AGA1xx

Central-i DC Power Amplifier

Datasheet

Rev.2.4

agito

www.agito-akribis.com

Member of Akribis Systems group

Product Description

The AGA1xx is a series of DC amplifiers controlled by an AGM series Central-i master. The master controller reads encoder values and current samples from the amplifiers, performs control loops calculation, and generates PWM commands for the amplifiers.

Communication between AGA1xx amplifiers and master controller is through a fast Central-i fieldbus, which supports 16 kHz sample rate motion profiler and all servo loops.

The amplifiers are equipped with digital I/Os and analog inputs suitable for typical actuators and applications. The digital outputs are capable of sourcing up to 300 mA or sinking up 500 mA, which is sufficient for driving most external devices and end effectors, and eliminates the need for an external relay circuit.

The AGA1xx amplifiers are compact, ideal for mounting close to the actuator, such as the link in an articulated robot arm.

Part Numbering

Product Description	Part Number Format
Remote amplifier	AGA110-CI-5Dxx
Remote amplifier	AGA101-CI-2Dxx
Amplifier	AGA102-CI-1Dxx
Amplifier	AGA103-CI-1D03

CI: Central-i communication

5Dxx: 48–190 VDC power supply

xx: Continuous and peak current options

- **07**: 7.0 A_{rms} continuous, 14.0 A_{rms} peak

2Dxx: 12–90 VDC power supply

xx: Continuous and peak current options

- **01**: 1.4 A_{rms} continuous, 2.8 A_{rms} peak
- **02**: 2.8 A_{rms} continuous, 5.6 A_{rms} peak
- **05**: 5.6 A_{rms} continuous, 11.2 A_{rms} peak

1Dxx: 12–48 VDC power supply

xx: Continuous and peak current options

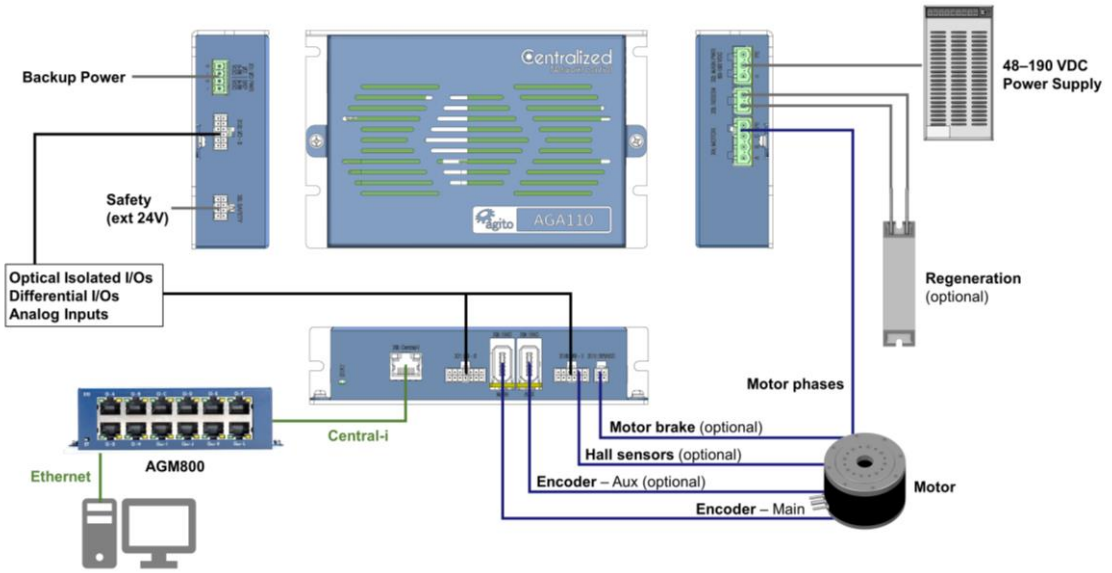
- **01**: 1.4 A_{rms} continuous, 2.8 A_{rms} peak
- **02**: 2.8 A_{rms} continuous, 5.6 A_{rms} peak
- **05**: 5.6 A_{rms} continuous, 11.2 A_{rms} peak

