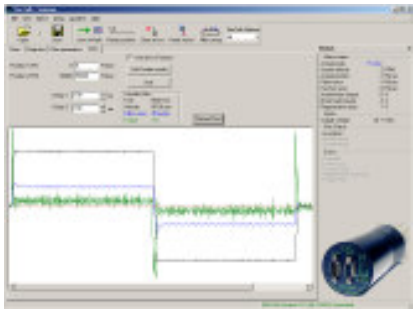
To ease the set up of the motor, it is delivered with the Windows software MacTalk. Internet upgrades are an integrated part of the MAC concept. If an update of MacTalk or the motor's firmware is required, the user simply selects "Update MacTalk" or "Update Firmware" and MacTalk will automatically download the latest version from JVL´s Internet server. It cannot be easier.



The motor with controller is no larger than an ordinary 750W servo motor

Control and electronic gearing

The MAC motor can be controlled via ±10V in velocity or torque mode, with encoder feedback to the overall motion controller (PC or PLC). In addition, the MAC motor can replace any step- or servo system that is based on pulse/ direction signals, without changing the PLC/PC controller software. The built-in electronic gear enables the MAC motor to simulate any conceivable step resolution.



Power supply

Powering the MAC motors is simple and only requires connection of a mains voltage of either 115 or 230VAC. To ensure correct and effective emergency-stop procedures, the encoder and microprocessor circuitry must be powered using 24VDC.
Switching technology is used to ensure large energy savings and thus reduction of heat generation when the voltage is regulated to the internal control circuits.

Regulation filter with 6th-order regulator

Normally a PID regulator, which is a 1st-order regulator, is used for each of the three control loops (torque, velocity and position).
JVL however has opted to use a significantly better 6th-order filter, which is a mathematically modelled perfect regulator that is far better than a PID filter at handling non-linear and undamped systems.

A 6th-order regulator offers the following advantages:

- Reduced installation and commissioning times
- A stiffer system with shorter positioning times
- Inexperienced users can set-up the servo system
- Oscillations due to non-linear mechanical systems are avoided
- Minimum positioning error during operation and stop

Adjust one parameter – it can't be easier

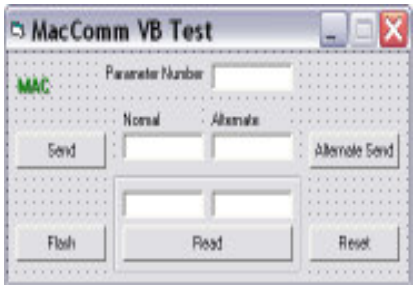
A common feature of JVL´s regulators is that the user need only adjust a single parameter. This parameter is called the "Load factor", since it only depends on the inertia of the system. The greater the load on the motor, the greater the load factor. Expert users can continue to fine-tune very complex, undamped systems using the MacTalk software to select the "Filter Selector" window and change the speed response and hardness. In addition, it is possible to optimise compensation for follow errors.

MacComm OCX file

MacComm OCX* makes it easy to develop Windows software with the MAC motors

This OCX can be used with Windows 95, 98, Me, 2000, XP, and makes it easy to communicate with the MAC motor.
The OCX makes it easy to send/read register values to/from MAC motor(s). Developers do not have to think about opening and closing the RS232 port. Communication is taken care of entirely by the OCX. The OCX will take care of the special MAC protocol with checksum, inverse byte, register length and register format. You only have to specify a register no. to read from, or a register no. and value to write to.
The OCX can be used in a very wide range of environments supporting OCX controls, e.g.:

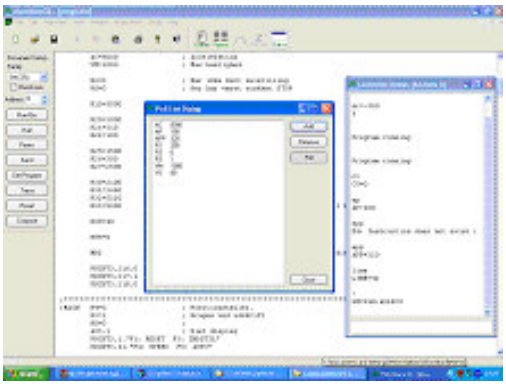
- Visual Basic
- Visual C++
- LabView
- Excel



*** MacComm OCX (Ole Custom Controls. Also known as ActiveX controls).**

New MotoWare

MotoWare, the Windows-based programming tool for JVL motor controllers, is now available in a new 32-bit version, MotoWare32 ver. 4.05. It can be used for the AMC20 as previously, but now also for programming and testing Step/Servo Indexers SMI30/31 and Step Motor Controller SMC35A/B with the same functions.
The Parameter Setup window shows the current values of parameters such as velocity, control bits, register values and the most recent error codes.
In addition, a Poll window has been added to enable the display of selected registers from either the AMC20, SMI3x or SMC35x during program execution.

