

News from JVL

A newsletter from JVL Industri Elektronik A/S

Number 6

AMC20 — A World-class Servo Controller. Developed and Manufactured in Denmark

Programmable Servo Controllers featuring Graphic Monitoring facilities

- 0.75, 1.5 and 3 kW
- Compact and programmable
- Built-in RS232/RS485 Interface
- 11 inputs, 8 outputs
- Uses programmable FLASH-PROM
- Profibus models (under development)
- Separate logic voltage
- Current overload protection
- Short-circuit and thermal overload protection
- Simple programming with MotoWare
- High resolution electronic gearing
- Facility for graphic monitoring
- EMC tested, built-in mains filter
- Mains supply from 1x115VAC to 3x400 VAC

JVL's new AC Servo Controllers provide many facilities, including very high resolution electronic gearing, built-in sequential program execution, 64 registers, 11 inputs and 8 outputs. The Controllers utilise FLASH PROM for easy upgrades and are CE approved. Programming is easy and very straightforward using a PC and JVL's programming software, MotoWare. In addition motor operation can be monitored graphically, thus greatly aiding control and troubleshooting.



JVL's product range now includes a completely new series of programmable AC Servo Controllers, AMC20, 21 and 22. These Controllers can be used to control AC motors up to 3kW. They are based on a 16-bit microprocessor and 32-bit signal processor and are characterised by great flexibility in application and control facilities. They can be controlled directly via the built-in RS232 interface, or indirectly via 6 digital inputs. In addition, the Controllers can be supplied with a built-in Profibus. The Controllers can be directly connected to PLCs with axis boards. Up to 255 units can be connected to the same RS232 bus, thus enabling a PC or PLC to function as controller in a multi-axis system.

Using JVL's programming soft-

ware, MotoWare, motor power, velocity, torque, etc. can be monitored graphically and comparisons made with previously recorded curves. This facility greatly assists control and troubleshooting.

The Controller's 6 digital inputs refer to 64 user-defined position and velocity references which are stored in registers via the built-in RS232 interface or a Profibus interface (under development). The AMC Controllers can also be velocity controlled by an analog input of +/- 10V. In addition they can be controlled as a step motor system with step-pulse and direction signals.

A special mode of operation provides electronic gearing at any selectable keyed-in ratio (from 0.001 to 9999.999) with a resolution

of 1 to 1000.

In the standard model, the programmed values are executed by external signals, while an extended model enables the Controller itself to perform sequential program execution.

8 general-purpose outputs can be configured for example to provide a ready signal when the motor has reached the desired position, or to give an error signal if a condition arises that prevents motor operation.

These Servo Controllers are very easily programmed. For example, various velocity profiles can be set by defining acceleration, deceleration (linear or s-curve) and velocity. The Controllers also have built-in, programmable end-of-travel stops and a zero-point seek function.

continued page 3

Danfoss assembling Pressostats and Thermostats using JVL equipment

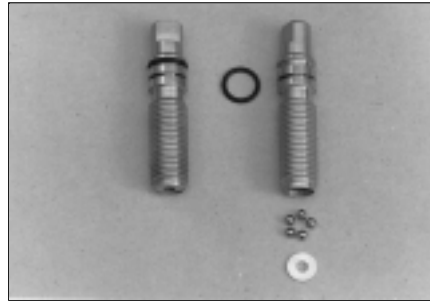
TurnMaster Turntable, JVL Servo Controllers and Yaskawa motors used in assembly units

Danfoss's Automatic Controls Division manufactures the world-renowned RT Thermostats and Pressostats, which recently celebrated their 60th year as one of the products that Danfoss has produced almost without change.

Production methods themselves have however changed since 1937 and recently Danfoss has developed and constructed new assembly units for thermostats and pressostats in order to rationalise and improve production. The mechanical components used in the assembly units are produced at Danfoss's own machine shop.

