JVL News

JVL ...when motors must be controlled

Number 13

A newsletter from
JVL Industri Elektronik A/S

MAC800 now also with built-in brake

The largest of JVL's integrated MAC motors is now available with a built-in brake

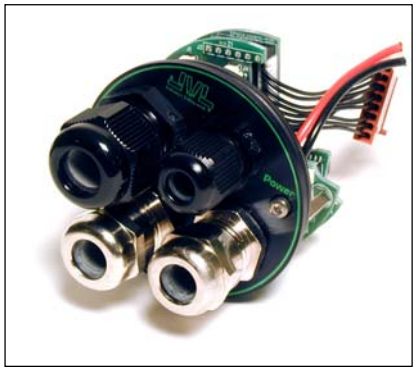
For applications in which motor position must be maintained at power-off, or for use in vertical linear applications, JVL can now supply the large, 750W MAC motor with a built-in brake. The brake, which has a holding torque of 3.2 Nm, is controlled by internal circuitry that activates the brake on power-off, or by software commands or via inputs. When a voltage is applied, the brake is released. The brake adds 32 mm to the length, but total unit length is only 207mm.

CANopen & Devicenet Module for MAC motors

Yet another new expansion module for the MAC50-141/MAC 400-800 series of integrated servo motors enables the motors to be used on a CANopen network. The CAN module offers:

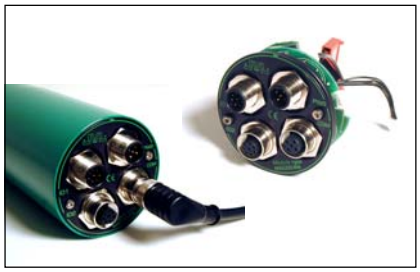
- Control and setup
- Logical I/O for high speed start/stop
- CANbus/CANopen DS 301
- Supports CANopen DS 402
- DeviceNet under development

The Module can be supplied with integral watertight cable & connector for use in industrial environments (IP67)(MAC00-FC2), or with M12 connectors (IP67) (MAC00-FC4).
The modular construction of JVL´s integrated MAC motors makes them extremely suitable for a wide number of applications. CANbus is just one of many possibilities.



Expansion modules with M12 connector for IP67

JVL is currently launching a new variant of the widely used nanoPLC modules for MAC motors. Until now, 2 versions were available: with DSUB connector or cable screw terminals. The new module is based on M12 connectors, which have been requested by many customers and offer several advantages.
The M12 connector is a standard that is used in many forms of industrial automation. Many suppliers produce M12 connectors and complete cables. In addition, M12 is a very robust connector that offers IP67 compliance (in contrast to modules with DSUB that offer only IP42).
JVL can also supply 5m complete cables (and 20m later).
Other MAC modules, such as MAC00-FP and FC (Profibus and CAN) are expected soon also to be available with



M12 connectors.

The first servo roller drive in the World

The world's largest producer of roller drives now uses JVL MAC motors

JVL has now entered cooperation with *Interroll*, the world's largest manufacturer of roller drives, and developed a completely new servo-motor controlled roller drive based on JVL's unique, integrated MAC motor. This development arose from increasing demand from Interroll's customers for a roller drive with more precise and dynamic control. Interroll had met these requirements by using frequency converters and in many cases new vector-based types, but in an increasing number of applications there were additional requirements for positioning and other factors which required the use of an external encoder.
Approximately 2 years ago Interroll had the idea of replacing their AC-motor with a JVL servo motor, not least because:

- The price of servo motors had fallen
- The MAC's compact design meant it could replace the AC-motor with little adjustment.
- Two well-known and proven components were combined:
  - JVL's 5-year success with the MAC motor
  - Interroll's mechanical unit with its 20-year track record

