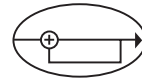




**CONTROL  
TECHNIQUES**

[www.controltechniques.com](http://www.controltechniques.com)



**ISAC**

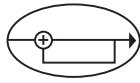
[www.isacsrl.it](http://www.isacsrl.it)

**CNC**

Motion Controller  
with

**M'Ax & MultiAx** (SLM)

Competitive Multiaxes Servo Motion Solutions.



## Puts Speed in Your Machine

6 millisecond PLC signal time from input to output on plant-floor I/O. 0,3 millisecond CNC interpolation cycle

## Interpolates

Up to 12 CNC axes and several axis group by concurring control between several interpolators.

## Synchronizes

- Interpolated movements with switching process, e.g. position-dependent value switching or position detection with interrupt input, and dependent movements between axis pair (Gantry)
- Several CNC connected via inter-process communication

## Processes and Interpolates

Not only linear, circular and helical contours, but also freeform contours (electronic cam)

## Transforms

- Any machine kinematics into Cartesian coordinates
- Any defined trajectory in a plane X-Y into a corresponding trajectory in any rotated and translated plane in the space
- Any tool tip trajectory into corresponding actuators movement (RTCP functionality)

## Executes

Standard ISO commands and parameterised programs

## Connects the Sensor / Actuator level

Via CANopen

## Communicates

Via Ethernet and TCP/IP in a factory network

## Visualises @ Web

In HTML and Java on any standard browser via its own web server

## Alarms

By text message to mobile or by e-mail with detailed message such as "No coolant"

## Diagnoses

Reliably and remotely via Ethernet and mobile phone

## Records

Any meaningful event in a remotely controlled way

## Offers

The ease of an unique software for milling and lathe machines and for all CNC models. The same PLC thus is valid even in case of CNC upgrade or downgrade

## Control NC Servo Drivers

Via  for Control Techniques, via CANopen (DSP402)

## Helps

In developing all the features of an application such as PLC, MMI and Working Programs

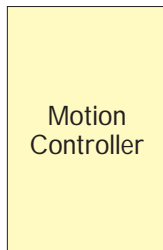
# (SLM) technology

## tomorrow's technology now!

The (SLM) technology uses a combination of Control Techniques 4-wire, (SLM) ASIC and motor-mounted SinCos encoders to achieve an application invariant 20-fold increase in position feedback resolution (over 8.3 million points per revolution). This is achieved by integrating speed & position control within the feedback system on-board the servomotor. As a result, the (SLM) is able to overcome the degradation in performance experienced.

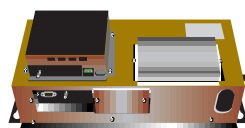
with encoder feedback signals when synchronising multiple servo axes on machines as operating speeds increase. For the ultimate interpolated multi-axes performance, control loops are deterministic and synchronised to give the lowest jitter in the industry - of 50 nanoseconds. As well as being a performance enhancer now, (SLM) technology is also a gateway to the future. Its integration into PC-based motion systems opens up a whole new vista for optimised multi-axes control in the new future.

(Traditional ±10V)



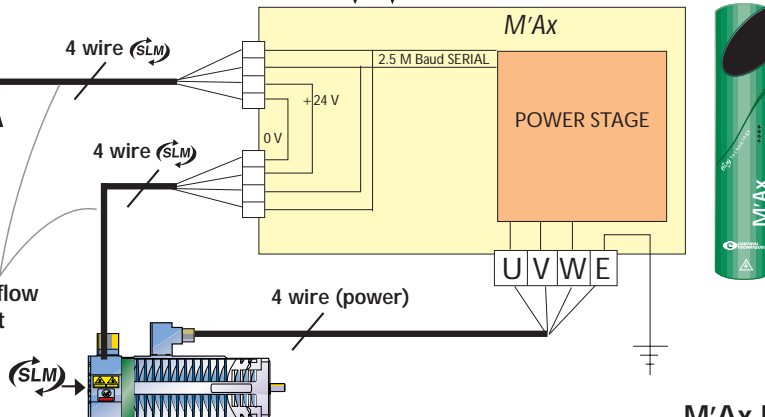
10V & Encoder Simulation  
~10-14 wire

(Alternative Digital Interface)