Assembly of the Thermostat and Pressostat adjustment spindle is carried out using JVL's TurnMaster Turntable, a Yaskawa AC servomotor and a Harmonic Drive play-free gear. This process is controlled by a JVL AMC11B AC Servo Controller operating in register mode. Five balls and a disc are mounted in the spindle, which is then flanged at the end so that the disc and balls are fixed as a small ball bearing.

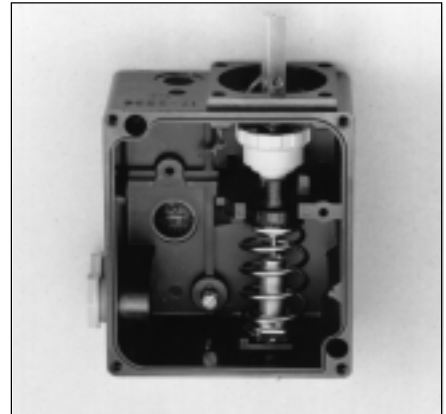
The turntable rotates at 30° intervals. Every 60°, balls are inserted, a spindle is positioned over the assembly and the end is flanged. Offset 30°, an inductive sensor is used every 60° to check that an O-ring has been positioned and that



The finished spindle and the components used in assembly.

the balls and disc are in place.

The completed spindle is then assembled in a plastic housing with a spring and end-plate. Here the spindle is screwed in to the required depth by another Yaskawa AC servo motor that is also controlled by an AC Servo Controller AMC11B. The motor is velocity controlled depending on the depth required, which is controlled pneumatically.



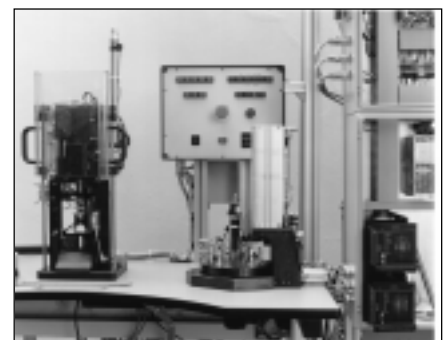
Assembly of the units in housing.

All other motion in the assembly units is controlled by Festo pneumatics. Overall control of both assembly units is done by a Hitachi PLC via the field bus system Interbus, to which Festo's pneumatics are also connected.

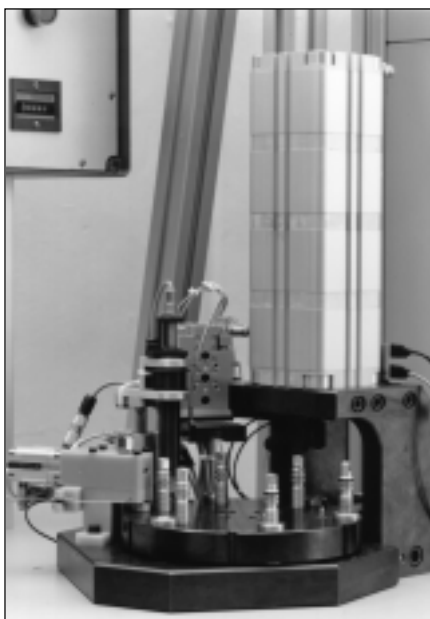


JVL AMC11B AC Servo Controllers mounted in the control cabinet.

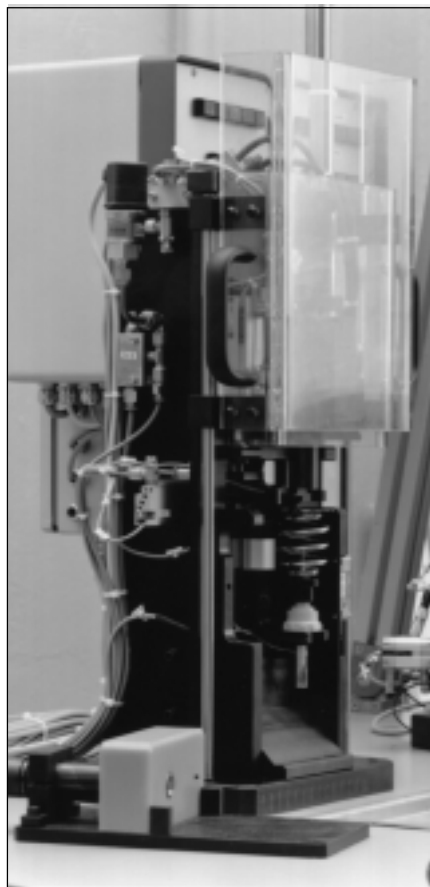
Regarding the choice of JVL's turntable for this application, Danfoss's development team emphasises the turntables' great stability, self-locking and the facility to freely select the resolution. For our part, JVL has been very pleased that we could contribute to the solution of the assembly task.



