



AGL10x

Central-i Adapter

Product Manual



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Member of Akribis Systems group

Revision History

Version	Description	Date
3.2	Updated electrical interface connection diagrams and pinout drawings. Revised the connector pin names to match the terminal names of electrical interface connection diagrams.	6 August 2025
3.1	Updated information regarding differential output and Bi-Dir-IO for AGL101. Corrected I/O power description.	23 June 2025
2.3	Updated information regarding digital inputs to improve clarity.	9 December 2024
2.2	Updated connector information for electrical interfaces. Various, minor text corrections.	18 September 2023
2.1	Minor correction in I/O Specifications table. Added hot plugging warnings. Corrected figure – AGL102 Interface X1	28 February 2023
2.0	New. One manual for both AGL101 and AGL102. Completely revised content.	8 June 2022

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Warranty

This product is warranted to be free of defects in material and workmanship and conforms to the specifications listed in this manual, for a period of 12 months from the shipment date from factory.

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1 Product Description

1.1 General Description

The AGL10x is a series of Central-i remote adapters to interface the Central-i network with third-party external devices, such as servo and stepper drives. The adapters provide two operations modes:

- **Position closed loop:** AGL10x converts Central-i current or velocity commands to analog $\pm 10V$ output. The position feedback is connected to the AGL10x encoder input.
- **Pulse and direction:** AGL10x converts Central-i position commands into pulse and direction outputs.

These adapters enable the Central-i master to control any third-party drive in analog current mode or digital pulse and direction mode, thereby extending the Central-i network to work with any servo drive.

- AGL101-CI is a fully featured Central-i remote adapter with numerous I/O interfaces and incremental and absolute encoders support.
- AGL102-CI is a compact Central-i remote adapter with standard I/O interfaces and incremental encoder support.



Figure 1. AGL10x Adapters

Part Numbering

1.2 Part Numbering

AGL10x Product Variants

Product Description	Part Number Format
Central-i remote fully featured adapter	AGL101-CI
Central-i remote compact adapter	AGL102-CI

1.3 System Design

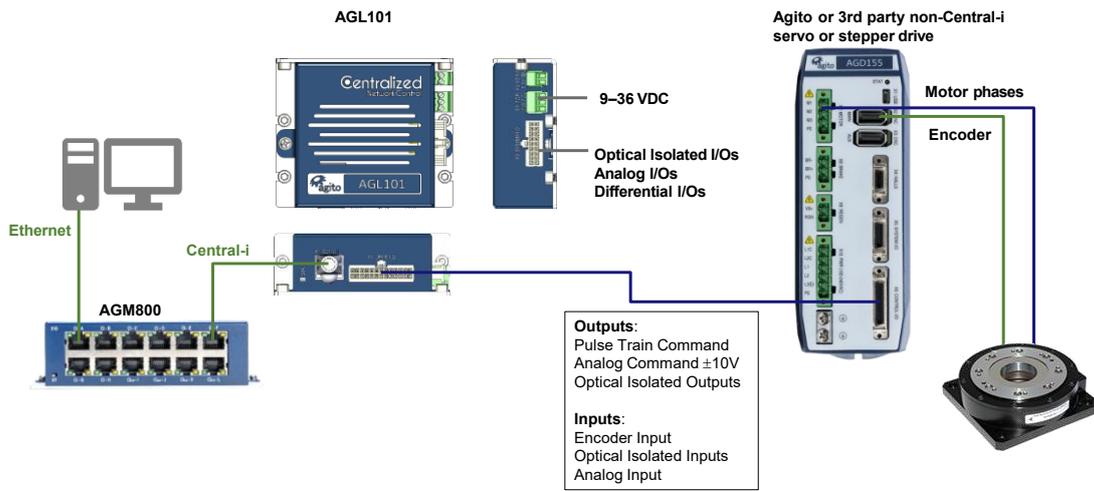


Figure 2. AGL101 System

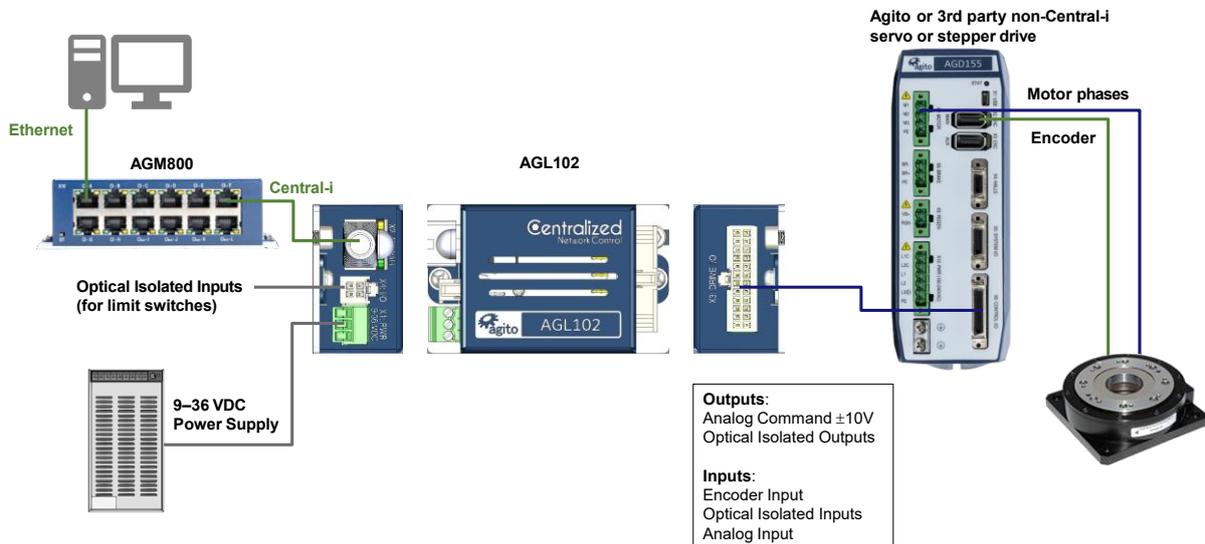


Figure 3. AGL102 System

1.4 Technical Specifications

Electrical/Mechanical Specifications

Feature	AGL101	AGL102
Number of axes	1	1
Nominal supply voltage	9–36 VDC	9–36 VDC
Isolated digital inputs	5 (2 NPN, 3 NPN/PNP)	–
Non-isolated digital inputs	–	6 (NPN)
Isolated digital outputs	6 (3 Sink, 3 Sink/Source)	–
Non-isolated digital outputs (Sink up to 50 mA)	–	4 (Sink)
Analog inputs	2 (16-bit resolution)	1 (12-bit resolution)
Analog outputs	1 (16-bit resolution)	1 (16-bit resolution)
Differential outputs	1	0
Bi-directional differential I/Os	2	0
Supported encoders	1 port; AqB or absolute BiSS-C	1 port; AqB
Communication	Central-i	Central-i

Encoder Ports Specifications

Feature	Specification
Encoder types	AGL101: Incremental AqB Absolute: EnDat 2.2 (dedicated FPGA version), BiSS-C AGL102: Incremental AqB
Power supply to encoder	AGL101 only: 0.5A 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
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

I/O Specifications

Feature	Specification
Power supply for optically isolated I/Os	Voltage: 5–28 VDC
Optically isolated digital inputs	Type: PNP/NPN (some of the inputs are NPN only) Propagation delay: 10 μ s Max. frequency: 50 kHz
Optically isolated digital outputs	Type: Sink/Source (some of the inputs are sink only) Max current: 0.5A (for Sink type), 0.3A (for Source type) Propagation delay: 10 μ s Max. frequency: 50 kHz
Non-isolated digital inputs	Type: NPN Propagation delay: 10 μ s Max. frequency: 50 kHz
Non-isolated digital outputs	Note: Requires external pull up resistor, 1 k Ω recommended Type: Sink Max. current: 50 mA
Differential I/Os	Hardware: Differential RS422 Propagation delay: 100 ns Max. frequency: 2 MHz Differential output voltage: 3.3 VDC Bi-dir differential output voltage: 2.3 VDC
Analog inputs	Operational voltage: \pm 10V Resolution: 16 bits
Analog outputs	Operational voltage: \pm 10V Resolution: 16 bits

Central-i Specifications

Feature	Specification
Topology	Star (peer to peer)
Cycle time	61 μ s
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 nanoseconds

Technical Specifications

Dimensions and Weight

Feature	AGL101	AGL102
Unit dimensions (max)	H=89.5 mm, W=79.5 mm, D=18 mm	H=45mm, W=73 mm, D=27 mm
Package dimensions	H= 96 mm x W=85 mm x D=23 mm	H= 51 x W=69 x D=33
Unit weight	250 g	150 g
Shipping weight	350 g	250 g

