JVL News

JVL ...when motors must be controlled

Number 14

A newsletter from
JVL Industri Elektronik A/S

The JVL integrated motors

Did you know that almost all current motor controllers that have a separate controller/driver can now be replaced without problems by an integrated solution in which the controller and driver are built into the motor to form a complete and compact unit?

You achieve the following benefits:

- No cables between the motor and driver = less electrical noise
- Simpler cabling = fewer errors and lower installation costs
- More space in the control cabinet
- Simple replacement during maintenance
- Protected inputs/outputs using 24V opto-couplers.
- Lower overall system cost

Not only AC servo motors, but now also integrated step motors (see below).

MAC50-141 (50-140W)

MAC800 (750W)

QuickStep (1.1-2.1Nm)

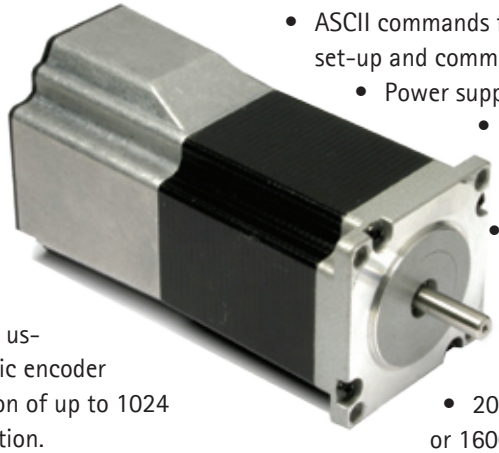
QuickStep Motors

Now available: integrated step motors from JVL

Since the introduction of the integrated AC servo motor – the MAC motor – several years ago, there has been a great deal of interest in these motors. The benefits of integrating the driver and controller in the motor unit are numerous, as outlined above.

QuickStep is a new series of integrated step motors from JVL. They are available in a wide range, offering various functionality and combinations. The basic unit is a high-torque step motor with flange dimensions of 57x57 mm (NEMA23). The housing is constructed to provide IP55 or better protection. One or more PCBs and various connectors can be mounted in the housing to provide the various models. An IP55-protected motor without driver can also be supplied.

- Pulse/direction driver.
- Serial RS485/RS232 position controller.
- Position controller with graphic programming. Canbus, CANopen 402 or Devicenet.
- "Stall detect" using a magnetic encoder with resolution of up to 1024 pulses/revolution.
- All modules can be supplied with M12 connectors. On large orders, customer-specified connectors.
- Double voltage-supply available so that position and parameters are maintained during emergency stop.
- MAC motor protocol so that MAC motors and QuickStep motors can be connected to the same RS485 bus.
- ASCII commands for simple PLC/PC set-up and communication.



- Power supply 12-48V DC.
- 1.1 Nm, 1.6 Nm, and 2.1 Nm versions.
- Fixed 1600 pulses/revolution for version with built-in position controller.
- 200, 400, 800, 1000, or 1600 pulses/revolution for versions with pulse/direction inputs.

Backlash-free and planetary gears with ratios of 3, 5, 10, 20, and 100 can be supplied as standard.

3-D laser scanner with MAC motors

Scantech´s newest portable 3-D scanner utilises 2 JVL MAC motors

Laser scanning is used to measure an object by scanning it with a laser and digitalising the data. Using this information, it is possible to copy or modify the scanned object in various ways using Scantech´s CAD/CAM system CARSO. The scanner system is used for restoration work, scaling models, and creating industrial moulds. For example, it is possible to scan a marble figure that is deteriorating, and use the CAD/CAM system and a 3-D lathe to produce a true copy of the pristine original.
It is thus possible to save a lot of manual work.
Mounted directly on a CNC machine, Scantech´s 3D laser scanners make the CNC an effective copying machine. Scantech´s products are fully compatible with all modern CNC machines, and increase both the machine's productivity and potential.
Typical applications are in the stone and wood carving industries, but also in the foam and footwear industries and in the manufacture for example of industrial moulds. The machines are sold directly to well-known machine manufacturers throughout the world.
The new St 400 scanner is a portable scanner that can be used anywhere.
For motion control in the x- and y axes, Scantech chose JVL´s MAC motor MAC140-A1 with MAC00-B1 modules, owing to their compact design with motor, encoder, driver, and controller integrated in the same unit. The 2 MAC motors are connected to the same RS485 interface and are controlled via serial commands from a PC. JVL´s Active X (OCX) is used as the driver between Scantech´s C++ software and the MAC motors.