1D03: 12–48 VDC power supply

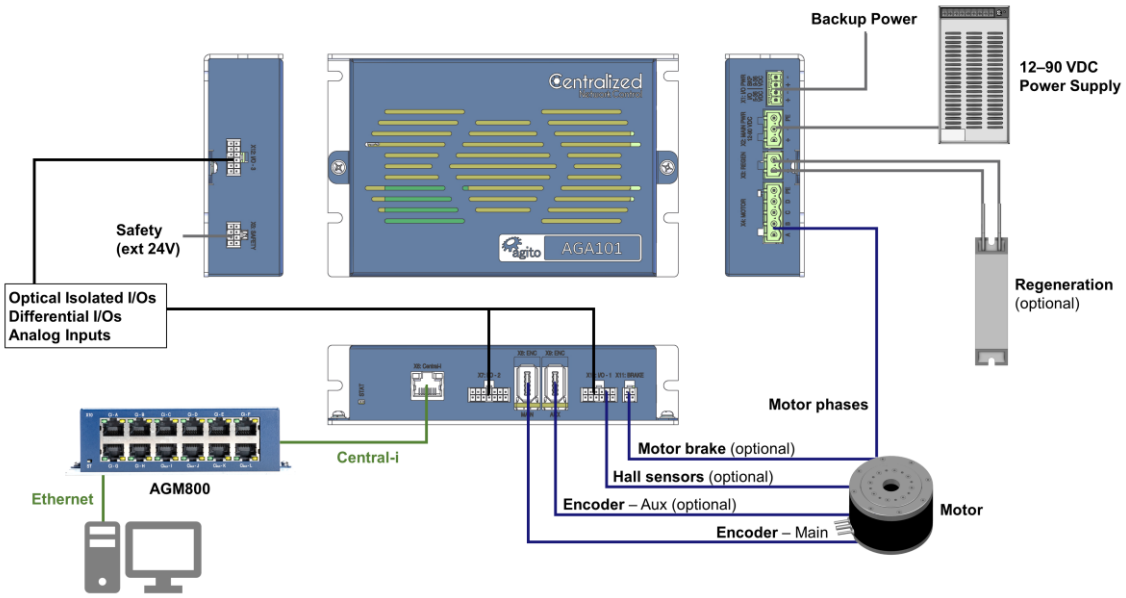
No product variants. This model has 2.8 A_{rms} continuous current and 5.6 A_{rms} peak current.

