

Ethernet / CAN Converter, Enhanced

P/N: AX140900A

Features

- 12 or 24 VDC input power (nominal)
- 1x Ethernet port (10 or 100 Mbps) for multiple Ethernet devices on a machine
- 1x CAN port (SAE J1939 or CANopen®)
- Supports CAN filtering
- Configurable via password protected web server
- RESTful API (password protected) for M2M (machine-to-machine) communication
- Ability to save device configurations as files
- Power, Link/Activity, and Speed LED indicators
- 1x power output (up to Vps) to power an external device over the CAN cable
- Input power surge, reverse polarity, overvoltage, and undervoltage protection
- Power output overcurrent protection
- Compact, IP66 unit
- 2x M12 connectors
- Suitable for high vibration and shock environments
- CE / UKCA marking
- Available as a kit with cables, P/N: AX140900AK



Applications

- Off-highway equipment, mining equipment
- Industrial control panels

Ordering Part Numbers

Ethernet/CAN Converter with Enhanced Features – P/N: **AX140900A**

You can also order the items as a service tool kit. The **AX140900AK** comprises AX140900A converter, AX070531 cable, and AX070532 cable.

Economical model – P/N: **AX140900**

Accessories:

- **AX070531** – Ethernet and Power Cable - 1.7 m (5.5 ft.), 8-pin M12 A-coded, Unterminated Leads, Ethernet Jack
- **AX070532** – CAN Cable - 1.5 m (5 ft.), 5-pin M12 A-coded, Unterminated Leads
- **AX140910** – Software Support Package (Download for free from axiomatic.com)
- AxioDisc.exe application (Download for free from axiomatic.com)
- Ethernet to CAN Converter Discovery Protocol Document
- Ethernet to CAN Converter Communication Protocol Document
- Ethernet to CAN Converter Health Status Document

Description

The Ethernet/CAN Converter operates as a simple data converter capable of handling communication between Ethernet IEEE 802.3, IP ICMP, ARP, UDP, TCP, HTTP, or proprietary protocol devices and a machine's CAN bus (SAE J1939 or CANopen®). Communication can occur in either direction, Ethernet to CAN or CAN to Ethernet.

It can be utilized for CAN bus monitoring, two-way remote CAN bus monitoring, and synchronization as well as CAN bus extension over Ethernet applications. CAN frames are converted into a simple data encoding and sent over Ethernet to the Ethernet device. Likewise, data received from the Ethernet device is decoded into CAN frames and sent via CAN bus to the connected CAN device. CAN filtering is supported. The converter can be utilized to optimize space and eliminate the need for more complex devices.

The Ethernet port can communicate up to 100 Mbps and has LED indicators showing the status and speed. The CAN port has overcurrent protection that triggers at 1 A. It supports CAN baud rates of up to 1 Mbps. All standard and extended CAN frames, including data and remote frames are supported. The power can be delivered to the CAN port over the Ethernet connection. Protection is provided. The converter is designed for the harsh environments of off-highway equipment or industrial equipment.

