AC Servo Controllers AMC10, AMC11 and AMC12

AMC10, 11 and 12 are a series of AC Servo Controllers which can be used to control both AC and step motors rated up to 1kW.

The Controllers are based on a 16-bit microprocessor and 32-bit signal processor, and are characterised by great flexibility for a wide range of control applications.

The Controllers can be controlled directly via the built-in RS232/RS485 interface, or indirectly via 6 digital inputs. In addition, models can be supplied with a built-in Fieldbus interface. The Controllers can be directly connected to PLCs equipped with controller modules.

Up to 255 units can be connected to the same RS232 bus, and thus a PC or PLC can function as controller for a multi-axis system.

Using JVL´s programming software, MotoWare, motor-power, velocity, torque etc., can be monitored graphically and comparisons made with previously recorded curves. This facility greatly assists control and troubleshooting.

• Compact and programmable
• EMC tested. CE-marked
• Built-in RS232/RS485 Interface
• Fieldbus models available
• Simple programming using MotoWare
• Facility for graphic monitoring
• Electronic gearing with high resolution
• Can be used for both AC-Servo and Step motors up to 1kW

• Use FLASH-PROM, can be reprogrammed
• Absolute or relative positioning
• Programmable velocity profiles
• Driver stage 6 and 12A
• Digital control loop
• Automatic zero-point seek
• 11 inputs, 8 outputs
• Current and voltage overload protected
• Short-circuit and thermal protection
• End-of-travel limit inputs

Description (continued)

Servo Controllers AMC10, 11 and 12 are equipped with 11 digital inputs. 6 of these refer to 64 user-defined position and velocity references which are read into registers via the built-in RS232 interface or a Fieldbus interface. The AMC Controllers can also be velocity-controlled via an analogue input of +/- 10V. In addition, the Controllers can be configured as a step motor system using step-pulse and direction signals. A special mode of operation enables electronic gearing through a selectable keyed-in ratio (from 0.001 to 9999.999) with a resolution of 1 to 1000.

In the standard model, the preset values are executed in response to external signals, while an extended model enables the Controller itself to execute a sequential set of program instructions.

8 general purpose outputs can be configured, e.g. to provide a signal when the motor has reached a predefined position, or an error signal if an obstruction occurs and the motor cannot operate.

The Servo Controllers are very easy to program. For example, different velocity profiles can be set up by defining acceleration, deceleration (linear or s-curve) and velocity. The Controllers also include built-in programmable end-of-travel limits and a zero-point seek function.

As a signal from a feedback sensor to the digital control loop, the Controllers accept both a balanced and an unbalanced signal, for example from a standard 2-channel incremental encoder. The Controllers are prepared for master/slave interpolation control in 2 axes.

A new feature of these Controllers is the use of FLASH PROM, which enables the unit's basic program to be upgraded at a later date if required.

All inputs and outputs are optically isolated and voltage-overload protected to provide a high degree of immunity to spurious noise signals. Similarly the Controllers are also protected against both thermal overload and short-circuits. The Controllers are designed and constructed to fulfil EMC requirements and are CE marked. The cabinets can be mounted in a 19" rack or mounted on a surface.

Model	Motor Current		Sequential program execution	Built-in Fieldbus Interface	Built-in power supply. 150W/230VAC
	0-6A cont. 12A peak	0-12A cont. 25A peak			
AMC10B	X				
AMC10C		X			
AMC11B	X				X
AMC12B	X		X	X	X
AMC12C		X	X	X	

# Programming and use with MotoWare

Programming of the AC Servo Controllers is easily accomplished using JVL's windows-based programming software, MotoWare. Controller programs are written in a very simple BASIC-like language, and several Controller programs can be opened and edited at the same time. Each Controller program is saved in a separate disk file. Windows show a complete overview of the various parameters. Multiple parameter sets can be saved under their own unique name and these can be retrieved, edited and sent to the Controller. The current set-up of a Controller can also be retrieved from the Controller and displayed on the screen or saved in the PC. During motor operation, the actual motor power, velocity, torque and deviation in position can be displayed graphically on the PC screen and printed out. This feature can be used for comparison with previously recorded curves and is extremely useful for checking that the system is operating optimally and for trouble-shooting.