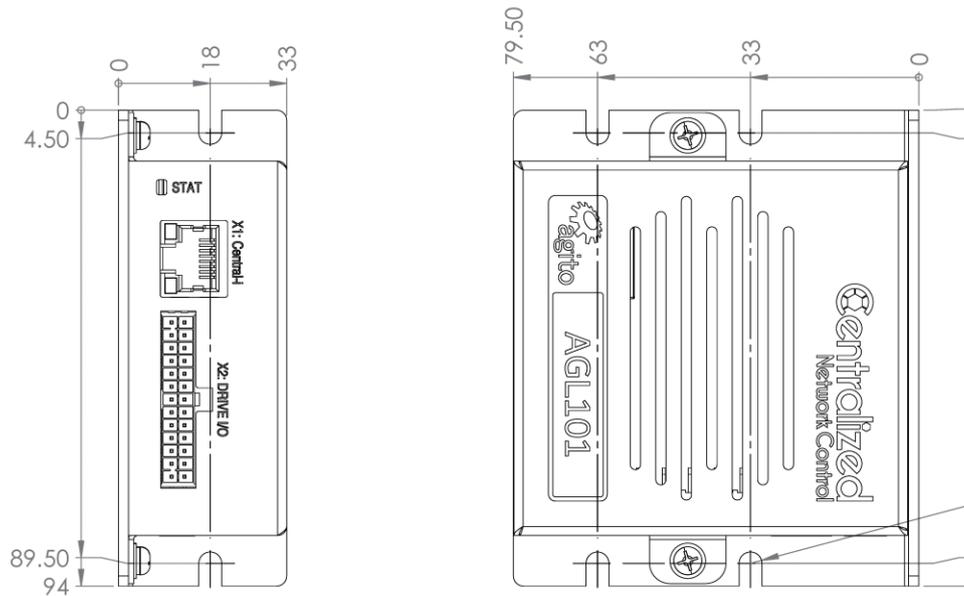


Figure 4. AGL101 Dimensions (mm)

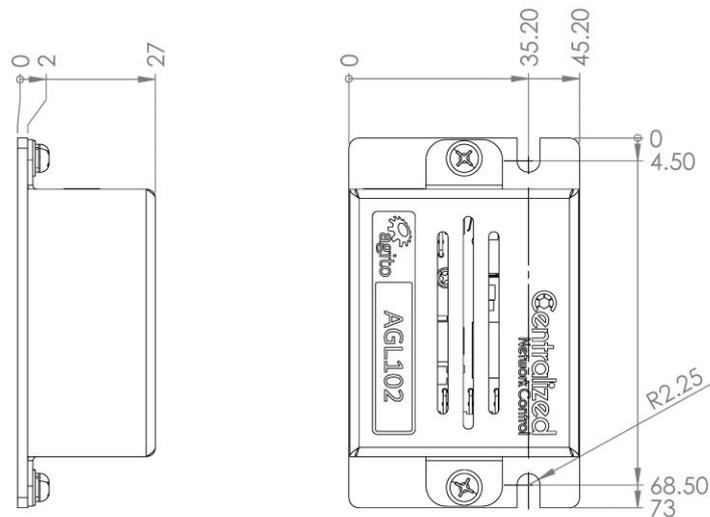


Figure 5. AGL102 Dimensions (mm)

1.5 Environmental Specifications

The operational range may be additionally limited by the internal temperature protection of the product. It is the user's responsibility to avoid operating the product in environmental conditions that do not conform to the defined limits.

Environmental Specifications

Feature	Specification
Operating (ambient) temperature	0°C to 45°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
Operating conditions	IP20

2 Safety

2.1 Safety Symbols

Safety symbols indicate a potential for personal injury or equipment damage if the prescribed precautions and safe operating practices are not followed.

The following safety symbols are used in the product documentation.

Safety Symbols

Symbol	Meaning	Description
	Hazardous voltage	Indicates hazards arising from dangerous voltages.
	Earthing PE (protective earth)	Identifies any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.
	Caution, hot surface	Indicates the marked item can be hot and should not be touched without taking care.

2.2 Safety Guidelines

To achieve optimum and safe operation of the product, it is important to follow the safety procedures specified in this manual.

- Only qualified personnel may install, maintain, or repair the product. Before starting installation, maintenance, or operation, ensure that all system components are connected to protective earth ground (PE).
- The PE wire must be colored green-yellow, in accordance with local electrical wiring standards.
- This product contains electrostatic-sensitive components. Proper handling procedures must be observed to avoid damage to the product.
- To avoid electric arcing and hazards, never connect or disconnect any connector while the power source is on.
- The maximum power supply voltage connected to the product must comply with the ratings provided in this manual.
- Always disconnect the power cables before servicing the product.
- Pay attention to safety symbols on the product or in the manual. Follow proper safety precautions when installing or operating the product.



Attention

All power connectors must be securely tightened before any operation.



Attention

Do not attempt to hinder or override the product's or system's fault detection or protection circuits. You must determine the cause of a fault and correct it before you attempt to operate the system. Failure to correct the fault could result in personal injury and/or damage to equipment.

2.3 Compliance

Standards Compliance

Description	Standard
Safety requirements – Electrical, thermal and energy	IEC-61800-5-1
EMC requirements and specific test methods	IEC-61800-3

This product is intended to operate in a machine or equivalent end-product. The machine or end-product must comply with any necessary safety standard as typically required for the same type of machine or end-product. It is the responsibility of the machine or end-product manufacturer to ensure the final machine or end-product meets the requirement of any safety and EMC regulations.

3 Installation

3.1 Unpacking and Packing

Save the original box and packing materials in case you need to pack and return the product to the manufacturer.

To unpack the product:

1. Carefully remove the product from the box and the packing materials.
2. Visually inspect the product to ensure that there is no damage. If any damage has occurred, report it immediately to the carrier that delivered the package.
3. After unpacking, locate the part number label on the product, and make sure it matches the product you ordered, and that the voltage meets your specific requirements.

3.2 Mounting

3.2.1 Mounting the AGL10x

The heatsink on the back of the AGL10x includes holes/slots for mounting the unit.

The AGL101 is mounted using 2 M4 screws. The AG102 uses either 2 or 4 M4 screws depending on orientation. It is important to mount the product on metal panel for both grounding and secure connections.

The heatsink of the AGL10x is electrically conductive and serves as the protective earth (PE) ground of the product. However, it is critical to ensure the PE screws are electrically conducting between the PE of AGL10x and the PE of main power supply in the system. For details, refer to the section Grounding.

All cables connected to the product must be securely constrained to avoid vibration that causes stress concentration at the cables or connectors which may result in breakage of electrical conductivity.



Warning – Metal Base Plate for Heat Dissipation

The product is supplied with a mounting plate built into the heatsink. At full power operation, the heat sink can be quite warm, around 45°C. It is recommended to mount the product on a large metal panel to help dissipate the heat generated in the product.

Mounting

3.2.2 Mounting Multiple Adapters

When mounting multiple adapters within a cabinet, clearance between units must be at least 5 mm. In addition, top and bottom clearance must be at least 50 mm.

Ambient temperature in the cabinet must not exceed limit defined in the section Environmental Specifications.

If adapters are mounted on a backplane, the backplane temperature must not exceed the ambient limit defined in the section Environmental Specifications.

It is recommended to install a cooling fan at the bottom of the cabinet for best circulation.