The complete assembly set-up.



Turntable for assembling spindles.



Set-up for assembling the spindle, spring, end-plate in the pressostat/thermostat housing.

New AC Servo Controllers...

continued from front page

For connecting a feedback sensor to the digital feedback loop, the Controllers accept either a balanced or unbalanced signal, e.g. from a standard 2-channel incremental encoder. The Controllers are prepared for master/slave interpolation control in 2 axes.

A new feature in these Controllers is the use of FLASH PROM, which enables the firmware to be changed if required.

All inputs and outputs are galvanically isolated and voltage-overload protected to give high immunity to

spurious noise signals. Similarly the Controllers are also protected against thermal overloads and short-circuits. The Controllers have

been designed and constructed to fulfil EMC requirements and are CE approved.

Model	Motor current [A]	Nominal Torque [Nm]	Power nominal [kW]	Power Peak [kW]	Advanced program execution	Profibus (under development)
AMC20	8	5	0.75	3		
AMC21	12.5	8	1.5	6		
AMC22	25	18	3	12		
AMC20P	8	5	0.75	3	X	X
AMC21P	12.5	8	1.5	6	X	X
AMC22P	25	18	3	12	X	X

The new AC Servo Controllers are available in 8, 15 and 25A models, and are additionally available with facilities for advanced program execution and with a Profibus interface

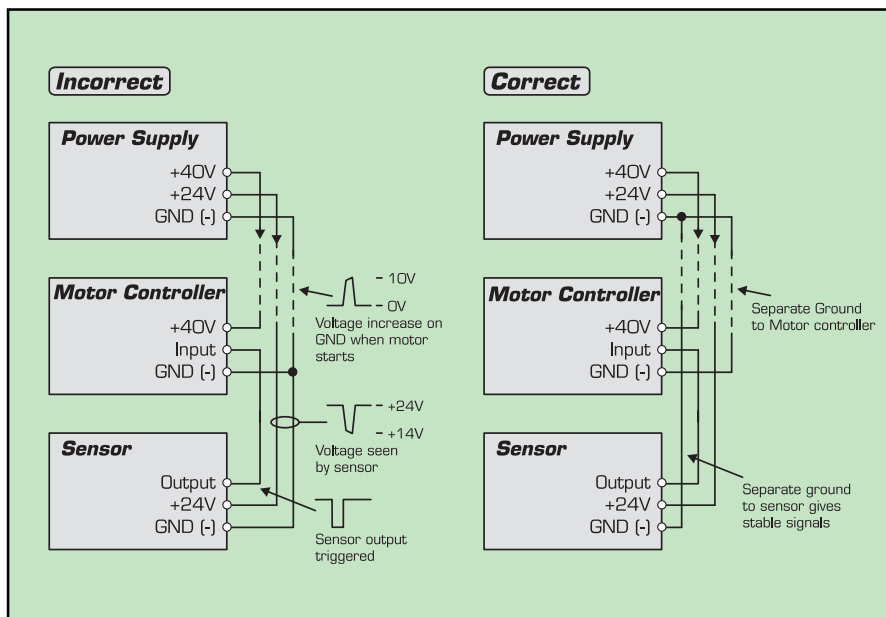
Avoid noise problems from power supplies

A separate ground should always be used from the DC supply source to the individual loads

