AGD301

3-Axis Controller

with Integrated Drives

Datasheet

Rev.2.0

agito

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Member of Akribis Systems group

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Product Description

AGD301 is a series of 3-axis, standalone, high performance programmable motion controllers with integrated servo amplifiers.

It is equipped with Ethernet, USB, CAN bus, RS232, and RS485 communication ports to interface with host devices such as PCs, PLCs, and HMIs. It can control any external driver via analog or digital command.

At 16 kHz sampling (profiler, position, velocity, and current control loops) frequency, AGD301 controllers are ideal for any tightly coordinated motion systems.

AGD301 has three integrated amplifiers, enabling it to drive three motors directly. It can drive all types of motors, such as steppers, voice coils, brushed or brushless motors, and including direct-drive linear and rotary motors.

Agito PCSuite software and IDE is used for AGD301 programing, configuration, tuning and operation. Agito PCSuite provides configuration wizard, time domain tuning and analysis, frequency domain identification and design, auto tuning and easy to use GUI for all the features of Agito controllers.

Part Numbering

Product Description	Part Number Format
3-Axis Controller, Integrated Amplifiers	AGD301-ET-2Dxx[-CCC]

ET: Ethernet

2D: 12-90 VDC

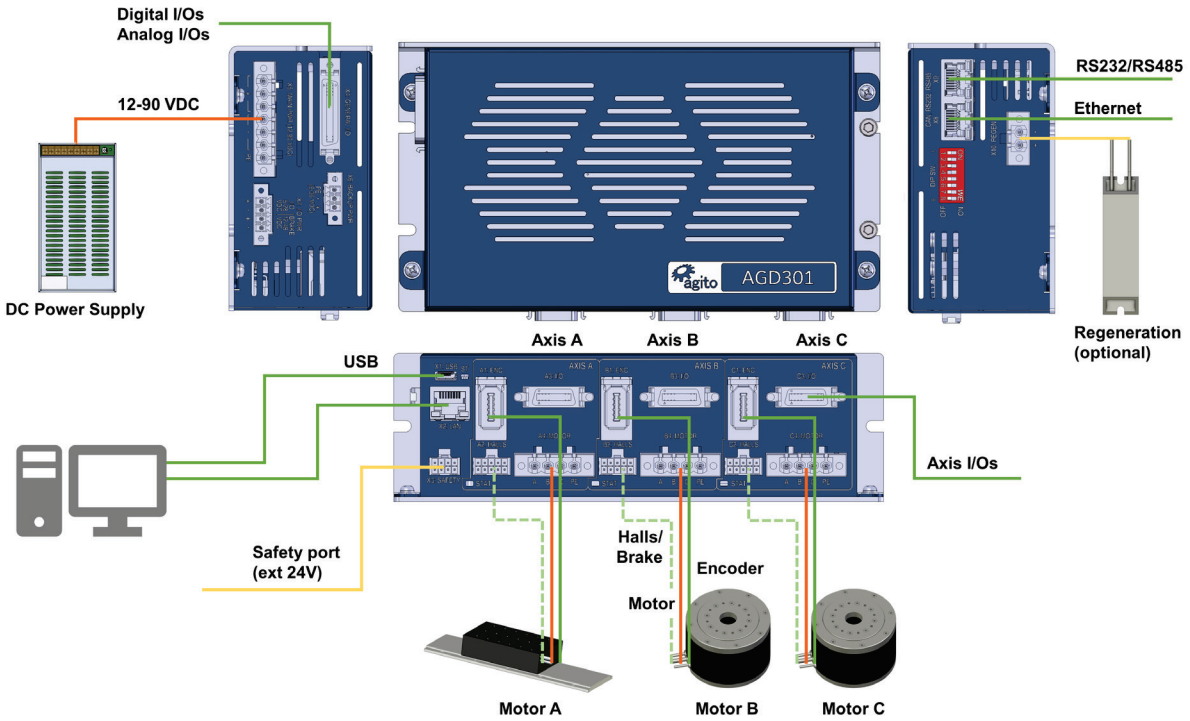
xx: Continuous and peak current rating

- 05: (per axis) 5.6 A_{rms} continuous, 11.2A_{rms} peak
- 09: (per axis) 9.0 A_{rms} (up to 20 A_{rms} for 3 axes) continuous, 18.0 A_{rms} peak

CCC: Optional customization number

Example: **AGD301-ET-2D09-001**, 9A_{rms} continuous, 18.0 A_{rms} peak current for each axis, with 16-bit analog input.