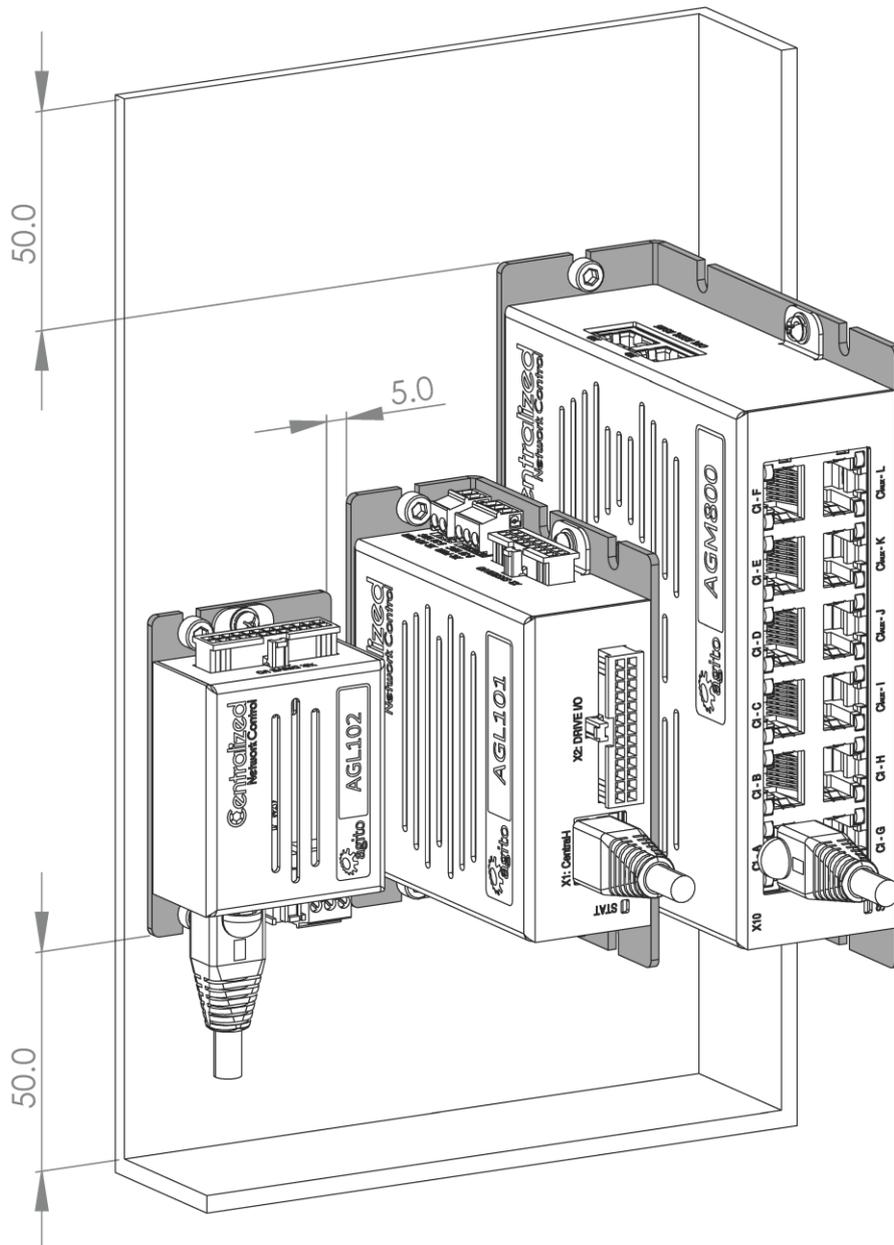


Figure 6. AGL10x Mounting Example

3.3 Electrical Installation

3.3.1 Power Supplies

The power sources provide power to the logic and I/O circuits.

Power Source	Description	AGL101	AGL102
Logic power	Supplies power to the logic and I/O circuits.	9–36 VDC	9–36 VDC
Isolated I/Os power	Supplies power to the optically isolated I/O circuits.	5–28 VDC	–

3.3.2 Wire and Cable Guidelines

To prevent EMI and ensure high performance of the system, be sure to comply with the following guidelines:

- Use twisted pair shielded wires for control, feedback, and communication.
- Always use shielded cables for motor connection.
- Keep all wires and cables as short as possible.
- Keep the motor cables as far as possible from the control, feedback and communication lines and cables.
- Wire impedance must be as low as possible. Refer to the wire gauge definitions for each electrical interface.



Warning - Hot plugging is forbidden!

Plug or unplug the power connector only when power is off! Plugging the power connector when power is on may cause power surges through connected devices and possibly damage them.

3.3.3 Grounding

It is recommended to install the AGL10x on a metal backplane for better power dissipation, reduced EMI, and grounding connection. Make sure the plate is not painted.

The heatsink of the AGL10x is electrically conductive and serves as the protective earth (PE) ground of the product. However, it is critical to ensure the PE screws are electrically conducting between the PE of AGL10x and the PE of the main power supply in the system.

The power input (PWR) connector includes a PE pin. Make sure to connect PE to this pin or to the adapter’s metal heatsink.

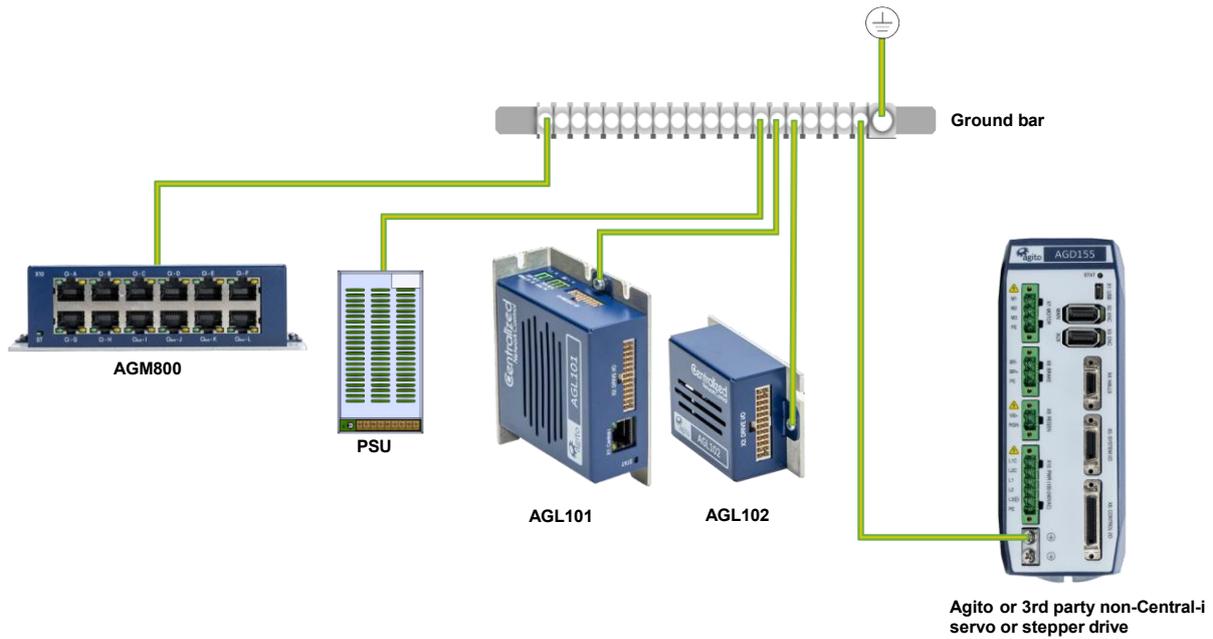


Figure 7. System Grounding

Ground Domains

The following table shows the ground domains in the AGL10x system:

- GND. Reference voltage for digital/analog circuits and signals.
- General. Usually at DC potential close to GND, but not connected internally.

Ground Domains

Name	Ground Domain	Notes
DC power input	GND (I/O return)	External DC power supply
Central-i communication	General	Isolated for Central-i remote devices
Isolated digital inputs/outputs	General	Isolated
Differential inputs/outputs (not isolated)	GND	
Analog inputs/outputs (not isolated)	GND	

Grounding Policy

Grounding of the product must comply with the following guidelines:

- The enclosures and other external parts that may be touched by the user are in the safe domain.
- The AGL10x must be connected to protective earth (PE) and connected to the building's ground. PE is protected with an earth-leakage circuit breaker (ELCB); hence it is safe to touch. Refer to Figure 7.
- Digital ground (GND) is assumed to have the same potential as the PE. That means GND is connected to the PE at some point in the system.
- All shielded cables have their shield connected to PE as part of the external metal enclosure.

Communication – Central-i

- It is critical to avoid ground loops in the system. A ground loop allows currents to return by two or more different paths, causing electromagnetic interference or even damage to wires.
- The system designer must carefully examine all GND connections in the system to ensure that no loops are created, and that all GND-referenced signals have a GND wire nearby (for both return currents and common mode voltage).

3.4 Communication – Central-i

The AGL10x adapters use Central-i for communication with a centralized controller module.

The Central-i motion control platform includes a multi-axis motion controller, distributed adapters and sensors, and control software. The master controller performs all the control functions, including trajectory and position, velocity, and current loops. The Central-i digital protocol enables communication and synchronization of the remote devices.

A bi-colored LED, marked STAT on AGL101 shows the status of communication between the AGL101 and the Central-i master controller.



Note – AGL102 does not have a status LED.

Central-i Status LED indicator

Color	LED	Meaning
Green	On steady	Adapter communicating with master controller
Red	On steady	Adapter not communicating with master controller

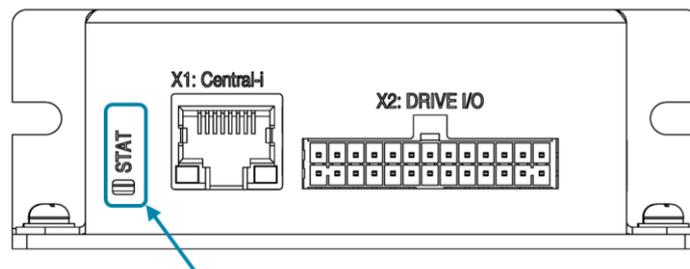


Figure 8. Status (LED) Indicator (AGL101)

3.5 AGL101 – Electrical Interfaces

3.5.1 Interface X4: Power

Connector X4 is used to supply 9–36 VDC to the AGL101.