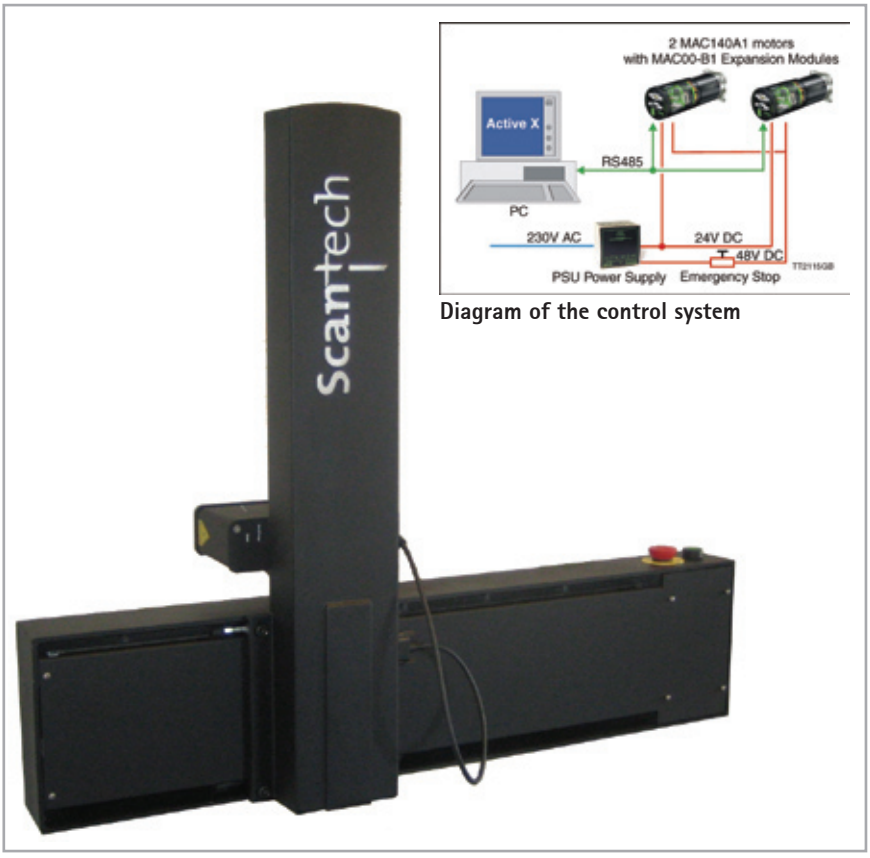
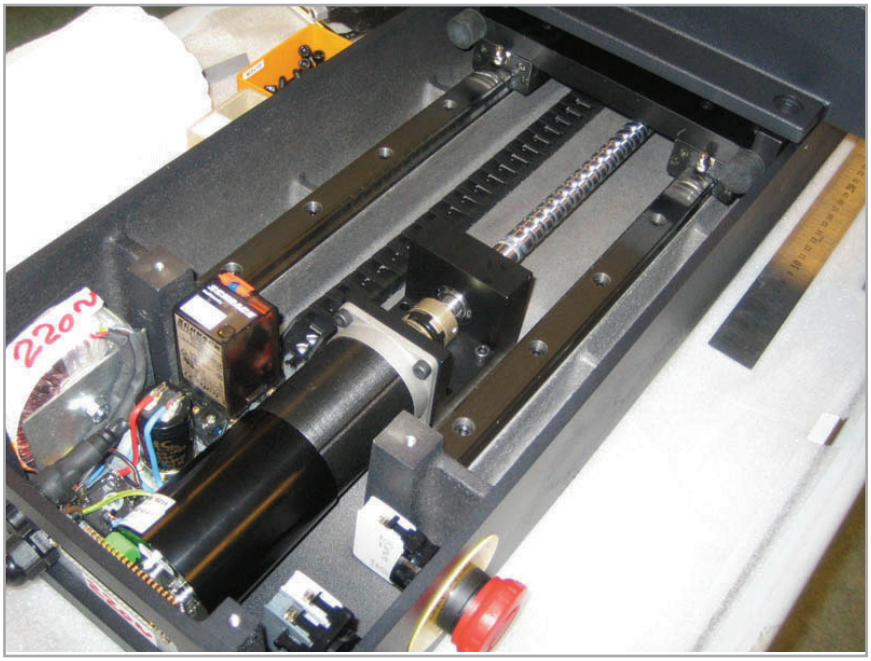


Diagram of the control system

The St400 laser scanner



MAC motor MAC140 mounted on the machine's y-axis.

Large Power Supplies, e.g. for MAC motors

New power supplies for use with several motors, drivers and controllers

JVL can now offer new power supplies that are specifically intended for powering several MAC50-141 Motors, SMD41 or SMD15 Step Motor Drivers, or SMC35 Step Motor Controllers.

Power Supplies PSU48-800, PSU48-1000 and PSU48-1500, which yield 800, 1000 and 1500 W respectively at 48V, are built into compact cabinets with a built-in DC ventilator. It is possible to remotely control on/off and 25-100% output voltage using 1-5 V. A built-in sensor enables the voltage to be remotely monitored and a PFC function ensures the signal waveform.

Several supplies can be connected in parallel if greater power is required.

The new Power Supplies are protected against short-circuits, overload and overheating. The supply voltage is 96-264VAC (176-264VAC, PSU48-1500). All units are CE and UL approved.