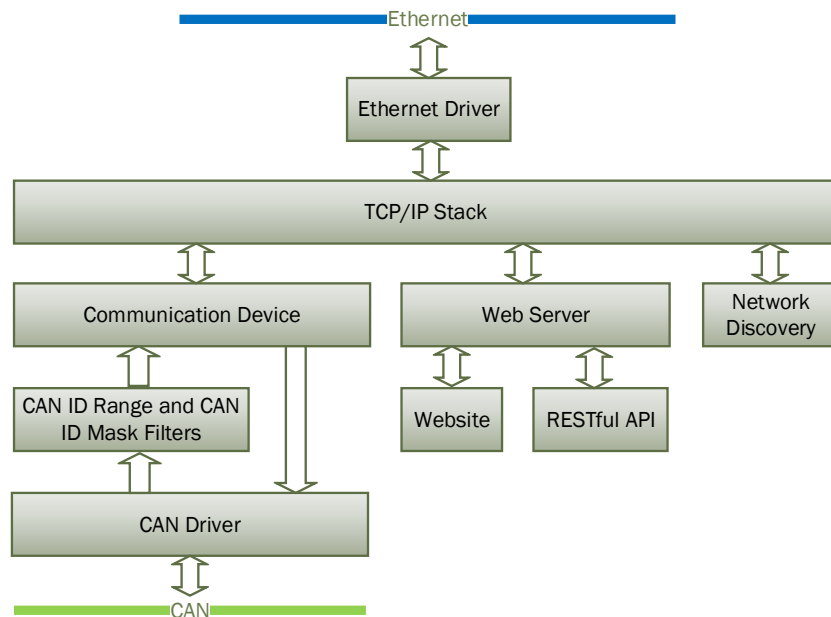


Figure 1.0 – Converter Software Organization

The Ethernet to CAN Converter software organization is shown in Figure 1.0. The input Ethernet messages from the *Ethernet Driver* are processed by the *TCP/IP Stack* and then routed to the *Communication Device* for conversion into CAN frames. The Ethernet messages are also routed to the *Web Server* and the *Network Discovery* modules. The *TCP/IP Stack* maintains necessary software infrastructure to support UDP and TCP IP communication.

The *Communication Device* establishes and maintains connection with other IP devices on the Ethernet network through data sockets. It also utilizes an Axiomatic proprietary communication protocol [1] to communicate CAN frames over IP network. CAN frames extracted from IP messages are sent directly to the CAN bus through the *CAN Driver*. Conversely, the CAN frames received from the CAN bus go through the *CAN ID Range* and *CAN ID Mask* filters before they are converted into IP messages and sent over to connected IP nodes by the *Communication Device*.

The *Web Server* supports HTTP requests to the device internal *Website* and the *RESTful API*.

The *Network Discovery* module supports an Axiomatic proprietary network discovery protocol [2] to locate the converter IP address on the LAN.

There are two major approaches in using the Ethernet to CAN converter. One is to use the converter on its own as a CAN extender or a baud rate converter. For example, a pair of coupled converters can synchronize two CAN networks. This example can be extended to several CAN networks running at different baud rate in various remote locations, connected using the Ethernet to CAN converters.

The second approach is to use the converter together with other IP devices that can directly communicate with the converter over the IP network. This approach requires writing a custom software for interfacing with the converter. Since the converter uses a proprietary communication protocol, Axiomatic provides the CAN-ENET Software Support Package (SSP), P/N AX140910, for interfacing with the converter.

Functional Block Diagram

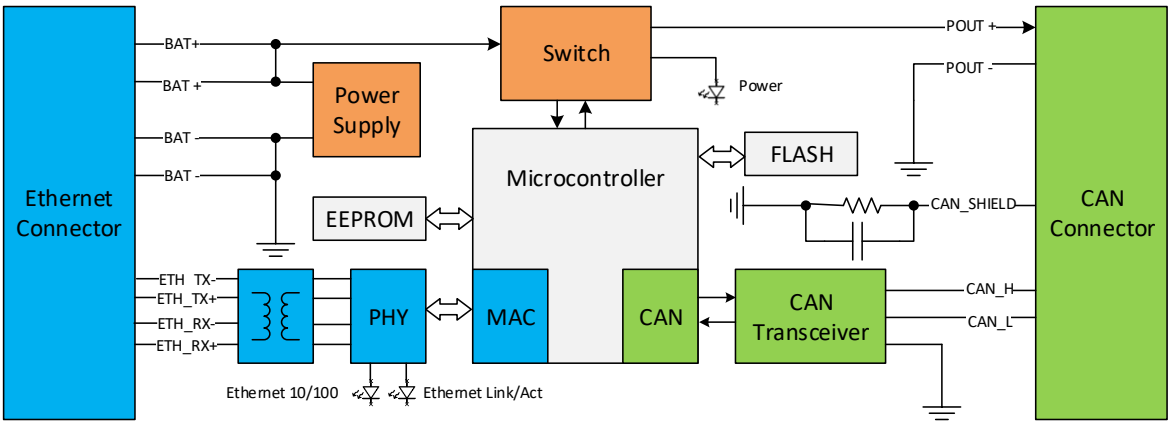


Figure 2.0 – Block Diagram

Technical Specifications

Specifications are indicative and subject to change. Actual performance will vary depending on the application and operating conditions. Users should satisfy themselves that the product is suitable for use in the intended application. All our products carry a limited warranty against defects in material and workmanship. Please refer to our Warranty, Application Limitations & Return Materials Process as described on <https://www.axiomatic.com/service/>.