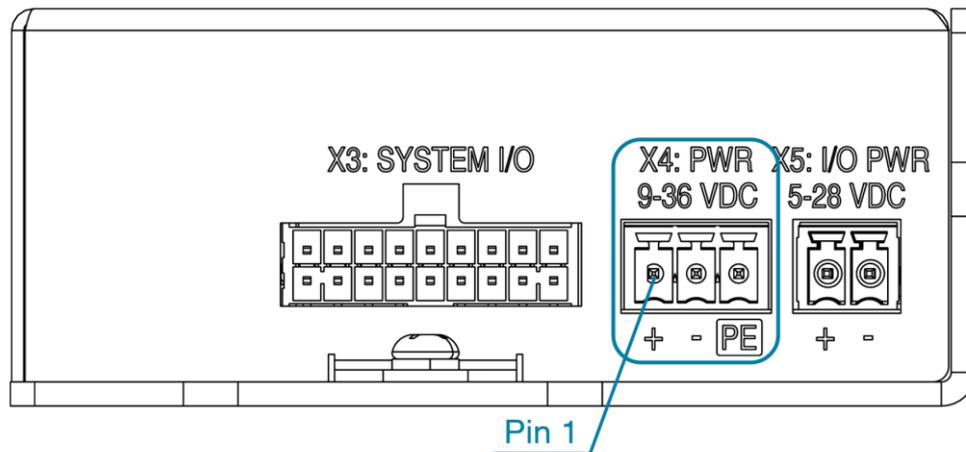


Figure 9. Power Connector

Connector X4: PWR

Pin #	Name	Description
1	Main Power	Power input: 9–36 VDC, up to 1A continuous
2	GND	Ground – power return
3	PE	Protective earth

Mating connector options	Degson 15EDGK-3.5-03P-14-00A Phoenix Contact 1847068 Wurth Elektronik 691361100003
Connector pitch	3.5 mm
Wiring	16–28 AWG, insulation rated for 160V



Warning - Hot plugging is forbidden!

Plug or unplug the power connector only when power is off! Plugging the power connector when power is on may cause power surges through connected devices and possibly damage them.

3.5.2 Interface X5: I/O Power

Connector X5 supplies DC power supply to the isolated inputs and outputs.

To use inputs and outputs, be sure to power up this port.

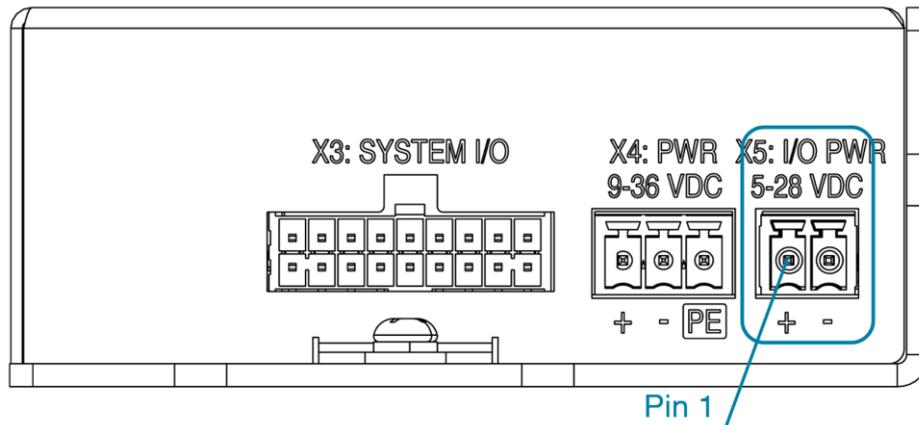


Figure 10. I/O Power Connector

Pin #	Name	Description
1	I/O Power	5 to 28 VDC – user supplied I/O power supply input, up to 2A
2	I/O Power Return	Ground – I/O power supply return
Mating connector options	Degson Phoenix Contact	15EDGK-3.5-02P-14-00A 1840366
Connector pitch	3.5 mm	
Wiring	16–28 AWG, insulation rated for 160V	

3.5.3 Interface X2: Drive I/O

Connector X2 is used for connecting external I/O devices to the adapter.

For schematics and more information about these interfaces, refer to the section *I/O Connection Diagram Example*.

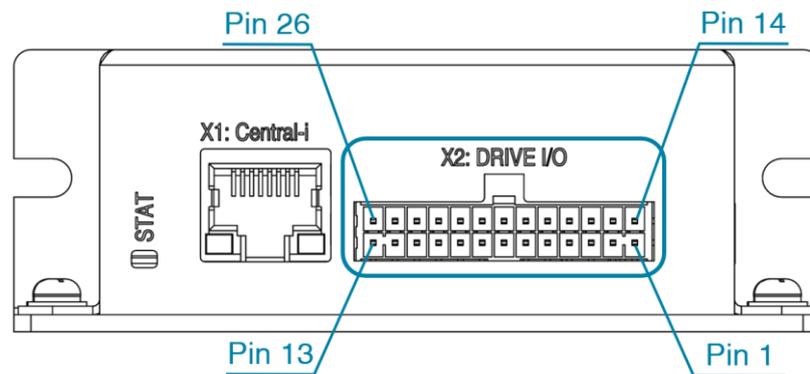


Figure 11. Drive I/O Connector

Connector X2: DRIVE I/O

Pin #	Name	Software Representation	Description
1	I/O Power Return		Input I/O power supply return. Connected internally to X5 pin2, I/O Power Return. Common pin for isolated digital outputs 4, 5 and 6.
2	I/O Power		Input I/O power supply 5 to 28 VDC. Connected internally to X5 pin1, I/O Power. Common pin for isolated digital inputs 1 and 2.
3	Digital Output 6	DOutPort.bit(5)	Isolated digital output 6. Sink only.
4	Digital Output 4	DOutPort.bit(3)	Isolated digital output 4. Sink only.
5	Digital Input 1	DInPort.bit(0)	Isolated digital input 1. NPN only.
6	Bi-Dir Diff I/O 1 +	DInPort.bit(5) DOutPort.bit(7)	Bi-directional differential input or output. BiDirConfig.bit(0) = 0 for Input; BiDirConfig.bit(0) = 1 for Output.
7	Diff Output 1 +	DOutPort.bit(6)	Differential output 1. Positive pin.
8	A_Encoder_4+		Differential input. Not inverted.
9	A_Encoder_3+		Differential input. Not inverted.
10	A_Encoder_2+		Differential input. Not inverted.
11	GND		Ground
12	Analog Output 1	AOutPort[1]	Analog output 1. Not inverted.
13	Analog Input 1	AInPort[1]	Analog input 1, ±12V, 12 bits
14	PE		Ground-Earth connection

Pin #	Name	Software Representation	Description
15	GND		Ground
16	5V		Output power supply 5V (up to 0.5A)
17	Digital Output 5	DOutPort.bit(4)	Isolated digital output 5. Sink only.
18	Digital Input 2	DInPort.bit(1)	Isolated digital input 2. NPN only.
19	Bi-Dir Diff I/O 1 -		Bi-directional differential input or output.
20	Diff Output 1 -		Differential output 1. Negative pin.
21	A_Encoder_4-		Differential input. Inverted.
22	A_Encoder_3-		Differential input. Inverted.
23	A_Encoder_2-		Differential input. Inverted.
24	GND		Ground.
25	GND		Ground.
26	Analog Input Return 1		Analog input 1 return.

Mating connector options	Samtec Inc. IPD1-13-D-K and CC79R-2630-01-L
Wiring	26 AWG, insulation rated for 100V



Note – Absolute Encoder Connection

Connect the absolute encoder Clock+ and Clock- signals to Diff_Out+ and Diff_Out-, respectively. Connect the absolute encoder Data+ and Data- signals to A_Encoder4+ and A_Encoder4-, respectively. See the following example.