MotoWare is supplied on a 3½" diskette, and is easily installed on a PC with Windows 3.1 or higher. Only ½ - 1 Mbyte of disk space is required for installation in addition to an available COM port for connection to the Controller. The screen above shows a velocity and power profile for an AC Servo in operation.
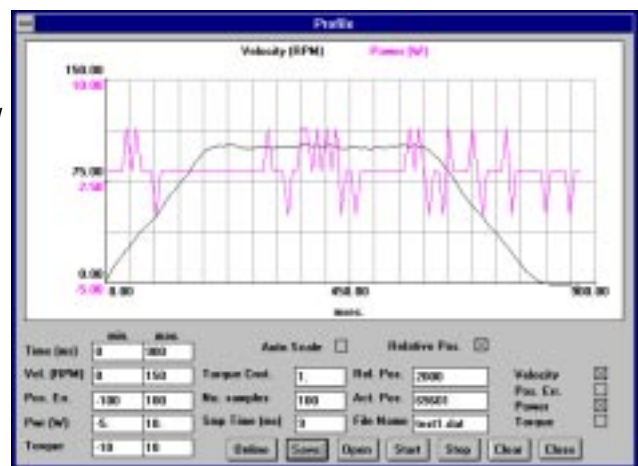
Modes of Operation

Step-pulse Mode

In this mode the Controller operates as in a step motor system. The motor moves one step each time a voltage pulse is applied to the step-pulse input. Velocity, acceleration and deceleration are determined by the external frequency. The encoder enables monitoring and adjustment during motor operation, a feature which is not possible with a standard step motor system. In addition, the AMC Controllers also provide a facility for electronic gearing at a keyed-in ratio.

Positioning Mode

In this mode the Controller positions via commands sent over the RS232 interface. Various operating parameters can be changed continuously via the interface while the motor is running. This mode is used primarily in systems where the Controller is permanently connected to a PC via the interface. This mode is also well suited for setting up and testing systems.

Register Mode

In this mode the Controller's registers contain the parameter sets, positions, velocities, etc., required for the actual system. The registers can be addressed via the digital inputs and the order executed by activating a start input. This mode provides maximum utilisation of all the Controller's features since the Controller itself takes care of the entire positioning sequence.

Velocity Mode

In this mode the Controller controls the motor velocity via the analogue input. This mode is typically used for simple tasks or applications in which an overall unit such as a PC-board controls velocity and positioning.

Torque Mode

In this mode the Controller controls the motor torque using a voltage applied to the analogue input. Typical tasks in this mode are winding or tensioning of foil, cable, etc.
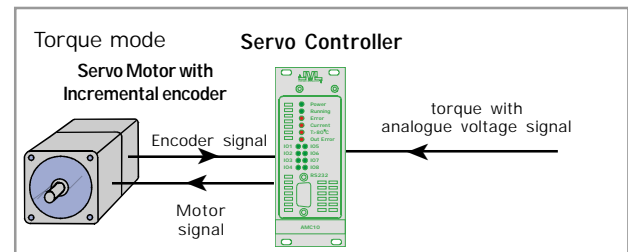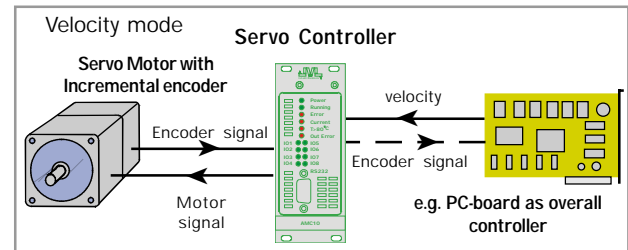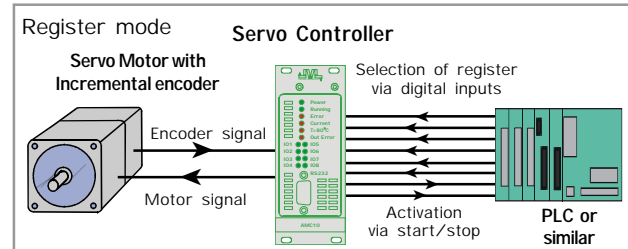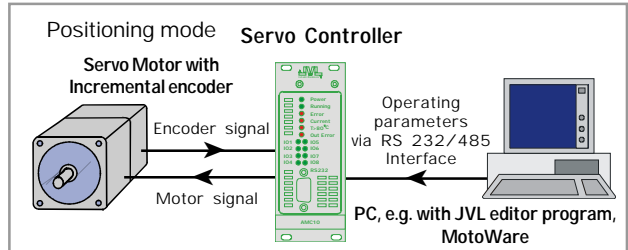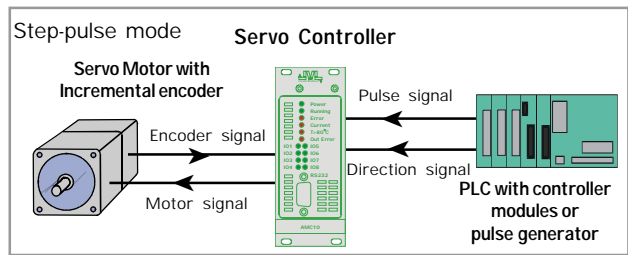
System Configuration