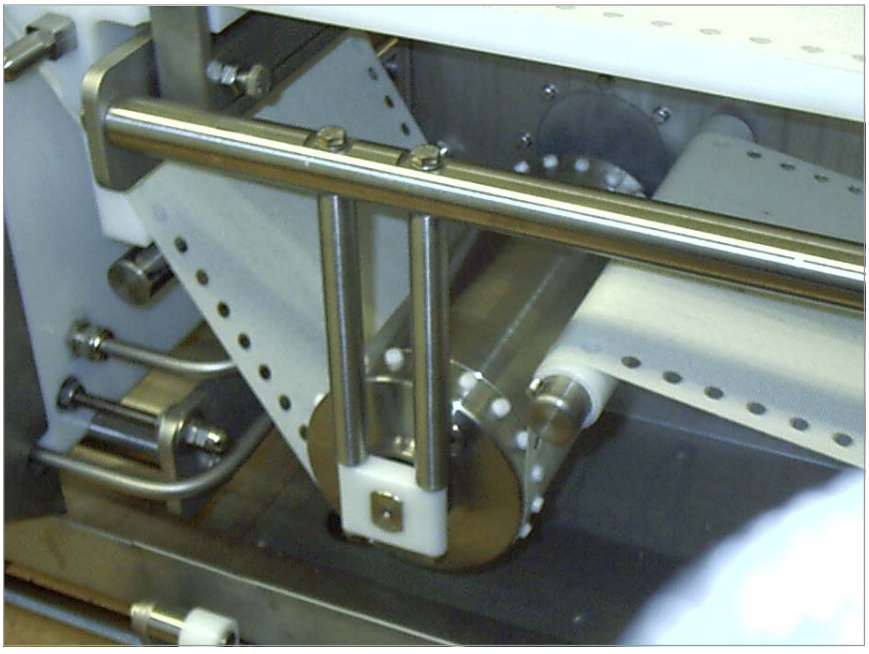
In just 3 months, JVL manufactured the first servo roller drive in the world, based on proven components and technology. In terms of both price and performance, Interroll now had a competitive alternative to the "old" three-component solution.
The next step was to present the new unit to existing Interroll customers to test the idea in the real world. Response was very positive, so after final market analysis, Interroll decided in January 2004 to beta-test IntelliDrive® (as the "child" has been christened). Again, the response was very positive:

- Quick and easy to install
- Very user-friendly software
- Competitive with the traditional solution
- Very interesting for packaging machines and food processing

With these results, Interroll decided to launch IntelliDrive®. The first IntelliDrive® units appeared on the market in August 2004, and the first application is already running.
Interroll's expectations of the new product are great, despite the fact that in many ways it represents a break with the company's traditional core expertise of mechanical construction.
Experience is showing that the new technology is very applicable to specialised machinery, where IntelliDrive® is now being incorporated in new and improved machinery for a wide range of applications such as:

- Automatic sowing machine
  - indexing
  - Simple and less expensive
- Meat slicing machinery
  - positioning
  - greater accuracy
  - higher yield for end-user
- Dynamic weighing machines
  - velocity and torque
  - Greater accuracy and more compact design
- Machinery for folding bed linen
  - torque and positioning
  - compact and cheaper

New development projects include a video-controlled robot, in which the keywords are simplification and cost reduction.
The possibilities are numerous, and already now Interroll sees many opportunities for using larger MAC motors in large roller drives. Such a decision will depend on the market success of the small IntelliDrive®, which so far looks very promising.