Sample Pinout for Encoder

Pin #	Name	Encoder Types			Description
		AqB	BiSS-C	EnDat 2.2	
16	5V				5V power supply (limited to 0.5A per connector)
15	GND				5V return and reference for differential signals
7	Diff_Out_1+		Clock+	Clock+	Clock+ pin for absolute encoders
20	Diff_Out_1-		Clock-	Clock-	Clock- pin for absolute encoders
10	Encoder_2+	A+			A+ (for AqB) or sin+ (for analog sin/cos)
23	Encoder_2-	A-			A- (for AqB) or sin- (for analog sin/cos)
9	Encoder_3+	B+			B+ (for AqB) or cos+ (for analog sin/cos)
22	Encoder_3-	B-			B- (for AqB) or cos- (for analog sin/cos)
8	Encoder_4+	Z+	Data+	Data+	Data+ for absolute encoders, or Z+ for both AqB and analog sin/cos encoder
21	Encoder_4-	Z-	Data-	Data-	Data- for absolute encoders, or Z- for both AqB and analog sin/cos encoder



Note – 5V supply limitation

The 5V supply provided on pin 16 on connector X2 is limited to 0.5A.

3.5.4 Interface X3: System I/O

Connectors X3 is used for connecting external I/O devices to the adapter.

For schematics and more information about these interfaces, refer to the section *I/O Connection Diagram Example*.

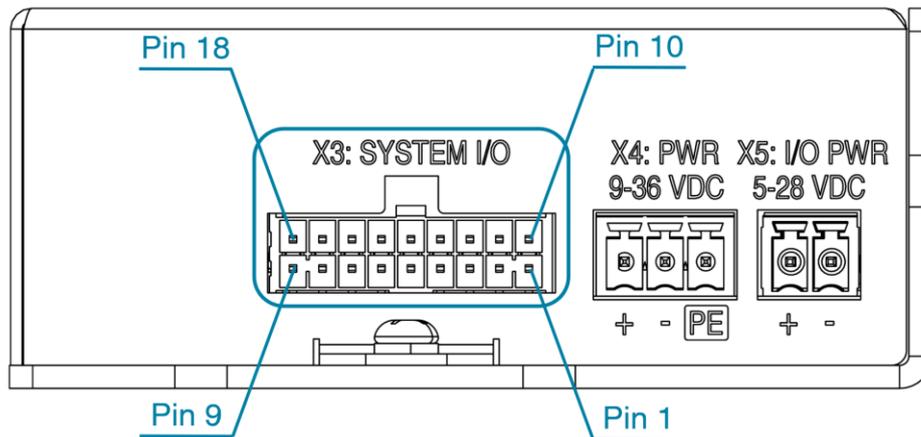


Figure 12. System I/O Connector

Connector X3: SYSTEM I/O

Pin #	Name	Software Representation	Description
1	I/O Power Return		Input I/O power supply return. Connected internally to X5 pin2, I/O Power Return.
2	I/O Power		Input I/O power supply (5V to 28V). Connected internally to X5 pin1, I/O Power.
3	Digital Output 1	DOutPort.bit(0)	Isolated digital output 1. Programmable sink or source.
4	Digital Output Common Power (1 to 3)		Common power pin for digital isolated outputs 1 to 3. Programmable sink or source.
5	Digital Input 4	DInPort.bit(3)	Isolated digital input 4. (NPN or PNP, depending on the connection of the group's common pin).
6	Digital Input Common (3 to 5)		Common pin (power or return, depending on external connection) for digital isolated inputs 3 to 5
7	Bi-Dir Diff I/O 2 +	DInPort.bit(6) DOutPort.bit(8)	Bi-directional differential input or output. BiDirConfig.bit(1) = 0 for Input; BiDirConfig.bit(1) = 1 for Output.
8	GND		Ground
9	Analog Input 2	AInPort[2]	Analog input 2, ±12V, 12 bits
10	PE		Ground-Earth Connection

Pin #	Name	Software Representation	Description
11	Digital Output 3	DOutPort.bit(2)	Isolated digital output 3. Programmable sink or source.
12	Digital Output 2	DOutPort.bit(1)	Isolated digital output 2. Programmable sink or source.
13	Digital Output Common Return (1 to 3)		Common power return pin for digital isolated outputs 1 to 3.
14	Digital Input 5	DInPort (bit 4)	Isolated digital input 5. (NPN or PNP, depending on the connection of the group's common pin).
15	Digital Input 3	DInPort (bit 2)	Isolated digital input 3. (NPN or PNP, depending on the connection of the group's common pin).
16	Bi-Dir Diff I/O 2 -		Bi-directional differential input or output.
17	GND		Ground
18	Analog Input Return 2		Analog input 2 return

Mating connector options	Samtec Inc. IPD1-09-D-K and CC79R-2630-01-L
Wiring	26 AWG, insulation rated for 100V

I/O Connection Diagram Example

Isolated Digital Inputs

Isolated digital inputs are organized as groups with a dedicated common pin. This enables connection to different voltage supplies. Each group is fully isolated and independent of the other groups.

Isolated Digital Inputs 1 to 2

- Inputs 1 and 2 can be connected as NPN only as the common pin is internally connected to I/O Power.

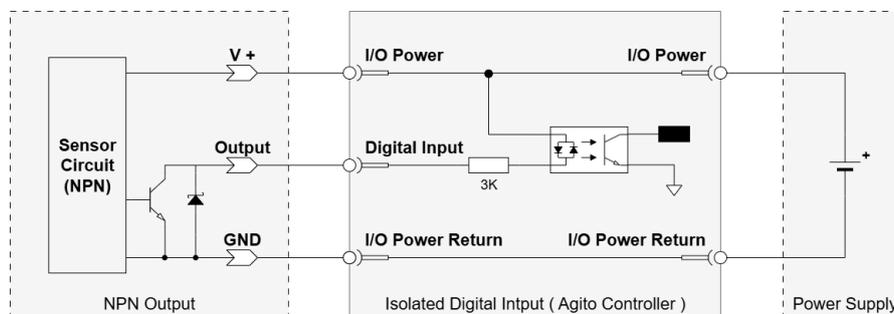


Figure 13. Digital Input with NPN Sensor only

AGL101 – Electrical Interfaces

Isolated Digital Inputs 3 to 5

- Inputs 3, 4 and 5 can be connected as NPN or PNP, depending on the wiring of the group's common pin. If the common pin is connected to power (5V to 28V), then the inputs of this group can be used with external NPN devices (external current sinking devices). If the common is connected to the GND of some external power, then the inputs can be used with external PNP devices (external current sourcing devices).
- The input circuit of the opto-couplers includes two diodes. This enables use as NPN or PNP.

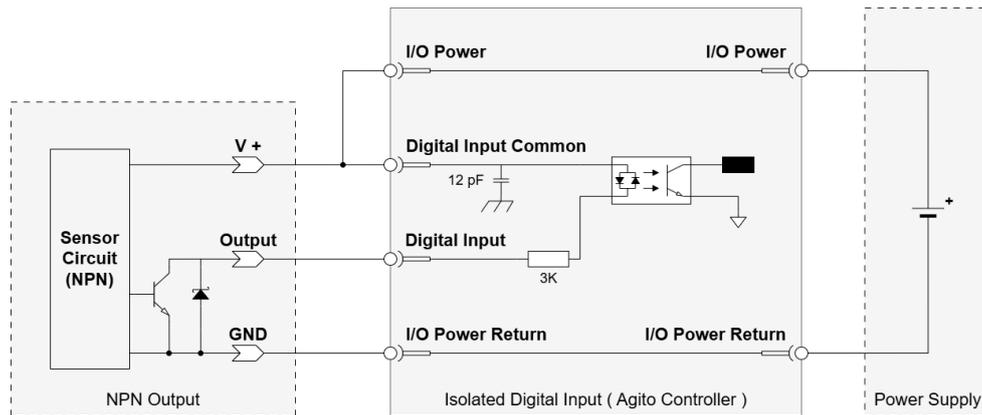


Figure 14. Digital Input with NPN Sensor

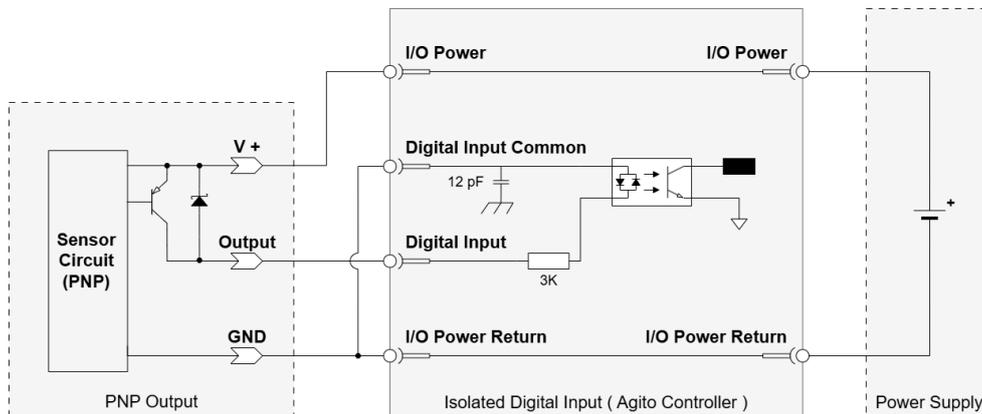


Figure 15. Digital Input with PNP Sensor

Isolated Digital Inputs – Groups and Common Pins

Connector	Inputs	Common
X2	1, 2	Internally connected to X5 – PIN 1, I/O Power (5 to 28 VDC)
X3	3, 4, 5	Pin 6

Isolated Digital Outputs

Isolated Digital Outputs 1 to 3

- The digital output interface circuit in AGL101 is identical for isolated digital outputs 1, 2 and 3.