Power Input

Power Input	12 or 24 VDC nominal (9 to 36 VDC range) The power supply uses external battery power. It is not compatible with the PoE (Power over Ethernet) standard.
Current Consumption	2 W max. @ 12 VDC
Protections	Transient protection is provided. (12 V load dump) Reverse polarity protection is provided. Undervoltage shutdown (< 6 V) Overvoltage shutdown (> 37 V)

Power Output

Power Output	9 to 36 VDC (pass-through power from the power input)
Pass-Through Current	0.7 A max.
Voltage Drop	1 V max.
Protections	Overcurrent protection (>1 A) Protected against short to Battery and short to Ground

CAN Port

Port Type	1x port Up to 1 Mbit/s (ISO 11898-2 compatible) Twisted pair Shield connection is provided.
Protocol	CAN Bosch 2.0A and 2.0B protocol Data frames and remote frames with standard and extended IDs are supported. CAN ID range and mask filtering is provided.
Baud Rate	User programmable (1000, 666.6, 500, 250, 125, 100, 83.3(3), 50, 20, or 10 kbit/s)
Network Termination	It is necessary to terminate the network with external termination resistors. The resistors are 120 Ω , 0.25 W minimum, metal film or similar type. They should be placed between CAN High and CAN Low terminals at both ends of the network.

Ethernet Port

Port Type	1x port 10BASE-T, 100BASE-TX (IEEE 802.3i/u, IEEE 802.3 compliant auto-negotiation)
Transmission Speed	10 or 100 Mbps (auto-configuration and full-duplex supported)
MDIX	Auto-MDIX (auto-crossover to eliminate cabling mismatch)
Protocols	Ethernet IEEE 802.3, IP, ICMP, ARP, UDP, TCP, HTTP, and proprietary protocol ¹ Notes: - CAN messages are transmitted using a proprietary application protocol running on top of the user selectable UDP or TCP transport protocol [1]. - The internal web server uses HTTP protocol. - The unit supports a proprietary discovery protocol² [2].
Server Mode	Up to 10 bi-directional simultaneous connections (Up to 9 connections, if Client mode is enabled)
Client Mode	1x remote bi-directional connection Auto-connect to a remote server, if connection is dropped or temporarily unavailable. Client mode can be disabled.
Web Server	Provided (Password protected) Hosts a website and a RESTful API for the converter configuration, diagnostics, and flashing application firmware.
RESTful API	Provided (Requires "Basic" HTTP authentication as per RFC 7617)
Internal Diagnostics	Internal <i>Health Status</i> of the converter is transmitted in heartbeat messages [1] [3]. Also available from the web server.

Reference documents describing proprietary protocols and *Health Status* field format are presented below. The documents are available upon request.

- [1] O. Bogush, "Ethernet to CAN Converter Communication Protocol, Document Version 6," *Axiomatic Technologies Corporation*, April 22, 2025.
- [2] O. Bogush, "Ethernet to CAN Converter Discovery Protocol, Document Version 1A," *Axiomatic Technologies Corporation*, April 5, 2021.
- [3] O. Bogush, "Ethernet to CAN Converter Health Status, Document Version 4," *Axiomatic Technologies Corporation*, April 22, 2025.

Status LEDs

Power LED (shared between Input & Output)	1x bicolour green/red LED		
	OFF	No power	
	GREEN	Power ON	
	RED	Error on the power output	
Ethernet LEDs	2x green LEDs		
	Link/Activity	OFF	No link
		GREEN	Link up but no activity
		BLINKING	Link up and active
	Speed (10/100)	OFF	No link (if Link/Activity LED is OFF too) Link up at 10 Mbps (if Link/Activity LED is not OFF)
		GREEN	Link up at 100 Mbps

¹ Supported by *CAN-ENET Software Support Package (SSP)* – P/N: AX140910 v3.0.0+

² Axiomatic *Windows* console application *AxioDisc.exe* can be used for converter discovery.

