

PHASE



Configurable



AxM

Configurable Motion Control Platform

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Maximum Power in Minimum Space

AxM ushers in a new yardstick in terms of power density, handling over 5.5 kW in a very little volume.

Completely compatible with the AxV series, AxM is an open control system entirely configurable via software. The architecture is based on a dual Microprocessor - DSP set to achieve at the same time best flexibility and high control speed. The result is a fully configurable IGBT drive, particularly suited for high bandwidth brushless PM motor servo control, which can be considered a mix of digital drive, axis controller and mini-PLC.



Best Simplicity

With the "default" application integrated in the standard firmware AxM is immediately ready without any software operation. Additionally, if the drive is used with a Phase MC motor with EnDat encoder and electronic nameplate, the drive performs an automatic motor parameter recognition and automatically loads an initial tuning.

The "default" application configures AxM as a digital brushless drive, with torque and speed control loops and several programmable functions. A kit of standard applications, supplied with the drive, extends the features to manage electric gear or to turn the drive into a simple positioner.

To create sophisticated applications the software Global PLC (GPLC), also supplied with the drive, allows programming of displacement cycle and automation on PLC environment IEC 1131.



Power Stage



AxM is based on Phase proprietary technology without electrolytic capacitors, which results in optimal reliability, minimum size and immediate availability at power on.

The input current, by virtue of the converter technology, has low harmonic content and a total power factor better than 0.95 irrespective of load. AxM runs the current loop feedback loop at 4 kHz. The permissible input power voltage range is 24 to 460 Vac; for application debugging purposes, the drive is fully functional just with a 24 Vdc supply.

The forced air cooling system is controlled by the heat sink temperature. The fan is started only when the heat sink temperature exceeds 50C, thus maximizing fan life and minimizing dirt build-up. The cooling works on the turbulence principle and the air flow is all external to the drive casing. Drive temperature is monitored and available to the internal PLC for cycle self limiting.

The power stage is designed with intrinsic protection (overtemperature, short circuit between lines and to ground, earth leakage). All fault conditions, along with the drive status at fault, are stored in non volatile memory for application debugging.





Control Stage and Interface

- *CanOpen interface, standard DS301 V4.02 and DSP402 V2.0*
- *Support for EnDat interface and electronic nameplate*
- *Electric gear and multi-axis operations*
- *High speed, point to point positioning and motion profile interpolation*

The AxM family shares the same design philosophy as the AxV programmable motion platform. It is particularly adapted to drive the last generation Ultract III and T ultra compact servo motors.

The drive is able to interface a variety of position sensors: Hall sensor, resolver, digital line-driver and sincos encoder, EnDat encoder.

General purpose interface:

2 programmable differential analogue inputs

2 programmable analogue outputs

8 programmable digital input

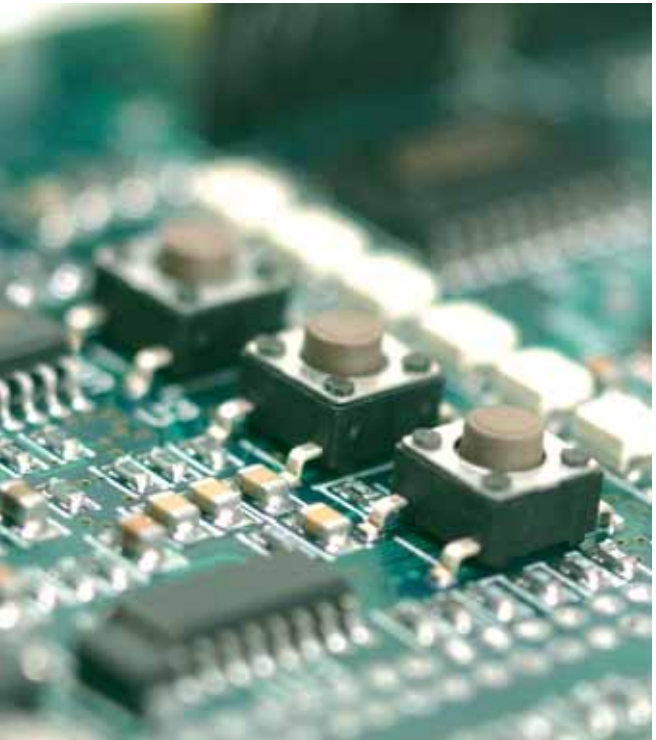
4 programmable digital outputs

1 mechanical relay contacts 1A, 250V.

Communication:

RS 232 asynchronous serial interface

CAN port with CanOpen protocol.