AGL101 – Electrical Interfaces

- The digital output interface circuit is identical for all outputs.
- Each output can be programmed (by a software parameter) to act as a current sourcing output (up to 300mA) or as a current sinking output (up to 500 mA).
- Digital Output Common Power is shared by all 3 outputs.
- The outputs are designed for resistive loads. For inductive loads, an external flyback diode is required.
- Digital outputs specifications:
 - Digital Output Common Power voltage range is between 5V and 28V.
 - Maximal load current, per each output:
 - Sink mode, any Digital Output Common Power voltage: 500 mA
 - Source mode, at 24V Digital Output Common Power: 300 mA
 - Source mode, at 5V Digital Output Common Power: 60 mA (see Note below)

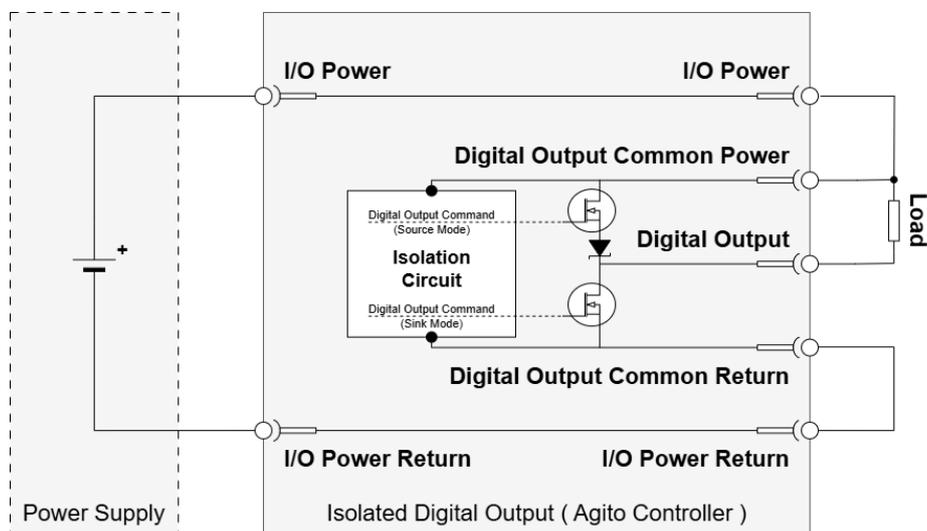


Figure 16. Digital Output (Sink Mode)

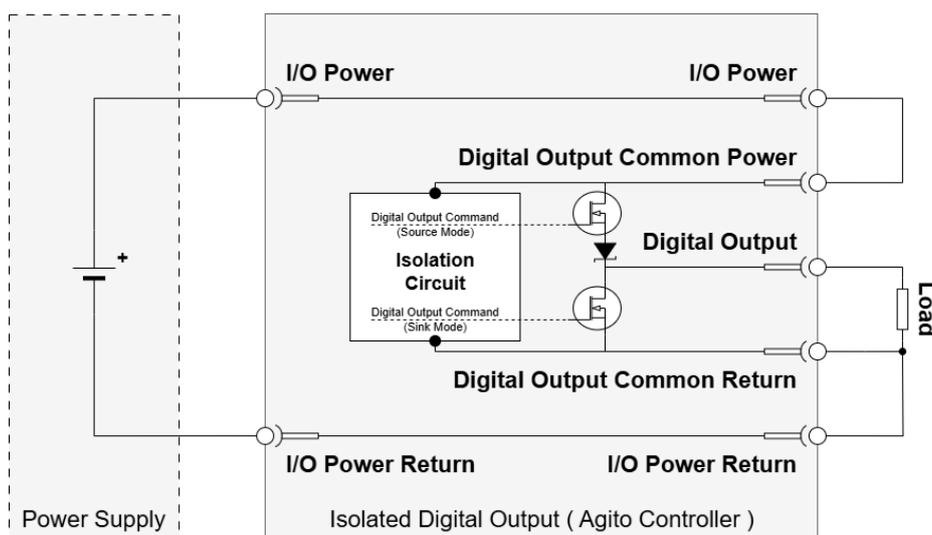


Figure 17. Digital Output (Source Mode)

Isolated Digital Outputs 4 to 6

- Outputs 4, 5 and 6 can be connected as sink only as the common pin is internally connected to I/O Power Return.

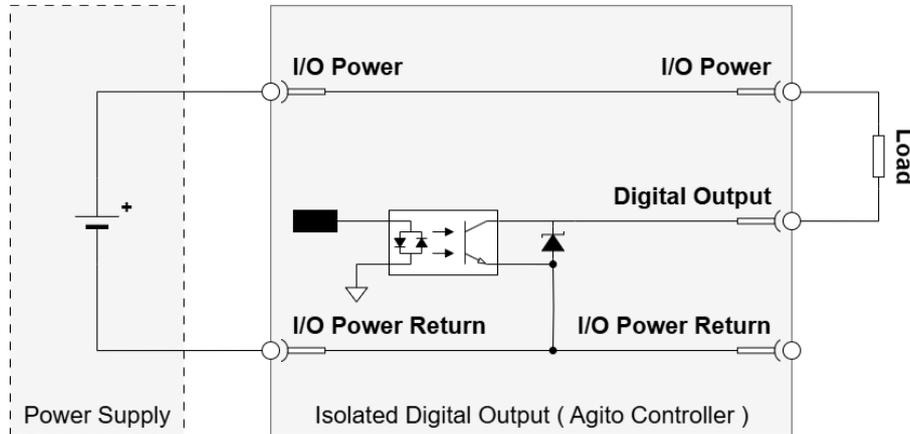


Figure 18. Digital Output (Sink Mode only)

Isolated Digital Outputs – Groups and Common Pins

Connector	Outputs	Common
X2	3, 4, 5	Internally connected to X5 – PIN 2, I/O Power Return
X3	1, 2, 3	Pin 4, 13



Note – 5V Digital Output Common Power source mode limitation.

When using 5V Digital Output Common Power, higher current (but less than the absolute maximum value of 250 mA) can be driven. However, the output high voltage will drop significantly. To maintain output high voltage at >4.5V, limit the current to 60 mA.

Analog Inputs 1 to 2

- The electrical interfaces of all analog inputs are identical.
- The analog input range is -12V to +12V, and resolution is 16 bits.
- The analog input is designed for standard differential analog input, with a simple input circuit, having an input resistance of ~60 kΩ.
- Input circuit bandwidth: 1 kHz, -40 dB/decade
- The controller software provides the following parameters to control the analog input reading:
 - Filter
 - Offset
 - Deadband
 - Gain

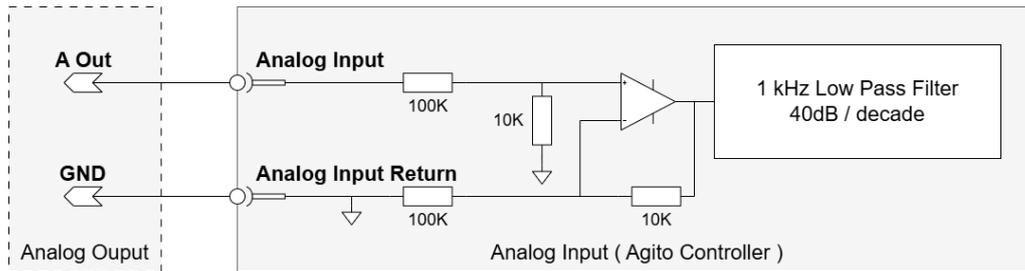


Figure 19. Analog Inputs

Analog Output

- The electrical interfaces of all analog outputs are identical.
- The analog output range is from -12V to +12V, with resolution of 16 bits.
- Output resistance is 10 Ω
- Output current is up to ± 2 mA, without internal current limitation.
- Analog outputs are controlled by the controller software in a few operational modes:
 - Analog output controlled by the user program for a general purpose.
 - Analog output used to provide analog torque or velocity command to external amplifier.