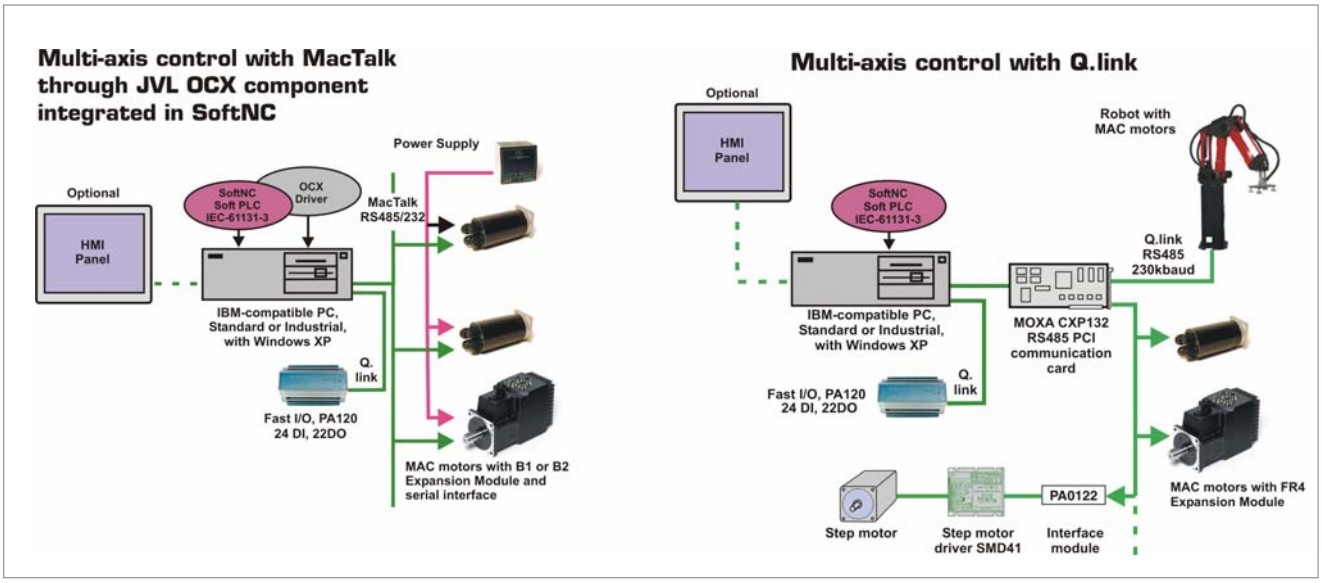


Drive unit with built-in MAC motor and gear

Smart soft PLC

SoftNC software controls a large number of JVL MAC motors from a standard PC

The *SoftNC* software functions as a soft-PLC as soon as it is installed on a standard PC or industrial PC with Windows XP.
This means it is possible to use all programming languages described in IEC 61131-3.
The software makes it possible to control up to 254 of JVL´s integrated MAC motors over a serial RS232/RS485 connection between the PC and the motors.
Step motors can also be controlled via PA0122 modules and separate drivers. JVL can supply several solutions for this purpose. The combination of SoftNC and JVL´s integrated servo motors and step motor equipment is ideal for multi-axes control, e.g. XY and XYZ pick-and-place robots using G-codes.
On a Pentium 4 (or Centrino) with Windows XP, SoftNC gives a PLC scantime of 1 ms in practice, independent of how many axes and I/O's are connected. This yields a modern automation system that fully supports all five languages described in IEC 61131-3.
Moreover, combined with a Moxa RS485 communication card and MAC motors with FR4-modules, SoftNC offers control of up to 32 axes in up to 8 coordinate systems. Thus even very complex motion can be controlled, e.g. in robot arms with 3 to 6 axes. This solution also offers excellent immunity to electrical noise.



Shaft Reinforcement and Electronic Brake

Extended application opportunities for NEMA23 step- and servo motors

JVL can now offer a Shaft Reinforcement and Electronic Brake matching all motors with a NEMA23 flange and 6.35mm shaft.
The Shaft Reinforcement comprises a ball bearing with an outer diameter of 35mm and output shaft of 14mm. This ensures the shaft can withstand high radial and axial loads. The output shaft and flange are compatible with Yaskawa/Omron 200/400W flanges, enabling existing motors to be replaced by a motor from the MAC50-141 series.
An M5 threaded hole makes it easy to mount a toothed or other drive unit.
Similarly, the Electronic Brake can be mounted on step- and servo-motors such as the MAC 50-141 series. The Brake can be used to hold the motor shaft fixed at power-off, or in a vertical linear application. When 24VDC is applied, the brake is deactivated. It is recommended that the brake is only used as a holding brake and not as an emergency stop.
An M3 threaded hole easily facilitates a toothed or other drive.

Watertight MAC motors

MAC140-141 series of servo motors now available as watertight models

Watertight IP67 ingress protection ratings fulfil a requirement from industries such as the food processing industry where very aggressive cleaning agents are used. IP67-compliant versions of the integrated MAC motor are fully protected by a robust layer of chemically resistant epoxy and have stainless steel shafts and flanges.

These models feature:

- A thick protective layer of epoxy on the motor/controller housing.
- Double shaft sealing and watertight cabling.
- Resistance to aggressive chemicals.
- An economic solution in wet and aggressive environments.
- Ideal solution for food processing, pharmaceutical and chemical industries.

IP67 version, standard model

IP67 version for FDA requirements in the USA

The modular construction of JVL´s integrated MAC motors make the IP67 versions particularly well-suited for many applications. Several IP67 modules are available for a variety of applications:

- 12 I/O nanoPLC - Perfect for industrial integration with I/O at 24V @ 300mA.
- RS 485/422, CANopen,Profibus, DeviceNet.
- Electronic gearing, Pulse/ Direction
- Stand-alone indexing – Minimum number of connections, decentral control.

AMTECH & JVL MAC Motor Application

Successful application story from British company Amtech

A CNC company contacted Amtech after samples produced by their 3D-milling machine did not meet customers' requirements. The company which specialises in the manufacture of small 3D CNC machines were asked to produce some samples for an engineering company working in the jewellery trade. The samples did not meet the demanding requirements; the edges of the parts were not smooth and the process took too long.

After looking at the process, it was identified that the stepper motors being used were to blame for the poor finish on the edge of the parts. The stepper controller being used did not give continuous motion, it had a slow serial interface and it stopped between each command. This contributed to the poor finish and the time taken to complete the process.

To smooth out the motion of the machine, the stepper motors were replaced with MAC95 motors. This was easy as the MAC motor and stepper motor being replaced were both NEMA23. The stepper control system was replaced with the Amtech PCI servo control card (AMT-PCI-MC4) and GNC for Windows software. The smooth continuous path motion speeded up the process by as much as 50% and gave a high quality finish.

The machine is now used in the jewellery trade for prototyping, master models, wax casting patterns and small-volume production runs.

Close-up of the machine cutting

The thistle broach produced on the machine

About Amtech

A custom-built motion control system in no time!

Amtech (Automated MicroTechnology Ltd) has been in the PC motion control business for over 15 years, both designing and manufacturing the hardware and software components required to build a PC-based motion control system. The wide range of applications over the years is a testament to the quality and flexibility of the company's products.

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