When a motor controller is connected to a system, it should be done with due consideration. A motor controller often operates at high currents and voltages, in contrast to many other industrial components such as PLCs, sensors, etc., that normally have reasonably stable current consumption. Motor controllers can exhibit greatly varying current consumption as a result of the motor accelerating, standing still, etc. A typical fault often found in systems is sharing the main ground connection from the power supply with other components such as input and input circuits. In extreme circumstances, this fault can mean that during acceleration of the motor (i.e. high current consumption) a voltage difference will occur at the ground conductor and other components

may for example "think" their inputs are activated. The diagram below shows how cabling should be done.

The optimum solution is to wire a separate ground from the supply source to the individual loads.



JVL ensuring quality

New electrostatic conductive flooring in production facilities

In order to further ensure the high quality of our products, we recently invested in completely new flooring in our production facilities. The construction consists of conductive carbon-fibre rods in the ground, with a conductive carbon-fibre layer under the floor surface. The vertical resistance has been reduced to between 50kΩ and 1MΩ, thus

preventing the build-up of electrostatic charges which can damage sensitive circuitry such as micro-processors. We are certain that this latest development will further ensure the high quality of our products. Our climatic tests and computer-controlled testing procedures have given us excellent experience in quality assurance.



JVL High-torque Step Motors

JVL launches its own step motors, tailored to JVL drivers/controllers

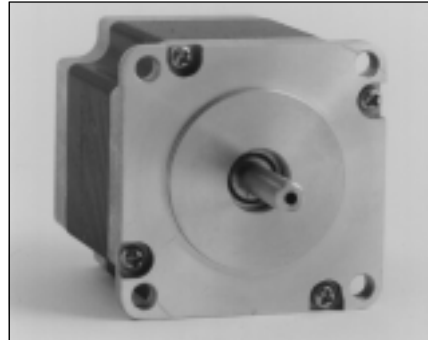
JVL has now introduced the first of a series of our own high-torque step motors. The motors have been designed by JVL and are manufactured by a supplier. The first JVL motor is designated MST001A and is compatible with all JVL 3-Ampere drivers and controllers.

The MST001A has the following characteristics:

Type	Bipolar High-torque
A/Phase	2.5 A
Torque	1.2 Nm
Step angle	1.8°
Max. Temp.	80°C
LxB	56x57.2mm

The new motor is extremely compact, yet despite a length of only 56 mm provides a torque of 1.2 Nm.

In the near future, we will be introducing JVL motors for our 6A and 9A drivers/controllers.



New direct phone numbers

We recently installed a new ISDN telephone system with twice the number of incoming lines. This means you can now call or e-mail directly to our staff. Of course you can still continue to use our main number and e-mail address:

Tel. +45 4582 4440, e-mail: jvl@jvl.dk

Direct numbers and addresses to your contacts are:

Mads Vernon Jørgensen:

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Bo Valeur Jessen

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JVL at SIM

In October 98 JVL took part at the Scandinavian Industrial trade fair at the Bella Center in Copenhagen. It was a very hectic couple of days with our new, intelligent servo driver AMC20 and Yaskawa's completely new self-optimising servo driver drawing particular attention. We were visited by many established customers and also had the pleasure of presenting our product programme to new faces.



JVL represented in Belgium and Holland

From the 1st of December 1998, Roterø has taken over distribution of JVL's products in both Holland and Belgium.

Roterø has its own offices in both countries and a staff of more than 30 who exclusively deal with sales and service of motor controllers and related products. Our product programme is an excellent supplement to Roterø's existing programme and we have great expectations for this new-found co-operation.



...when motors must be controlled

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Successful step motor course

On Tuesday the 20th October 1998 we held our first one-day course on step motor technology. The course was hosted by JVL engineer Mads Siggard at our newly refurbished premises. The participants were presented with the theory of step motors and also given the practical exercise of setting up a driver and motor, and programming a Controller. They were very interested in the course and a reported a very rewarding day.



Representative