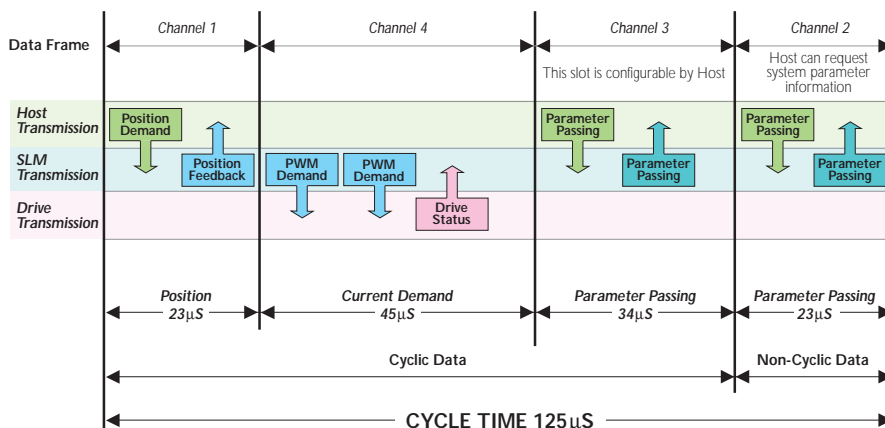


(SLM) Compatible  
CNC Motion Controller

Dataflow Chart



(SLM) Communications Protocol - Fundamental Cycle



M'Ax Menu Structure  
(Standalone only)

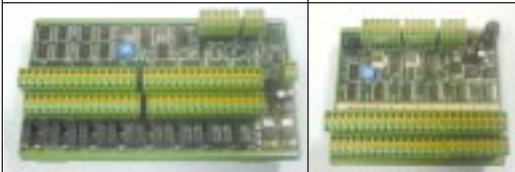
- Menu 0 – Basic Set up
- Menu 1 – Speed Reference Selection
- Menu 2 – Ramp Selection
- Menu 3 – Speed Loop PID Gains
- Menu 4 – Torque Control
- Menu 5 – Motor Control
- Menu 6 – Sequencer Functions
- Menu 7 – Analogue I/O Settings
- Menu 8 – Digital I/O Settings
- Menu 10 – Status and Diagnostic
- Menu 11 – Serial Communications
- Menu 13 – Pulse reference selection and scaling

# ISAC CNC - Features



## I/O

You can control digital or analogue signals via special interface modules through CANopen



## Compact Flash

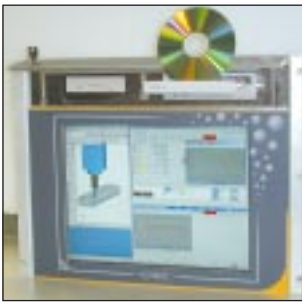
ISAC CNC are predisposed to the use of Compact Flash: the operating system and user data are saved on such a mass storage. All the maintenance manuals and other documentation take place on the same media and are remotely available

## Module

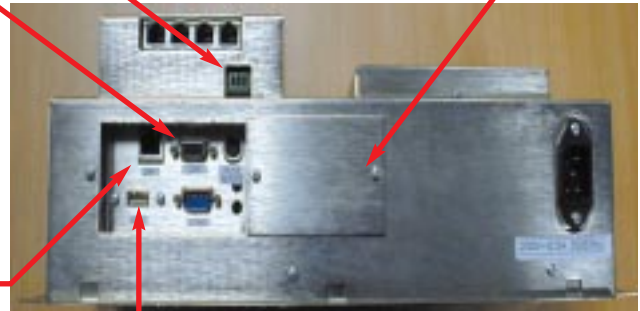
The XP-DL module from Control Techniques is a high speed interface for servo drivers



## Operator Panel



The screen is connected via LVDS interface or via VGA and the keyboard is connected via USB port



## Ethernet

The networking is via Ethernet and TCP/IP with 100 Mbit/s (RJ45 connection). The port can be used to connect either several CNCs or a supervisor PC