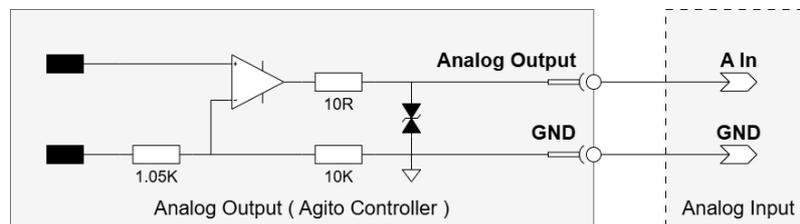


Figure 20. Analog Output

Differential Output

- Differential outputs use two complementary signals (Differential Output + and Differential Output -) to receive information.
- The same electrical signal is sent as a differential pair, each in its own conductor. The pair is wired as a twisted pair.
- The differential outputs are implemented according to the RS422 standard.
- The differential outputs are inactive during power on, until they are controlled by the drive firmware and the user parameters.

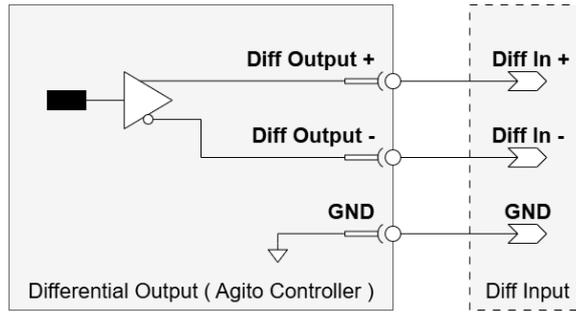


Figure 21. Differential Output

Bi-directional Differential I/Os 1 to 2

- The bi-directional differential output is configurable by software to be a differential output or differential input.
- Both + and - pins are pulled up to 3.3V.
- There is a 120Ω termination resistor between the + and - pins.

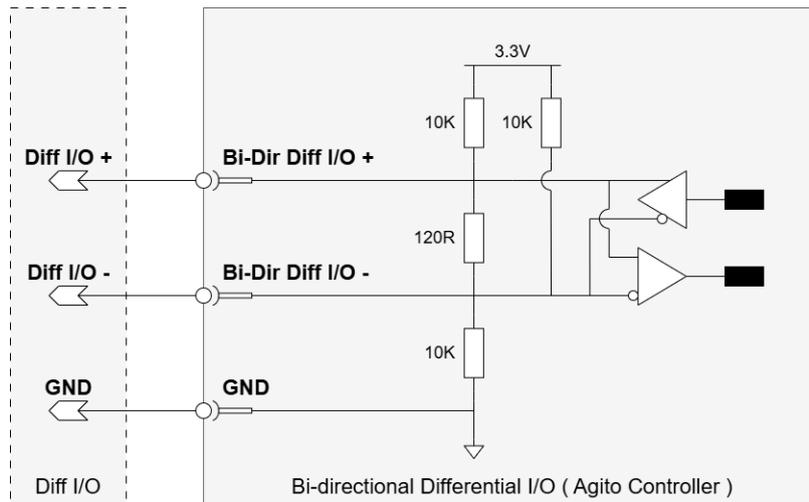


Figure 22. Bi-directional Differential I/Os

3.5.5 Interface X1: Central-i

Connector X1 is used for communication between the adapter and the PC.

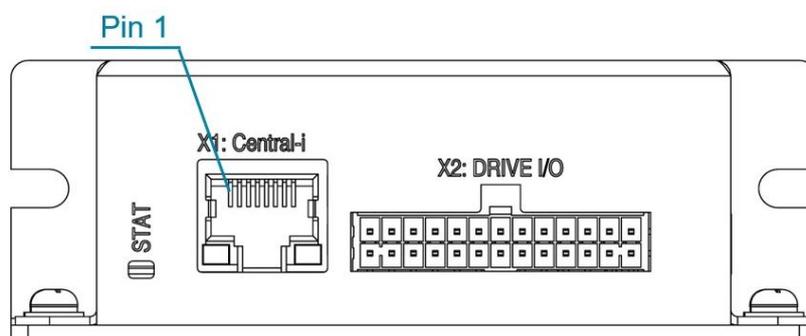


Figure 23. Communication Connector (Central-i)

Connector X1: Central-i (RJ45)

Pin #	Name	Description
1	DATA_0+	Data channel 0+
2	DATA_0-	Data channel 0-
3	DATA_1+	Data channel 1+
4	DATA_2-	Data channel 2-
5	DATA_2+	Data channel 2+
6	DATA_1-	Data channel 1-
7	V_REMOTE	Power supply to remote unit's communication module
8	GND	Ground

Connector type	RJ45 LAN 10/100Base-T connector
Mating connector part number	Any CAT5e compatible shielded connector
Cable	CAT5e or higher, standard Ethernet straight cable

3.6 AGL102 – Electrical Interfaces

3.6.1 Interface X1: Power

Connector X1 is used to supply power to the entire unit. The input voltage is directly connected to the adapter power bridge to generate the internal logic power that powers the adapter.

The adapter includes protection to prevent damage if polarity is inverted at the power input.

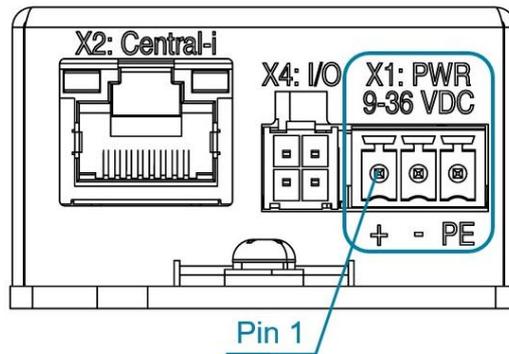


Figure 24. Power Connector

Connector X1: Power

Pin #	Name	Description
1	Main Power	Power input: 9–36V, up to 1A continuous
2	GND	Ground – power return
3	PE	Protective earth

Mating connector options	Degson	15EDGK-3.5-03P-14-00A
	Phoenix Contact	1847068
	Wurth Elektronik	691361100003
Connector pitch	3.5 mm	
Wiring	16–28 AWG, insulation rated for 160V	



Warning - Hot plugging is forbidden!

Plug or unplug the power connector only when power is off! Plugging the power connector when power is on may cause power surges through connected devices and possibly damage them.

3.6.2 Interface X3: Drive I/Os

Connector X3 is used for connecting external I/O devices to the adapter.

This port can be used for connection between the adapter and other external drivers.

For schematics and more information about these interfaces, refer to the section *I/O Connection Diagram Example*.

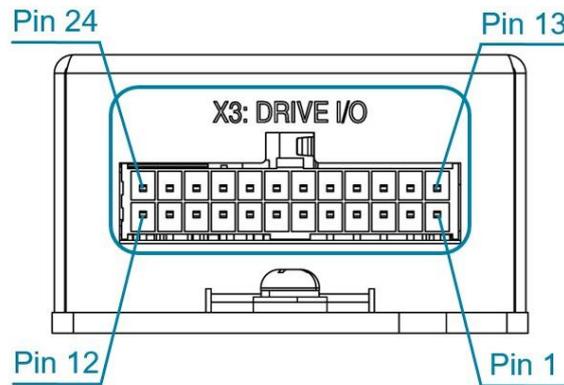


Figure 25. Drive I/O Connector

Connector X3: Drive I/Os

Pin #	Name	Software Representation	Description
1	I/O Power Return		Common ground. Connected internally to X1, pin 2. Common pin for digital outputs 1,2,3 and 4
2	I/O Power		I/O power supply. The voltage is determined by the supply voltage input in connector X1, pin 1. Common pin for digital inputs 1, 2, 3 and 4.
3	A_Encoder_4+		Encoder input 4. Positive pin.
4	A_Encoder_3+		Encoder input 3. Positive pin.
5	A_Encoder_2+		Encoder input 2. Positive pin.
6	Digital Output 3	DOutPort.bit(2)	Non-isolated digital output 3. NPN only.
7	Digital Output 1	DOutPort.bit(0)	Non-isolated digital output 1. NPN only.
8	Digital Input 3	DInPort.bit(2)	Non-isolated digital input 3. NPN only.
9	Digital Input 1	DInPort.bit(0)	Non-isolated digital input 1. NPN only.
10	Analog Input		Analog input
11	NA		Not connected
12	Analog Output		Analog output
13	PE		Protective earth
14	GND		Common ground. Connected internally to I/O Power Return.
15	A_Encoder_4-		Encoder input 4. Negative pin.
16	A_Encoder_3-		Encoder input 3. Negative pin.