System Design



Technical Specifications

Electrical/Mechanical Specifications

Feature	AGD301-ET-2D05	AGD301-ET-2D09
Number of axes	3	
Nominal supply voltage	12–90 VDC	
Minimum supply voltage	11 VDC	
Maximum supply voltage	95 VDC	
Logic power supply (optional)	12–36 VDC	
Continuous output current (Internally limited by firmware)	5.6 Arms per axis	9.0 Arms per axis (limited to 20 Arms total for 3 axes)
Peak output current (internally limited by firmware)	11.2 Arms	18.2 Arms
Output power @ 90 VDC	504 kVA	810 kVA
Peak current time	3 sec	
Output frequency	0–599 Hz	
Isolated digital inputs	27	
Isolated digital outputs	17	
Bi-directional differential I/Os (RS422)	8	
Analog inputs	4 (12 bit)	
Analog outputs	4 (16 bit)	
Brake outputs	3	
Encoder ports	3	
Hall sensors ports	3	
Regeneration output	1	
Motor types	Voice coil, brushed or brushless linear or rotary motor. 2-phase steppers (open and closed loop, micro-stepping)	
Communication	Ethernet, CAN RS232, RS485, USB	
PWM frequency	16 kHz	
Power supply to external devices	Voltage: 5V Overall max. current: 1.5A	

Encoder Ports Specifications

Feature	Specification
Encoder types	Incremental AqB, Sin/Cos, Absolute EnDat 2.2, Absolute BiSS-C
Power supply to encoder	0.5 A per encoder port
Max. cable length	40 m
Incremental encoder	Hardware: Differential RS422/RS485 Max. input frequency: 6.25 MHz Termination: 120 Ω Commutation: Auto-phasing, Hall sensors
Sin/Cos encoder (on Main Encoder port only)	Hardware: Differential RS422/RS485, 1V pkp @2.5V Max. input frequency: 250 kHz Termination: 120 Ω Max interpolation: 13 bits (x 8192) Commutation: Auto-phasing, Hall sensors
Absolute BiSS-C	Hardware: Differential RS422/RS485, clock (MA), data (SLO) Clock frequency: 2 MHz Max. position bits: 32 bits Commutation: Auto-phasing, by absolute offset
Absolute EnDat 2.2	Hardware: Differential RS422/RS485, clock, data Clock frequency: 2 MHz Max. position bits: 32 bits Commutation: Auto-phasing, by absolute offset
Hall sensors	Opto-isolated 5V with internal power supply

I/O Specifications

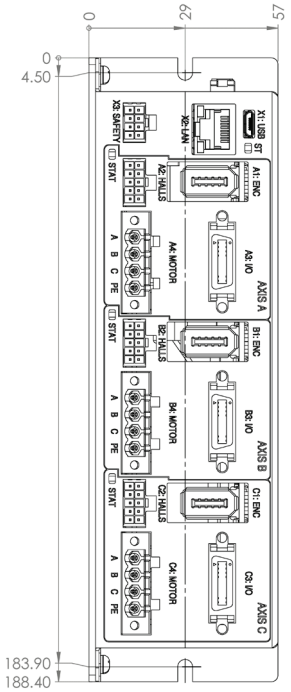
Feature	Specification
Power supply for optically isolated I/Os	Voltage: 5–28 VDC
Optically isolated digital inputs	Type: PNP/NPN Propagation delay: 10 µs Max. frequency: 100 kHz Functionality: limit switches, home, captures, start motion, gain scheduling, and others
Optically isolated digital outputs	Type: PNP/NPN Max current: 0.5A (for NPN type), 0.3A (for PNP type) Propagation delay: 10 µs Max. frequency: 100 kHz Functionality: alarm, in-position, event (PEG), and others
Bi-directional differential digital I/O	Hardware: Differential RS422 Termination: 120 Ω Propagation delay: 100 ns Max. frequency: 5 MHz Direction: Input or output, set by Agito PCSuite Functionality: Any differential input or output functionality.
Analog inputs	Operational voltage: ±12V Resolution: 12 bit or 16 bit
Analog outputs	Operational voltage: ±12V Resolution: 16 bit
Safety inputs	2 independent inputs Voltage: 5–28 VDC
Static brake output	Operational voltage: 24V Maximum current: 3A