General Specifications

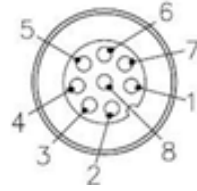
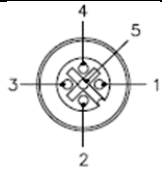
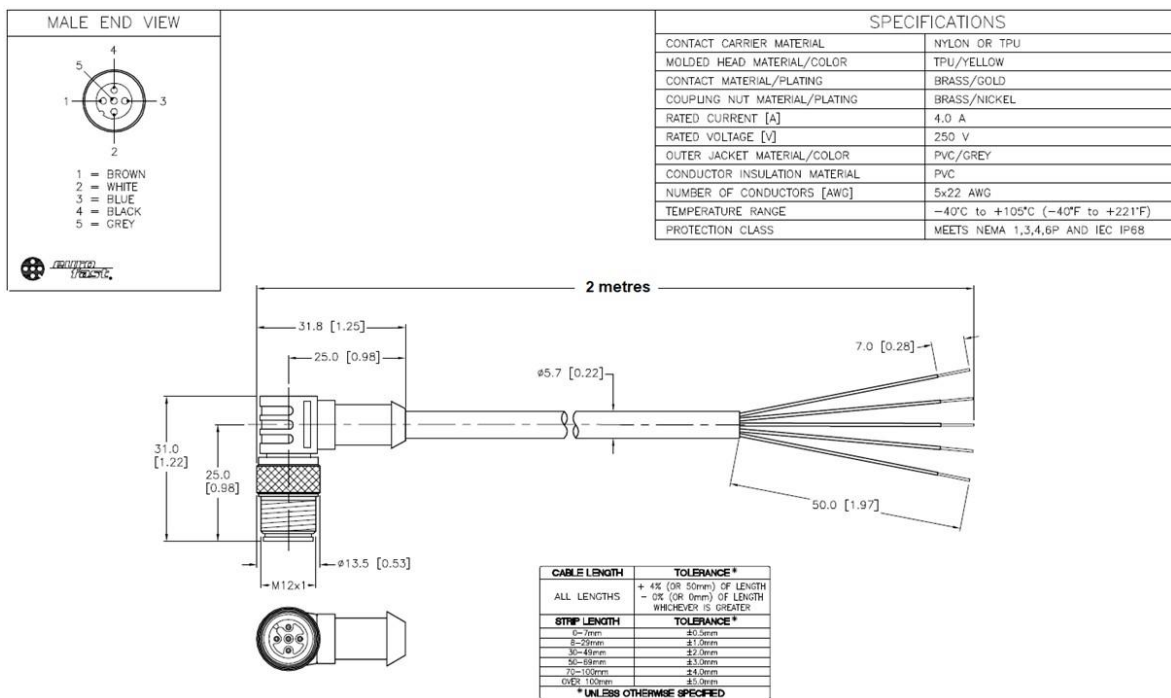
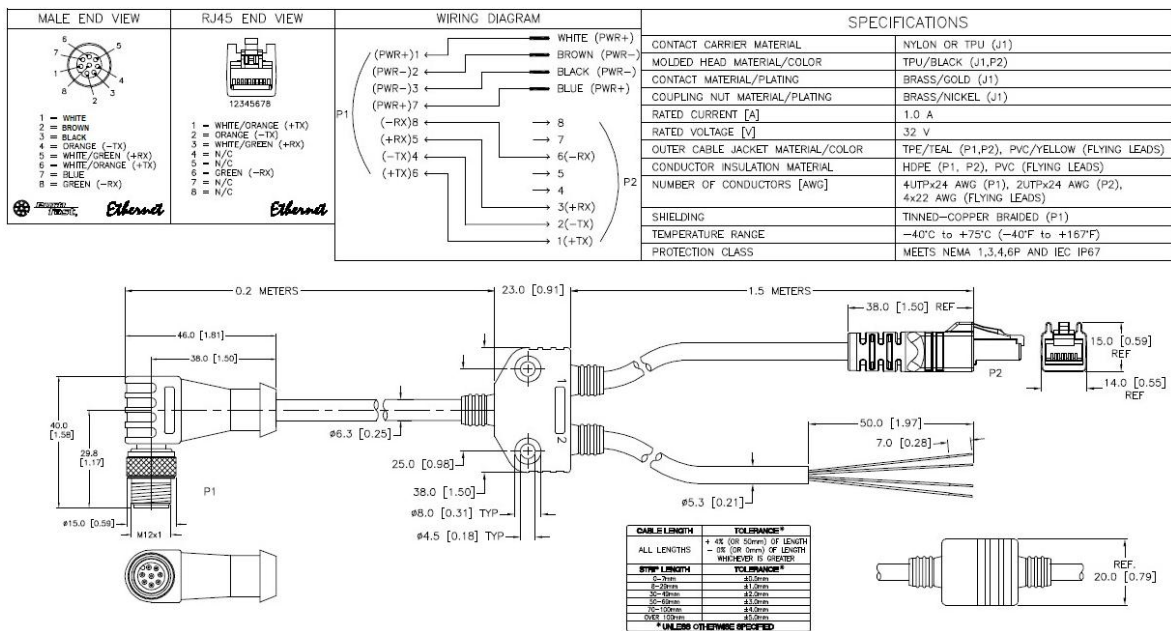
User Interface	Web server based interface Refer to User Manual for details.																														
Compliance	RoHS CE / UKCA, RCM marking																														
EMC Compliance	DIN EN 13309:2010 as well as ISO13766-1:2018 EN61000-6-4: 2005 Emission Standard for Industrial Environments EN61000-6-2: 2007 Generic Standards – Immunity for Industrial Environments EN61000-4-2: ESD, Level 4 (15 kV air/8 kV contact) at Criteria B EN61000-4-4: EFT/burst Immunity, Test Level 1 (500V power/250V signal lines) at Performance Criteria B EN61000-4-5: Surge Immunity, Test Level 1 (500V) at Performance Criteria B.																														
Protection	IP66 (IEC 60529)																														
Operating Temperature	-40 to 70 °C (-40 to 158 °F)																														
Storage Temperature	-40 to 85 °C (-40 to 185 °F)																														
Vibration	Sinusoidal Component: 8.9 G Sine sweep, 2.5 hr/axis in all 3 axes Random Vibration: 6.86 Grms peak, Z-axis tracked vehicle profile (5 hr/axis in all 3 axes)																														
Shock	50 g, 5 impacts per test, 6-20 ms impact duration																														
Weight	0.15 lb. (0.068 kg) AX070531: 0.39 lb. (0.178 kg) AX070533: 0.69 lb. (0.313 kg)																														
Enclosure	Nylon 6/6, 30% glass fill Ultrasonically welded UL 94V-0 4.19 in. x 1.81 in. x 1.31 in. (106.4 mm x 46.0 mm x 33.3 mm) L x W x H includes integral connectors See dimensional drawing.																														