AC servo motors for Controller AMC20

JVL introduces a new series of high-quality, high-torque AC servo motors

A long-standing request from our customers has been to supply general-purpose, high-quality, high-yield motors for the AMC20 series of advanced AC servo controllers. JVL has therefore now introduced the MSE motor series, which comprises the MSE400, MSE800, MSE1K5, and MSE3K0 (400W, 800W, 1.5kW, and 3kW respectively.)

These motors offer a long list of excellent characteristics, of which the following can be particularly highlighted:

- The best torque characteristics on the market.
- High torque-inertia ratio for rapid start/stop.
- Robust design and long-life bearings.
- Encoder with 2000 pulses/rev. With JVL AMC20 series of Servo Motor Controllers, 8000 counts/rev with index pulse.
- Very short length in relation to power: 102mm@750W.
- Standard servo flange.
- Yaskawa/Omron flange and shaft.
- High axial and radial load.
- Low noise.

- Facility for direct mounting of planetary gear.
- Facility for built-in 24V brake.

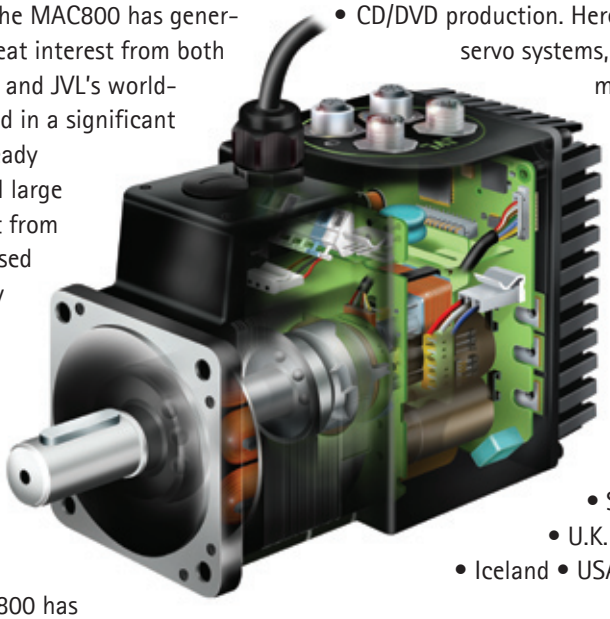
The MSE series of AC servo motors has been designed by JVL for use with the AMC20 series of advanced AC Servo Controllers, which offer the following features:

- Simple programming using MotoWare 32.
- Built-in RS232/RS485 interface.
- Versions with JVL-bus, CANopen, CAM profiles, and a freely programmable model.
- Initialisation without Hall sensor.
- Absolute or relative positioning.
- Programmable velocity profiles, "table positioning".
- High-resolution electronic gearing

MAC motors now in use world-wide

MAC800 has created great interest internationally

Since its introduction in 2003, the MAC800 has generated interest internationally. Great interest from both domestic customers in Denmark and JVL's world-wide representatives has resulted in a significant number of these motors are already tested and installed with several large international end-users. Interest from customers has typically been based on the large savings achieved by an integrated solution, in some cases more than 30% of total costs.



The range of applications is very wide:

- Multi-axis machinery such as CNC, surface processing, engraving. Here the MAC800 has replaced precision DC-brush motors.
- Packaging machines. The MAC800 has replaced AC-motors and frequency inverters, resulting in savings in consumable materials for the customer and more precise control.
- CD/DVD production. Here the MAC800 has replaced old servo systems, yielding large savings for the machine manufacturer on installation costs, as well as increasing machine efficiency by more than 20%.
- Printers. The MAC800 has replaced step motors/servo installations, and has given the manufacturer more dynamic operation, and thus higher productivity.

Until now JVL has sold MAC motors to the following countries:
• Sweden • Netherlands • Belgium • U.K. • France • Switzerland • Italy • Iceland • USA • New Zealand.

The MAC800 has opened many doors to the world for JVL and, together with the smaller MAC050-141 series, is making a strong bid for the future of servo motors with world-wide support via 20 representatives.

High-speed module for the MAC motors

Multi-axis, 460kbit high-speed interface for the integrated MAC motors

JVL can now offer yet another expansion module (MAC00-FS1) for the integrated MAC motors, MAC50-141 and MAC800. This module can be used in multi-axis applications with up to 255 units on the same RS485 bus with repeaters. I/O, position, error-status, etc., are scanned locally and can be read very rapidly from a PC or PLC. For example, 16 motors can be scanned in only 12ms. It is possible to send new positional data to 255 motors in only 133ms. This is particularly advantageous for machines in which many axes must be adjusted rapidly and simultaneously. All motor parameters can also be read/written, and a group command can be used to write to several motors simultaneously in an

instant. A new, improved MACCOMM OCX (ActiveX) component makes it possible to develop Windows software, such as Visual Basic, LabView applications, etc., that can control up to 255 MAC motors.
The modular construction of JVL's MAC motors makes them particularly well-suited to fieldbus applications. The range of expansion modules now also includes: Profibus, CANopen (DSP402), DeviceNet, USB and Bluetooth. Modules for Ethernet and Zigbee wireless communication are under development.

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