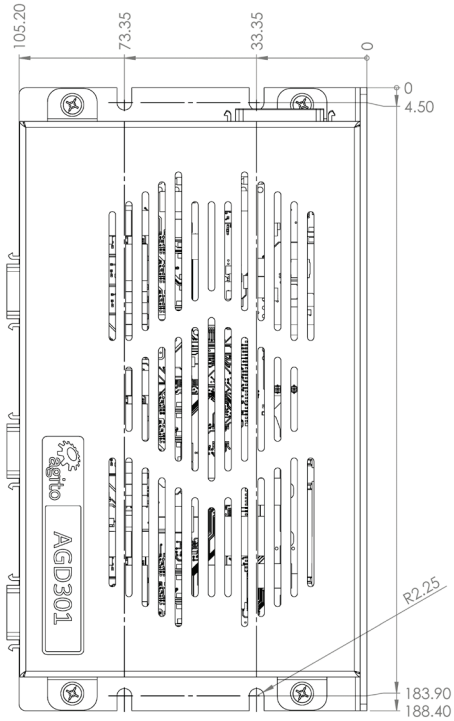
Environmental Specifications

Feature	Specification
Operating temperature	0°C to 50°C
Storage temperature	-20°C to 70°C
Operating humidity	< 90%
Storage humidity	< 40%
Pollution degree	2
Vibration	1G @ 150 Hz according to IEC 60068-2-6
Operating conditions	Protection class: IP20

Dimensions and Weight

Feature	Specification
Unit dimensions (max)	H=57 mm, W=188 mm, D=105 mm
Package dimensions	H=70 mm, W=235 mm, D=145 mm
Unit weight	0.4 kg
Shipping weight	0.5 kg





Motion Control Specifications

Feature	Specification
Key Features	Encoder error mapping: 1D, 2D or 3D Auto-loop shaping (auto-tuning) Frequency domain system identification and modeling Flexible gain scheduling based on motion conditions Position lock and event Advanced Auto-tuning algorithm in frequency domain Force control and mode switching
Advanced Features	Ultra Precision mode (UPM) Input-shaping Profile-shaping Machine vibration control with external sensor Spring and friction compensation Active-yaw gantry control
Control Sampling Rate	16 kHz (profiler, position, velocity, optional force, current)
Motion Modes	Point-to-point Repetitive CNC sequential contour (G-codes) Vector and tracking motion modes Jog ECAM Gearing Joystick Handwheel Pulse and direction
Operational Modes	Position Velocity Force Current (torque) modes
Motion Modes Switching	Motion parameters, such as speed, acceleration, deceleration, and target position can be all modified on-the-fly
Programming Interfaces	Standalone user programs Multi-threaded with priority setting environment, up to 8 threads Execution time: 50 low script commands in 1 millisecond High level C-language-like script programming language integrated in Agito PCSuite
IDE and Host Interfaces	Windows PC Suite IDE and configuration software Windows .NET API available in NuGet package manager Linux .NET API The API can also be used in MATLAB, LabVIEW, and other environments compatible with Windows .NET Standard TCP/IP communication ASCII string commands or binary CAN format