The figure below illustrates typical options for building up a servo system using the AMC Controllers. The PC or PLC is only necessary for programming or monitoring. Thereafter the Controller normally controls program execution, possibly in conjunction with a PLC as an overall controller in applications where many different units are controlled interdependently.

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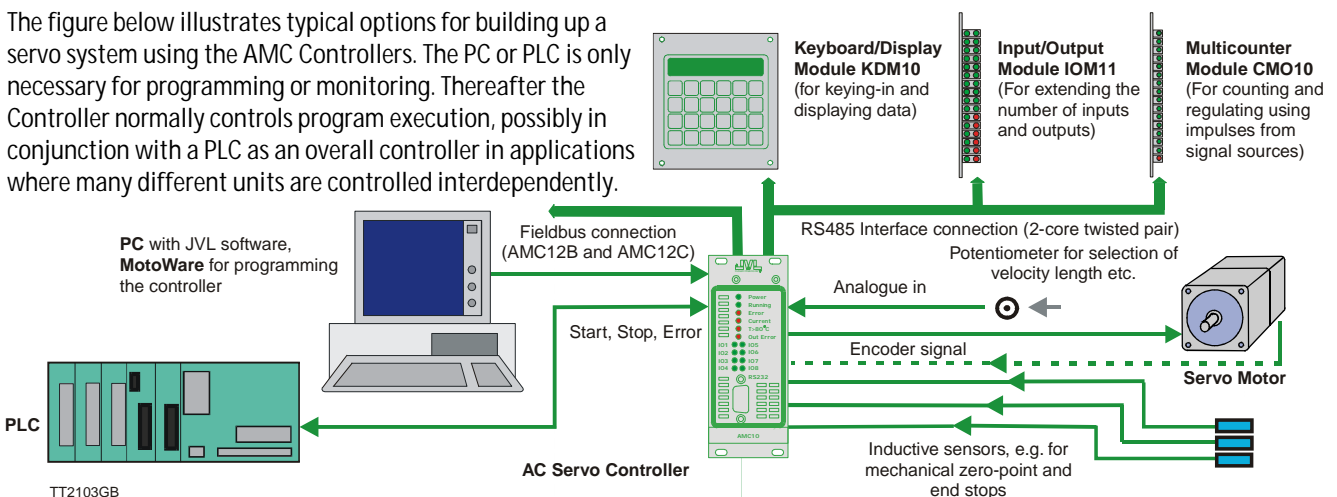
AC Servo Controllers AMC1O, AMC11 and AMC12
Block diagram - functional description
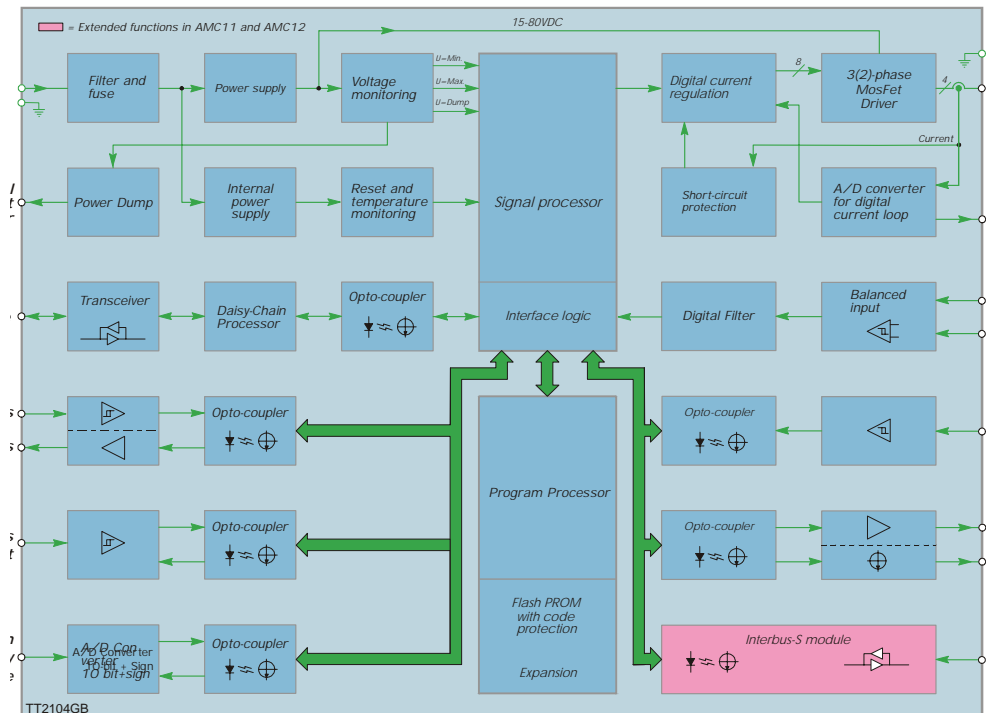
The diagram above shows schematically the internal structure of the AMC AC Servo Controllers. All inputs and outputs are available via a multi-connector (DIN41612 ver. C) on the rear panel. A connector board CON13 enables connection via screw terminals (Phoenix plug). The RS232/485 interface is available via a 9-pole SUB-9 connector on the Controller's front panel. The front panel is also equipped with LEDs that indicate Controller status.

Technical Data