System Design

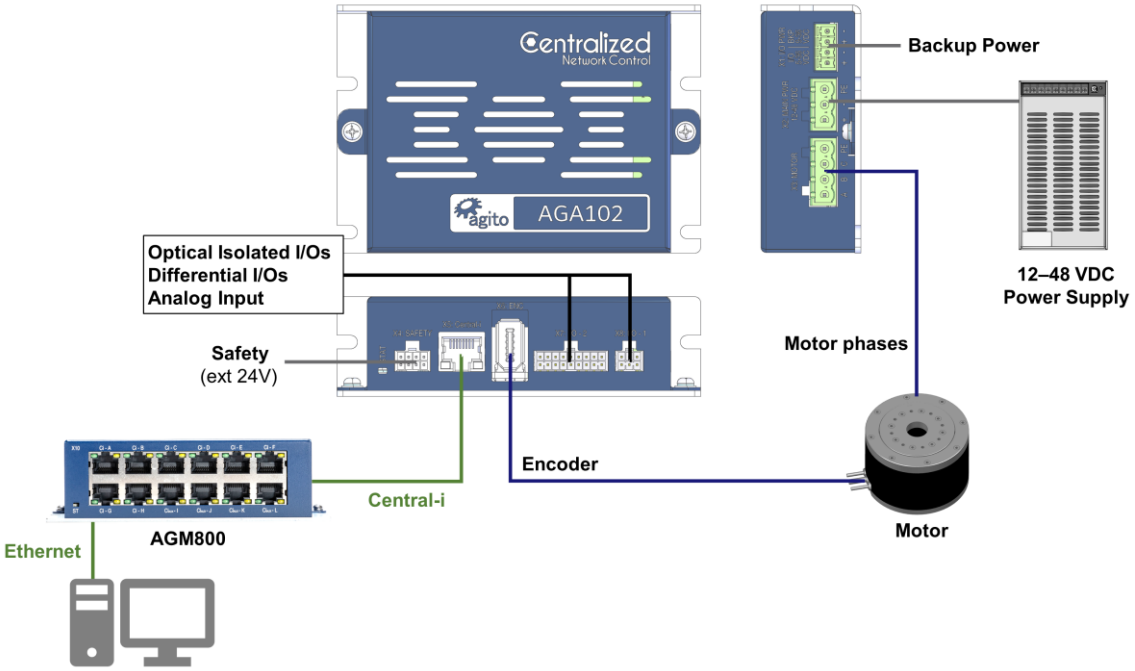
AGA110 system



AGA101 system



AGA102 system



AGA103 system

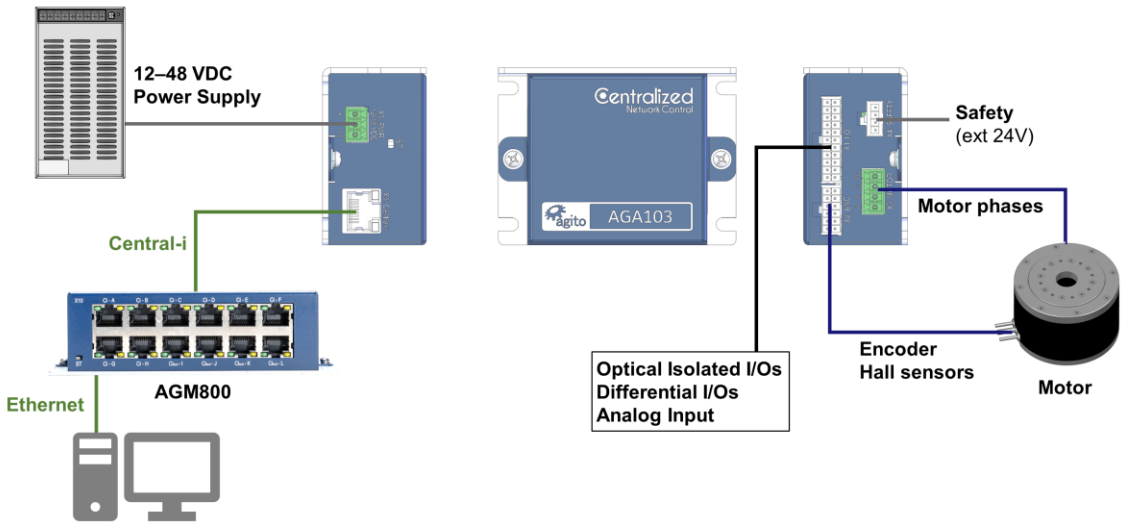


Figure 1. AGA103 system

Technical Specifications

Electrical/Mechanical Specifications

Feature	AGA110	AGA101	AGA102	AGA103
Number of axes	1	1	1	1
Nominal supply voltage	48–190 VDC	12–90 VDC	12–48 VDC	12–48 VDC
Minimum supply voltage	40 VDC	11 VDC	11 VDC	11 VDC
Maximum supply voltage	200 VDC	95 VDC	55 VDC	55 VDC
Continuous output current (internally limited by firmware)	7.0 Arms	1.4 | 2.8 | 5.6 Arms	1.4 | 2.8 | 5.6 Arms	2.8 Arms
Peak output current (Internally limited by firmware)	14.0 Arms	2.8 | 5.6 | 11.2 Arms	2.8 |5.6 | 11.2 Arms	5.6 Arms
Peak current time	2 sec	3 sec	3 sec	3 sec
Output frequency	0 – 599 Hz	0 – 599 Hz	0 – 599 Hz	0 – 599 Hz
Over-current protection	40 Arms	10 | 20 | 40 Arms	10 | 20 | 40 Arms	20 Arms
Isolated digital inputs (see Note 1)	11	11	7	5
Isolated digital outputs (see Note 2)	3	3	2	2 (see Note 3)
Bi-directional differential I/Os (RS422)	1	1	–	–
Analog inputs	2 (12-bit)	2 (12-bit)	1 (12-bit)	1 (12-bit)
Analog outputs	–	–	–	–
PT100	–	–	–	1
Brake outputs	1	1	–	–
Regeneration outputs	1	1	–	–
Encoder port - Main	Configurable as AqB, Sin/Cos 1Vpp, Absolute BiSS-C, Absolute EnDat2.2, SSI			
Encoder port - Auxiliary	Configurable as AqB, Absolute BiSS-C, Absolute EnDat2.2, SSI		–	
Motor types	Voice coil, Brushed/ brushless linear/rotary, 2-phase stepper (open/closed loop, micro-stepping)			
Communication	Central-i			
PWM frequency	16 kHz			
Power supply to external devices	Voltage: 5V Overall max. current: 0.5A			

Note 1: Isolated digital inputs can be configured as NPN or PNP, in groups of 3 or 4.

Note 2: Isolated digital outputs can sink up to 500 mA or source up to 300 mA.

Note 3: AGA103: digital isolated outputs can be configured only as NPN (sink).