Electrical Connections	Ethernet Port: Ethernet and Battery 1x 8-pin M12 connector (A-coded), Phoenix Contact P/N: 1441817 <table border="1"> <thead> <tr> <th>Pin</th><th>Description</th></tr> </thead> <tbody> <tr><td>1</td><td>Battery +</td></tr> <tr><td>2</td><td>Battery -</td></tr> <tr><td>3</td><td>Battery -</td></tr> <tr><td>4</td><td>Ethernet TX -</td></tr> <tr><td>5</td><td>Ethernet RX +</td></tr> <tr><td>6</td><td>Ethernet TX +</td></tr> <tr><td>7</td><td>Battery +</td></tr> <tr><td>8</td><td>Ethernet RX -</td></tr> </tbody> </table>  CAN Port: CAN and Power Output 1x 5-pin M12 connector (A-coded), Phoenix Contact P/N: 1441778 <table border="1"> <thead> <tr> <th>Pin</th><th>Description</th></tr> </thead> <tbody> <tr><td>1</td><td>CAN Shield</td></tr> <tr><td>2</td><td>Power Output +</td></tr> <tr><td>3</td><td>Power Output -</td></tr> <tr><td>4</td><td>CAN High</td></tr> <tr><td>5</td><td>CAN Low</td></tr> </tbody> </table> 	Pin	Description	1	Battery +	2	Battery -	3	Battery -	4	Ethernet TX -	5	Ethernet RX +	6	Ethernet TX +	7	Battery +	8	Ethernet RX -	Pin	Description	1	CAN Shield	2	Power Output +	3	Power Output -	4	CAN High	5	CAN Low
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Mating Connectors	Mating connectors should meet the standard IEC 61076-2-101:2012 for M12 Connectors. They should be A-coded.																														
Mating Cables	The following mating cables are available from Axiomatic. AX070531 – Ethernet and Power Cable - 1.7 m (5.5 ft.), 8-pin M12 A-coded, Underterminated Leads, Ethernet Jack, Temperature rating -40 to 75 °C (-40 to 167 °F) AX070532 – CAN Cable - 1.5 m (5 ft.), 5-pin M12 A-coded, Underterminated Leads, Temperature rating -40 to 105 °C (-40 to 221 °F)																														

Figure 3.0 – AX140900A Dimensional Drawing (TBD)



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Form: TDAX140900A-04/20/2026