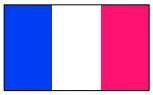


New modernised JVL website

Our updated website provides many additional features – see www.jvl.dk

Since the introduction of our website, already in 1995, much has happened both in web design and the opportunities afforded to Internet users. In addition to continuous updates, websites require complete redesign periodically, and we have therefore recently completed the second major upgrade of our site.
The new JVL website has been equipped with pop-up menus to provide easy access to information, and a search engine has been introduced so that users can quickly and readily find any subject of choice. Subscription to our newsletter is even easier, and a new file handling system makes it easy to both upload and download files.
Even more literature is now available for download, and links have been created between applications and product types.
In addition, many adjustments and changes have been made to make the site more accessible and user-friendly for all of our visitors.
Our internal processes for continuous updates to the site has been simplified greatly, enabling updates to be implemented readily.
We hope that all of our customers will benefit from these improvements.
We are currently working on the implementation of even more facilities, for example to enable download of firmware/software for testing and updating existing products.

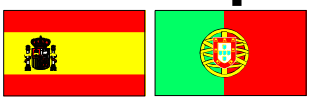
JVL in France



Transtechnik is JVL's new partner on the French Market.
Transtechnik Servomecanismes was established more than 15 years ago and has operated in the field of motion control since then. The company was established and is still owned by Michel Armand, who worked for Siemens in Germany for several years prior to founding *Transtechnik* .
Transtechnik is based in Dijon and has 2 other sales offices, one in Paris and one in Lyon. The company employs 7 people in sales and 6 people in the service and design of motion control systems. We are looking forward to developing relations between *Transtechnik* and JVL.

transtechnik servomécanismes

JVL in Spain and Portugal



ELMEQ S.L. is the new JVL representative on the Spanish and Portuguese markets.
At the end of 2003, *ELMEQ* signed an agreement with JVL to promote our products in Spain and Portugal. *ELMEQ* was established in 1986, and is owned by the MDP-group. *ELMEQ* is located in Barcelona, and has sales offices in Bilbao and Madrid, and within a short time also in Portugal. They are able to support customers within both step and servo systems and on system solutions. A part of the sales force, Top Stock, supports a call-centre with a maximum delivery time of 48 hours on products. JVL is looking forward to working together with *ELMEQ* to expand the market for JVL products.

ELMEQ

New Export Manager

On the 1st of March last year, Klaus Kramer took up his position as Export Manager at JVL. Klaus is an engineer and business economist. He has previously been employed at Danfoss Analyticals A/S and in sales and marketing at Gustav Fagerberg A/S.
At JVL, Klaus will primarily be engaged with exports, and our intensified activities in export markets. We welcome Klaus to JVL and look forward to our future cooperation.

New Pulse/Direction-to-Encoder Signal Converter

In many applications it is desirable to transform a pulse/direction signal to an incremental encoder signal. This is the case for example when a PLC with step motor modules is used, or if several axes are to be synchronised and the input is a pulse/direction signal.
JVL´s new converter PA0095-1 solves this problem. It converts a pulse/direction signal to an incremental encoder signal with index pulse.
A,B and Zout are 5V balanced. (A+,A-, B+,B-,Z+,Z-)
The pulse- and direction input are 5V TTL levels.
The index pulse is generated each time 1024, 2048, 4096 or 8192 (selectable) counts are produced by the internal pulse/direction up/down counter.
The module can be easily modified for other converter functionality.
Contact us for an offer.

JVL at *TechMessen* in Herning

At the Danish trade fair *Techmessen* last autumn, JVL participated with a large exhibition, showing our entire range of motor controllers to interested visitors.
There was special interest naturally in the integrated MAC motors and the new OCX driver for simplified communication.
We had a busy few days and were pleased to once again have direct contact with many of our customers.

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