Encoder Ports Specifications

Feature	Specification
Encoder types	Incremental AqB, Sin/Cos Absolute: EnDat 2.2, BiSS-C
Power supply to encoder	AGA110: 0.5A per encoder port AGA101: 0.5A per encoder port AGA102: 0.5A per encoder port AGA103: 0.3A per encoder port
Max. cable length	20 m
Incremental encoder (AqB)	Hardware: Differential RS422/RS485 Max. input frequency: 6.25 MHz Termination: 120 Ω Commutation: Auto-phasing, Hall sensors
Sin/Cos encoder	Hardware: Differential RS422/RS485, 1V pk-pk @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: 1 MHz Max. position bits: 32 bits Commutation: Auto-phasing, by absolute offset
Absolute EnDat 2.2	Hardware: Differential RS422/RS485, clock, data Clock frequency: 1 MHz Max. position bits: 32 bits Commutation: Auto-phasing, by absolute offset
Hall sensors	Opto-isolated 5V with internal or external power supply

Central-i Specifications

Feature	Specification
Topology	Star (peer to peer)
Cycle time	61 µs
Connector type	RJ-45 (Cat5e cable)
Cable length	Up to 20 m Longer cables, up to 100 m, are possible with special hardware
Physical layer	Dual channel RS485 full duplex
Baud rate	20 Mbps (per channel)
Synchronization between nodes	8 nanosecond

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
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
Differential digital inputs	Hardware: Differential RS422 Propagation delay: 100 ns Max. frequency: 2 MHz
Analog inputs	Operational voltage: ±10V Resolution: 12 bit
Safety inputs	2 independent inputs Voltage: 5–24 VDC
Static brake output	Operational voltage: 24V Maximum current: 3A

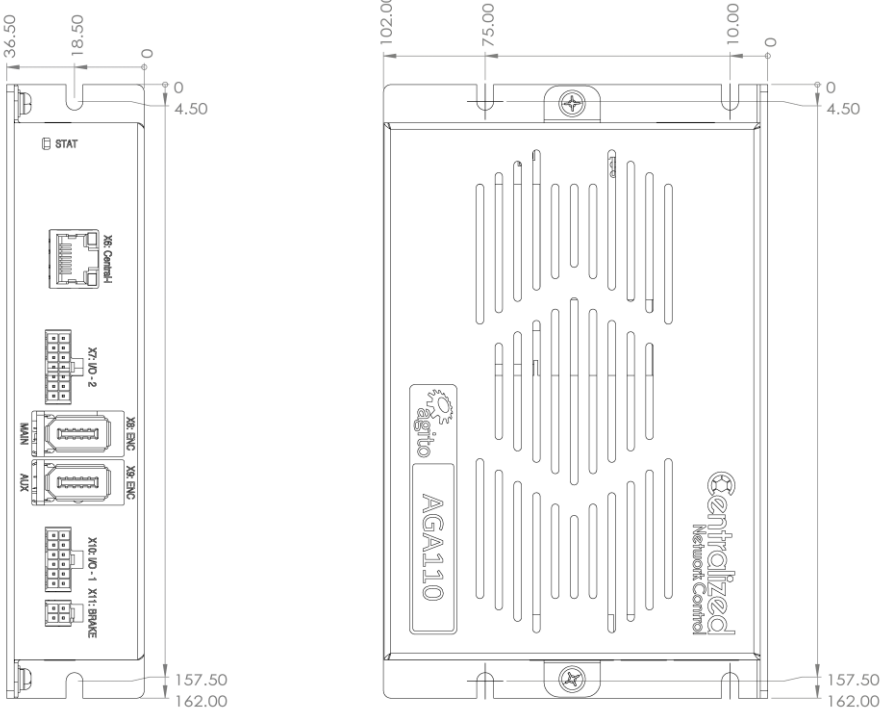
Environmental Specifications

Feature	Specification
Operating (ambient) temperature	0°C to 50°C
Storage temperature	-20°C to 70°C
Operating humidity	< 90%
Storage humidity	< 40%
Pollution degree	2
Vibration*	per 1G @ 150 Hz according to IEC 60068-2-6 – *under testing*
Operating conditions	IP20