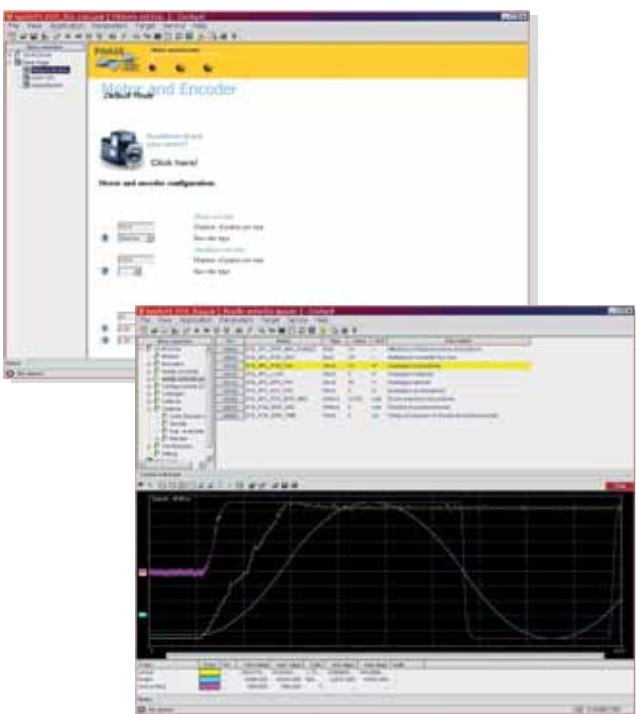




Configuration and debugging tools

All PLC code and all data registers are stored in non-volatile memory and can be read and written on-line, with the Phase Motion Control tools; this allows the user to configure the drive for his own needs and also to create his own drive software application.

The "Cockpit" tool makes basic drive configuration easy via HTML pages while all the system and application parameters are available in table form. It is possible to read, modify and copy parameters on other drive or download PLC application all via RS232.



A new "Oscilloscope" feature allows the acquisition of 4 variables at the same time with a maximum resolution of 250us. Moreover the Control Panel tool allows the user to manage the I/O interface directly from the PC, to make the first test and also to check current and voltage waveforms.





Global Programmable Logic Controller



To obtain a completely custom product optimum for your own specifications, use your technologies with the AxM control capacity. The GPLC development environment, provided free of charge with every drive, is based on standard IEC 1131 and transforms the AxM in a control machine able to receive analogue and digital signals from any type of sensor, to control motion cycles, to manage auxiliary output devices and instrumentation.

It is possible to process complex functions interpolating force and movement at very high speed.

The PLC function accesses all drive status registers and can perform operations among them at different speed:

a standard loop (slow), running at 125 Hz, with virtually unlimited program length, for system definition and PLC operation proper; ultrafast loop (fast), limited to simple operation between position registers for servo control and high speed monitoring, running at 4 kHz; a medium loop (medium) running at 500Hz, for CanOpen protocol management.

64kByte of memory are available for the code and 2kByte of memory are available for data.



Technical Specification

	AX-M 0409-4	AX-M 0614-4	AX-M 0920-4	Units
ELECTRICAL DATA				
Main supply voltage	0 - 460			Vac 3 phase
Auxiliary supply voltage (1)	22 - 30			Vdc
Supply current (2)	9	14	20	Arms
Supply frequency	0 - 400			Hz
Nominal power (3)	2.3	3	5.5	kW
Output current, speed < 100 rpm, cycle S1	4 (5*)	6 (8*)	9 (12*)	Arms
Output current, max. speed., cycle S1 (4)	4 (5*)	5 (7*)	7 (9*)	Arms
Peak current (5)	9	14	20	Arms
Max. output voltage	$V_{in} \times 0.95$			Vac
Current ripple frequency	16			kHz
Efficiency at rated power (6)	96	97	98	%
Input current form factor	.9			
Max braking current	100			%
PHYSICAL DATA				
Average braking power with internal resistor	10			W
Max. energy for single braking cycle	1700			J
Losses at nominal current	85	95	105	W
Thermal capacity	720			J/°C
Cooling	Forced cooling			
Dimensions (LxPxH)	78.5 x 148 x 167			mm
Mass	1.32			kg
Protection grade	IP20			
Max vibration, any direction	0.5 g all directions, 0 - 10 Hz			
Max. shock	0.5 g			
Working temperature	0-40; 0-50 with derating of 20%			°C
Storage temperature	-20 / +70			°C
Relative humidity	0 - 95%			% Rh
Altitude	0 - 1000 m (current derating: 3% every 100 m above 1000 m)			