Description	Min.	Max.	Units
Supply voltage:	15	80	VDC
AMC10B,AMC11B,AMC12B:			
Continuous motor current:	0	6	A
Peak motor current:	0	12	A
AMC10C, AMC12C:			
Continuous motor current:	0	12	A
Peak motor current:	0	25	A
Update time PID-filter		540	μs
Max. Power loss in driver:	0	25	W
Motor voltage:	0	85	V
Continuous "Power dump":	-	100	W
PWM Frequency:	-	24.3	kHz
Encoder frequency:	0	500	kHz
Pulse input - frequency:	0	500	kHz
Supply to encoder:	4.8	5.2	VDC
Temperature limit:	-	75	°C
Operating temperature:	0	50	°C
User inputs/outputs:	4.5	30	VDC

Dimensions: (mm)

TYPE	AMC10,12B	AMC10,12C	AMC11B
H	128.5(3HE)	128.5(3HE)	128.5(3HE)
W	50.1(10TE)	81.1(16TE)	106.4(21TE)
D	171	171	171

Accessories

Description	Type
Keyboard/Display Module	KDM10
Input/Output Module	IOM11
Multi-counter Module	CMO10
Power Supply 80V/200W	PSU80-2
Power Supply 80V/400W	PSU80-4
Interface cable (9-pole)	RS232-9-9
Interface cable (25-pole)	RS232-9-25
Mounting plate, baseplate	BASE1
Connector board for19" rack	CON13
Programming Software	MotoWare
Mains cable	NETKABEL1