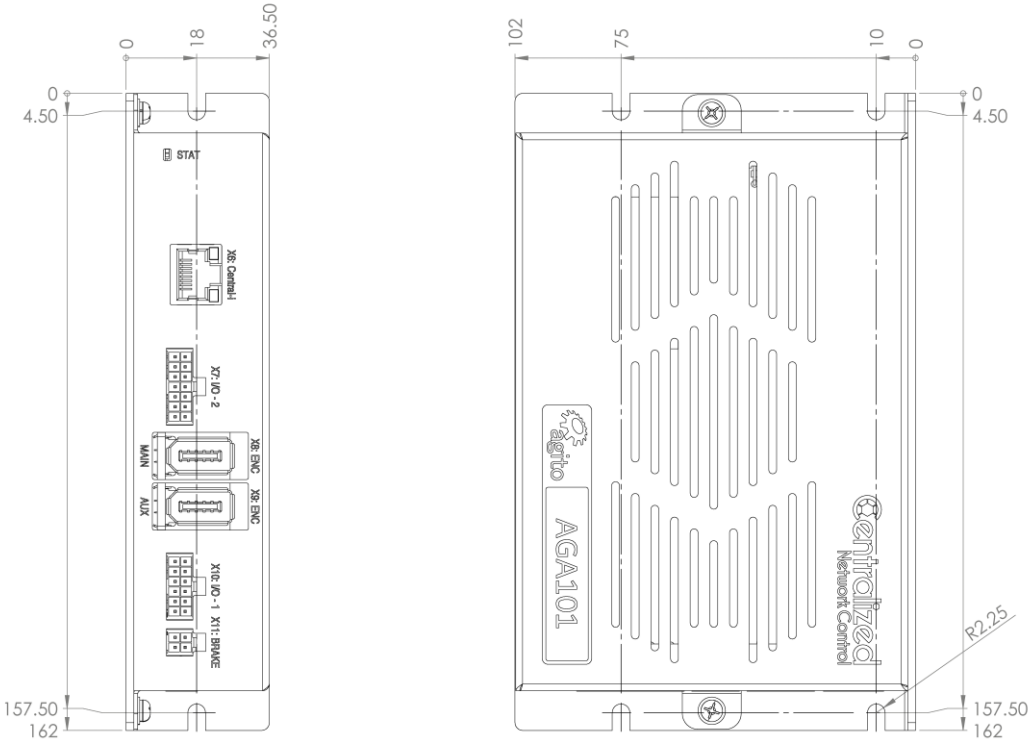
Dimensions and Weight

Feature	Specification			
	AGA110	AGA101	AGA102	AGA103
Unit dimensions (max)	H=162 mm W=36.50 mm D=102 mm	H=162 mm W=36.50 mm D=102 mm	H=120 mm W=33 mm D=82 mm	H=80 mm W=35 mm D=60 mm
Package dimensions	H=210 mm W=50 mm D=140 mm	H=210 mm W=50 mm D=140 mm	H=170 mm W=50 mm D=120 mm	H=170 mm W=50 mm D=120 mm
Unit weight	306 g	306 g	200 g	118 g
Shipping weight	410 g	410 g	286 g	204 g

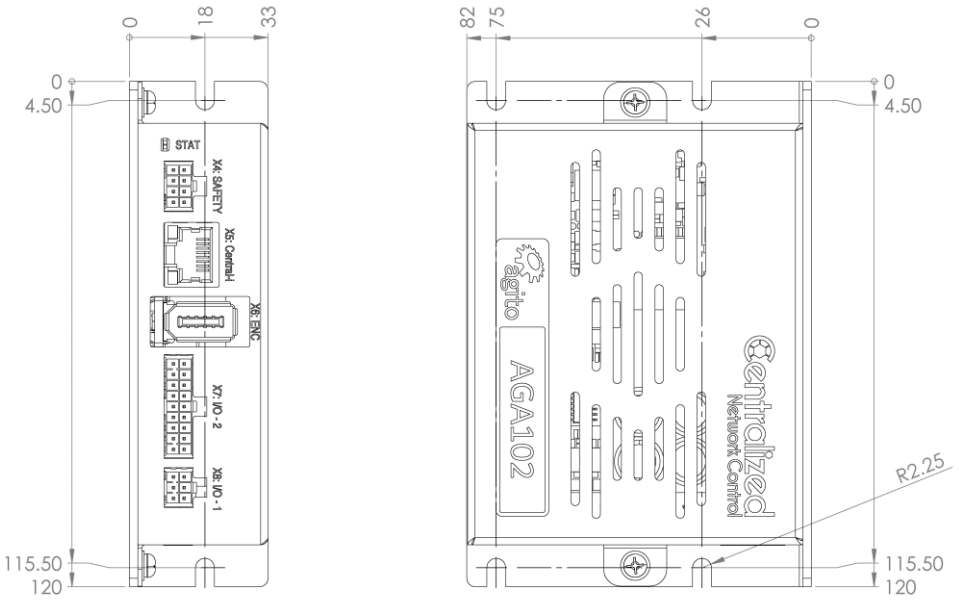
AGA110 system



AGA101 system



AGA102 Dimensions



AGA101 Dimensions