Pin #	Name	Software Representation	Description
17	A_Encoder_2-		Encoder input 2. Negative pin.
18	Digital Output 4	DOutPort.bit(3)	Non-isolated digital output 4. NPN only.
19	Digital Output 2	DOutPort.bit(1)	Non-isolated digital output 2. NPN only.
20	Digital Input 4	DInPort.bit(3)	Non-isolated digital input 4. NPN only.
21	Digital Input 2	DInPort.bit(1)	Non-isolated digital input 2. NPN only.
22	GND		Common ground
23	NA		Not connected
24	GND		Common ground

Mating connector options	Samtec Inc. IPD1-12-D-K and CC79R-2630-01-L
Wiring	26 AWG, insulation rated for 100V

3.6.3 Interface X4: I/O (Inputs for Limit Switches)



Note – This port is used for the connection of the limit switches

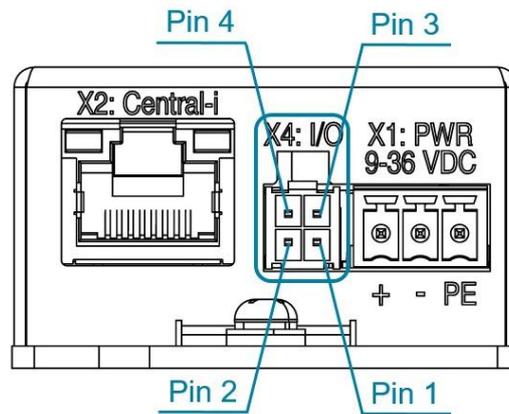


Figure 26. Drive I/O Connector

Connector X4: I/O

Pin #	Name	Software Representation	Description
1	I/O Power Return		Common ground. Connected internally to X1, pin 2.
2	I/O Power		Output power supply. The voltage is determined by the supply voltage input in connector X1, pin1. Common for input 5 and 6.
3	Digital Input 6	DInPort.bit(5)	Non-isolated digital input 6. NPN only.
4	Digital Input 5	DInPort.bit(4)	Non-isolated digital input 5. NPN only.

Mating connector options	Samtec Inc. IPD1-02-D-K and CC79R-2630-01-L
Wiring	26 AWG, insulation rated for 100V

I/O Connection Diagram Example

Non-Isolated Digital Inputs 1 to 6



Note – For AGL102, while there is an opto-coupler (isolation) in the input circuit, we refer to these inputs as non-isolated as they use Main Power to power the inputs (and not an external, separate power supply for the input circuits).

- Inputs can be connected as NPN only (I/O Power as a common).
- Main power supply is used for the I/O power supply.

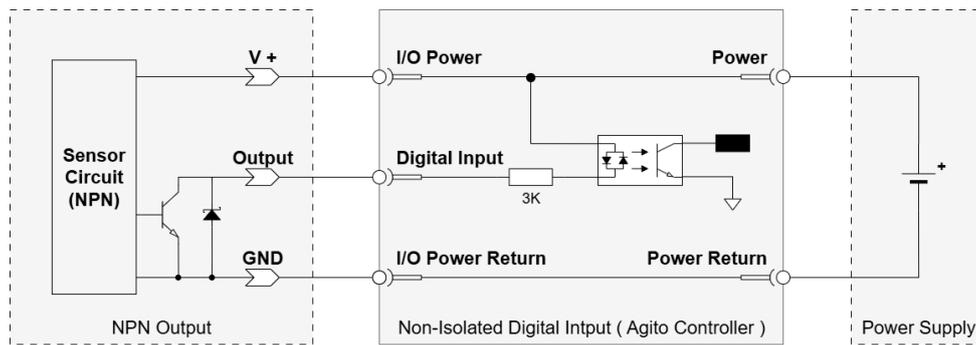


Figure 27. Non-Isolated Digital Input with NPN Sensor

Non-Isolated Digital Outputs 1 to 4

- The digital output is sink only.
- The digital output current is limited to 50 mA.
- The outputs are designed for resistive loads. For inductive loads, an external flyback diode is required.

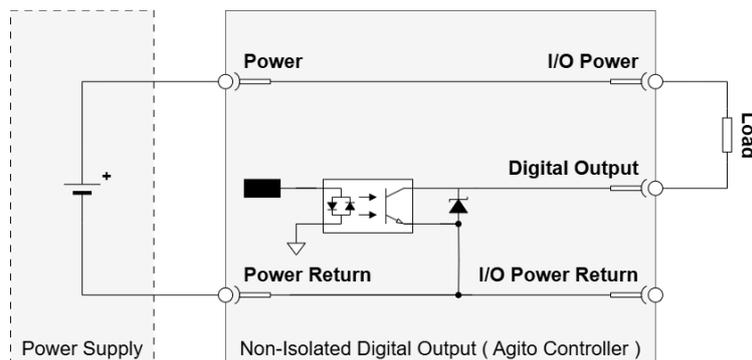


Figure 28. Non-isolated Digital Output (Sink Mode only)

Analog Input

- The electrical interfaces of all analog inputs are identical.
- The analog input range is -12V to +12V, and resolution is 12 bits.
- The analog input is designed for standard differential analog input, with a simple input circuit, having an input resistance of ~60 kΩ.
- Input circuit bandwidth: 1 kHz, -40 dB/decade
- The controller software provides the following parameters to control the analog input reading:
 - Filter
 - Offset
 - Deadband
 - Gain

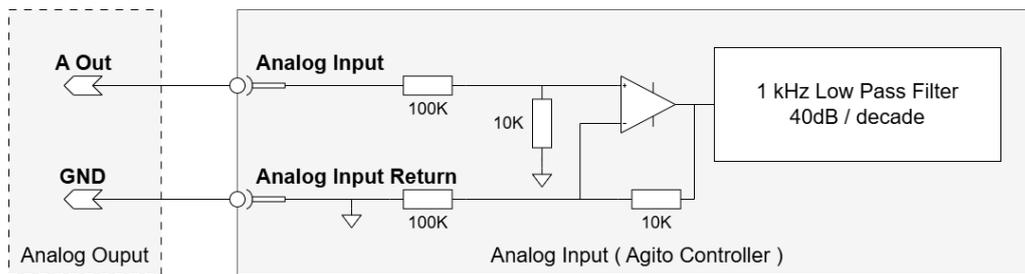


Figure 29. Analog Input

Analog Output

- The electrical interfaces of all analog outputs are identical.
- The analog output range is from -12V to +12V, with resolution of 16 bits.
- Output resistance is 10 Ω
- Output current is up to ± 2 mA, without internal current limitation.
- Analog outputs are controlled by the controller software in a few operational modes:
 - Analog output controlled by the user program for a general purpose.
 - Analog output used to provide analog torque or velocity command to external amplifier.

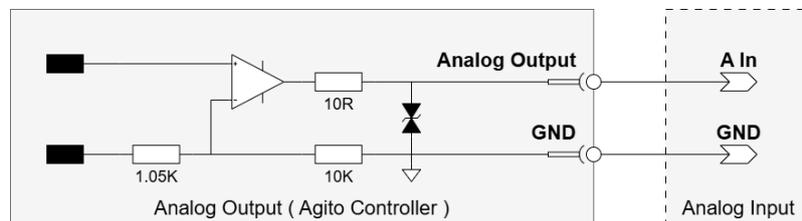


Figure 30. Analog Output

3.6.4 Interface X2: Central-i

Connector X2 is used for communication with the Central-i master controller, such as the AGM800, and other remote adapters and devices.

X2 is used for communication between the adapter board and other Central-i serial devices.

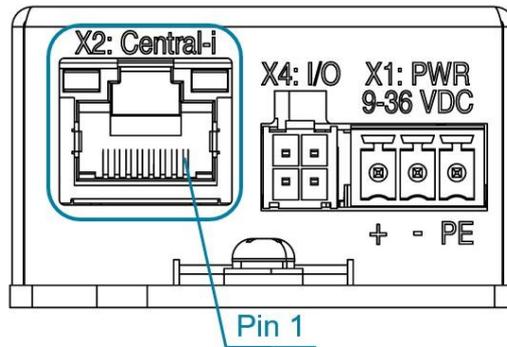


Figure 31. Communication Connector (Central-i)

Connector X2: Central-i (RJ45)

Pin #	Name	Description
1	DATA_0+	Data channel 0+
2	DATA_0-	Data channel 0-
3	DATA_1+	Data channel 1+
4	DATA_2-	Data channel 2-
5	DATA_2+	Data channel 2+
6	DATA_1-	Data channel 1-
7	V_REMOTE	Power supply to remote unit's communication module
8	GND	Ground

Connector	RJ45 LAN 10/100Base-T connector
Mating connector	Any CAT5e compatible shielded connector
Cable	CAT5e or higher, standard Ethernet straight cable