## Mounting

Mounting using fixing holes

## Supply Voltage

Operating Voltage 240 V AC (range 85-264)  
 Safety Class IP 20 to EN 60529 for Case  
 IP 65 for operator Panel

## Dimensions

(W x H x D) (mm)	SAB2001M:	390x195x130
	SAB2001E:	440x215x180
	SAB2001HS:	434x345x247

## Climatic Conditions

Ambient Operating temperature: 0... + 45 °C.  
 Relative humidity: 5 to 95% no condensation

## Electromagnetic Compatibility

Electrostatic discharge meets IEC/EN 61 000-4-2, severity 3  
 Electromagnetic fields meets IEC/EN 61000-4-3  
 Interference suppression meets EN 55 022  
 EFT-Burst IEC/EN 61000-4-4

## USB

The ISAC CNC can communicate with active terminal devices (such as CD-Rom, Floppy Disk, etc) via USB port

## RS232 Interface

The RS32 interface is for serial connection of programming devices, logging printers and barcodes readers

## LVDS

The LVDS Interface is for TFT screen connection

- DSP402 for motion control, DSP401 for I/O devices, DSP305 for layer setting services
- (SLM) for Control Techniques motion controls
- ± 10V analogue interface for traditional motion controls

## Networking

- Ethernet connection
- Modem

## Performance

PLC: 80 KB in 0.3 msec  
 CNC: Block Cycle Time: 500 / sec

# M'Ax - Design Features



## Digital I/O

- Opto-isolated
- Eight digital inputs
- Four digital outputs
- 24V user supply

## Keypad

- 7 segment removable display
- Memory Pad stores identical set of parameters for easy upload
- 16 bit high precision,  $\pm 10V$  differential

## Compact Design

- One size for the range 3.5 to 12.5 Amps
- Protection to IP20
- Only 62 mm wide

## DC Bus

- Can be supplied from a common DC power supply in parallel with other models
- Reduced DC bus running with drive backup supply

## Easy Start

- Automatic motor mapping
- Gains calculator
- MaxSoft with Wizard

## 'Electronic' Thermistor

- Intelligent thermal modelling
- Accurate monitoring and protection
- Serial data link employed – NO need for thermistor in motor and NO extra cabling requirements

## Advanced Feedback

- SinCos encoder as standard
- Reduced cabling 4 wire system – up to 50 metres
- Intelligent capability
- High resolution (8.3 million points per revolution)

## Back-up Power Supply

- 24 Vdc for (SLM) encoder
- 28/32 Vdc for drive logic suitable for standby, evacuation system - reduced dc bus running

## Standalone

- Frequency & direction or quadrature inputs
- 16 bit High precision  $\pm 10V$  differential (if keypad fitted)
- (SLM) and user back up supply
- 24V user supply

## Simulated Encoder

- Encoder quadrature A, B plus Zmarker-pulse outputs (4096, 2048, 1024 ppr)
- Two analogue outputs
- Standard-precision analogue differential reference input (12 bit)

## Communications Port

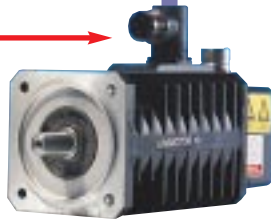
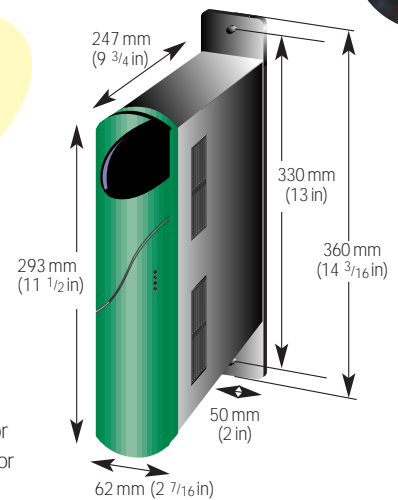
- RS232 ● RS485 ● ANSI 3.28/Modbus RTU