(1) Not stabilised (1Vpk-pk ripple) > 0.6A – Internal supply available

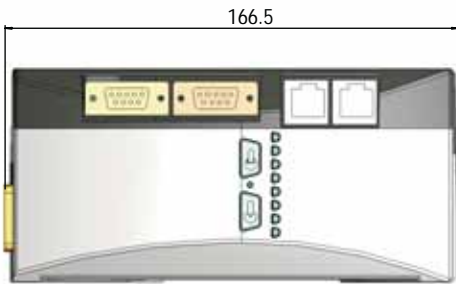
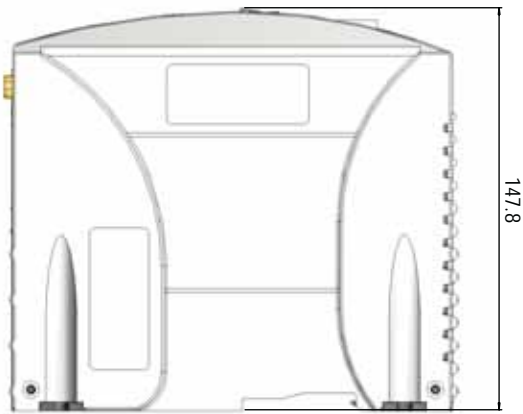
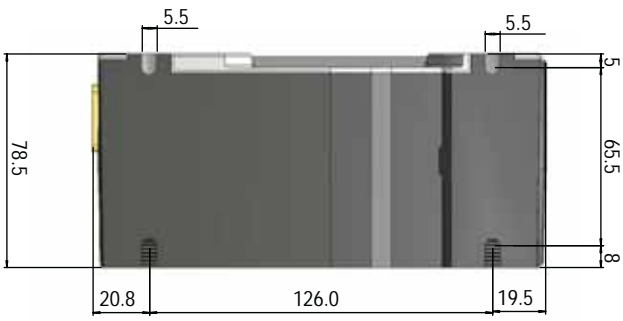
(2) Peak value

(3) $V_{in} = 400 \text{ Vac}$, $T_{amb} = 40^\circ\text{C}$, Comm. Freq. 8 kHz, $V_{out} = V_{in} \times 0.9$

(4) Including input bridge loss

(5) Overload 60 sec

(6) Aux. supply losses not included





Diagnostic LED

The 8 LEDs on the drive front panel provide for a quick check of the state of the drive. They check and display continuously the state of the CAN communication link, whether the drive is in control or in current limit, and the general drive status. If a fault is detected the first 5 LEDs, which are normally OFF, display an appropriate alarm code detailing the fault.

An advanced diagnostic mode can also be selected. In advanced diagnostic mode, all I/Os, RS 232, encoder, CAN port and drive parameter status can be checked without need of a diagnostic connection.



In order to provide our Customers with a continuously improved product, all technical data, drawings and product informations contained hereof are subject to change. For up to date information, software and drawings please refer to our web site: www.phase.eu

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COME ARRIVARE A PHASE MOTION CONTROL:

In automobile: direzione Genova; A12 direzione Livorno; uscita Genova Est; seguire la mappa (5Km), salire le rampe interne e parcheggiare al 3° piano negli spazi designati.

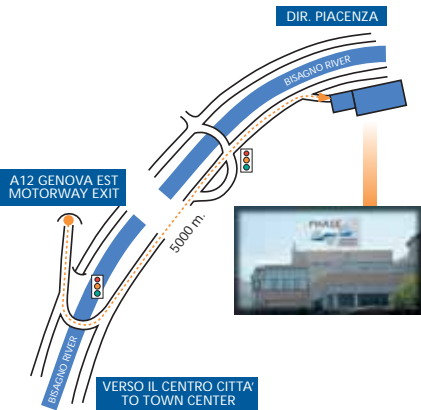
In aereo: il taxi dall'aeroporto impiega circa 20 minuti.

In treno: scendere a Genova P. Brignole, il percorso taxi dura circa 10 minuti.

HOW TO REACH PHASE MOTION CONTROL:

By car: drive to Genoa, take A12 to Livorno, exit Genova Est, drive according to the road map (5Km from motorway exit), drive inside Phase Motion Control building, park on 3rd floor.

By air: taxi from airport takes approximately 20 minutes.
By train: use Genova Brignole station, taxi ride approximately 10 minutes.



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WORLD WIDE SUPPORT AND DISTRIBUTION NETWORK



Phase Motion Control S.r.l. ●●
ITALY

Phase Automation ■
FRANCE

Phase Motion Control Ningbo Ltd. ■●
CHINA



● R&D, Company headquarters ● Manufacturing and support ■ Sales and technical support

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