## Braking

- Standard internal resistor 'failsafe' design
- Electronic I<sup>2</sup>t protection for internal braking resistor
- External resistor connectable

## Practical Grounding Bar and Cable Support

- Pluggable terminals for - mains supply - motor power - external braking resistor
- Earthing clamps for motor cable screen



## Electrical Data

	Output Current		External RFI Filter (IP20) Complies with EN50081/1 or 2					Internal Braking Resistor				
	Continuous Amps	Peak Current Amps (2sMax)	Part Number	Max Power Dissipation (W)	L (mm)	W (mm)	D (mm)	Value (mm)	Operating Voltage	Peak Current Amps	Peak Power (kW)	Max. Cont Braking Power (W)
M'Ax 403	3.5	7	4200-1645	6	250	45	70	75 ohm	780V	10.9	8.9	125
M'Ax 406	6.5	13										
M'Ax 409	9.5	19										
M'Ax 412	12.5	25										

Supply Voltage 380 - 480V  $\pm 10\%$ , 47.5 to 63 Hz  
 Rated ambient 45 °C (up to 55 °C with derating)

Altitude: derate above 1000 m  
 Relative humidity: 95% non-condensing



# MultiAx - Design Features



## MC/ EIA485

- (SLM) technology I/O to the motion controller
- Hardware enable input
- Status relay contact
- (SLM) and user back-up supply
- 24 V user supply

## Compact Design

- One size for the range
- Protected to IP20
- Only 92 mm for three axes
- Single power input, 3 axes output
- Each axis dual rated

## Easy Start

- Automatic motor mapping

## Practical Grounding Bar and Cable Support

- Pluggable terminals for - mains supply, motor power, external braking resistor
- Earthing clamps for motor cable screen



## Digital I/O

- 4 Opto Isolated inputs
- 24 V User supply

## Back-up Power Supply

- 24 Vdc for (SLM) encoder
- 24-32 Vdc for drive logic suitable for stand-by

## Advanced Feedback

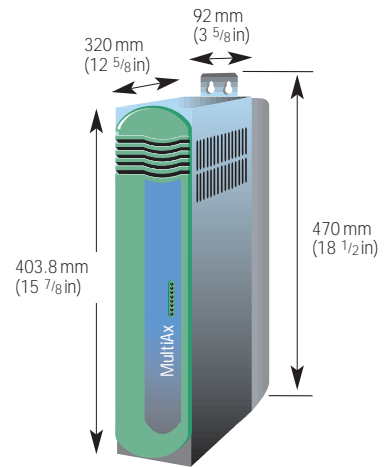
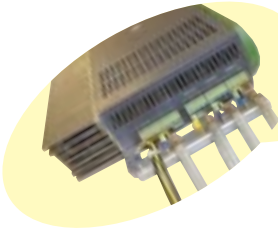
- SinCos encoder
- Reduced cabling
- 4 wire system - up to 50 metre per axis
- Intelligent capacity
- High resolution (8.3 million points per revolution)

## Braking

External resistor connectable

## DC Bus

- Can be supplied from a common DC power supply in parallel with other models
- Reduced DC bus running with drive back up supply



## MultiAx Ratings Table

Drive	Rating	Output Current						RFI Filter (IP20) Complies with EN50081/1 or 2				
		Maximum Continuous Amps			Peak Current (2 sec Max) Amps			Part number	Maximum power dissipation (W)	L mm	W mm	D mm
MultiAx SAC/SDC	Low	2.5	2.5	2.5	5.0	5.0	5.0	4200-3258	11.83	270	50	87
MultiAx SAC/SDC	High	9.375	9.375	9.375	18.75	18.75	18.75					
MultiAx HAC/HDC	Low	2.5	2.5	2.5	5.0	5.0	5.0					
MultiAx HAC/HDC	High	15	9.375	9.375	30	18.75	18.75					

AC supply 380 - 480 Vac  $\pm 10\%$ , 47.5 to 63 Hz  
9.75 kW continuous from system

Rated ambient 0 - 50 °C  
Altitude: derate above 1000 m  
Relative humidity: 95 % non condensing



# Driving the world...



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