Discrete I/O
12 Discrete Inputs
8 Relay Outputs
CANopen®
P/N: AXDIO128CO

Description: The Discrete I/O Module reads 12 discrete inputs and sets 8 Form C relay outputs while providing a simple interface between a CANopen® network and other electronic devices on a machine. The unit is a battery powered device with the ability to withstand engine cranking, reverse polarity and transient power conditions. In engine applications, information is provided to the engine control system using CAN messages. Outputs can be controlled by any input or CAN messages. A bi-color LED indicates operational status. The device complies to CAN in Automation Device Profile DS-401. Ruggedly packaged with watertight Deutsch IPD connectors, the I/O module is designed to meet the environmental and vibration requirements of industrial generator set applications. The control is EMC compliant. The module is UL recognized for UL508 (FTPM2) – Controls for Stationary Engine Driven Assemblies.

The AXDIO128CO has a number of setpoints that allow the user to configure it for their application. User programmable functionality uses SDO object access, per CiA DS-301 with commercially available CANopen® tools. Alternatively, a RS-232 interface allows for quick user configuration adjustments using Windows HyperTerminal or other similar terminal software. Settings are saved to non-volatile memory upon command. The setpoints can also be saved to a file and flashed into other AXDIO128CO modules over the CAN bus. A SAE J1939 model is available.

Applications:

- Power Generator Sets
- Diesel Engine Control Systems

Ordering Part Numbers:

CANopen® Controller: **AXDIO128CO**	
EDS File, User Manual: **CD-AXDIO128CO**	

Mating Plug Kit P/N: **AX070200**
This kit includes the following items. These items are also available from a local Deutsch IPD distributor.
NB. The sealing plugs are only needed in cases where less than the 40 pins are required.

Deutsch IPD P/N:	Description:
0462-201-16141	48 16AWG SOCKETS SOLID 16-20AWG WIRE 6mm
114017	24 SEALING PLUGS SIZE 12-16 CAVITIES 12-18 AWG
DRC16-40S	40-PIN PLUG, No Key
DT06-08SA	DT SERIES PLUG 8 CONTACT
W8S	WEDGELOCK FOR DT 8 PIN PLUG

A crimping tool from Deutsch IPD is required to connect wiring to the sockets, P/N: HDT 48-00 or equivalent (not supplied).

Technical Specifications:

- Modules are designed for mounting on power generator sets or remotely up to 30 ft.
- Multiple AXDIO128CO modules can be used on a CAN network.

Inputs

Power Supply Input	12V or 24VDC nominal (9…32 VDC power supply range)
Supply Current	At 12V: 90 mA + 50mA per active relay, typical At 24V: 50 mA + 30mA per active relay, typical
Protection	Reverse polarity protection is provided. Power supply input section protects against transient surges and short circuits and is galvanically isolated from the digital inputs and earth ground.

Inputs	Reads twelve (12) discrete inputs (active low with pull-up resistors)
	Input level characteristics:
	    Low-Level input voltage: 0 to 0.8 V
	    High-Level input voltage: 3.75 to +BAT
	    Inputs have internal pull-up resistors.
	    Input resistance: more than 5 kOhms
	    The inputs have internal over and under voltage protection.

Digital GNDs	Four digital GND pins are provided.

Outputs

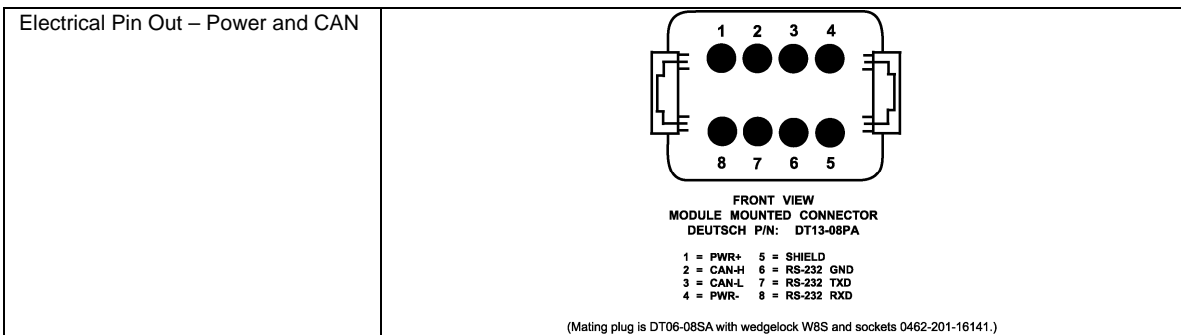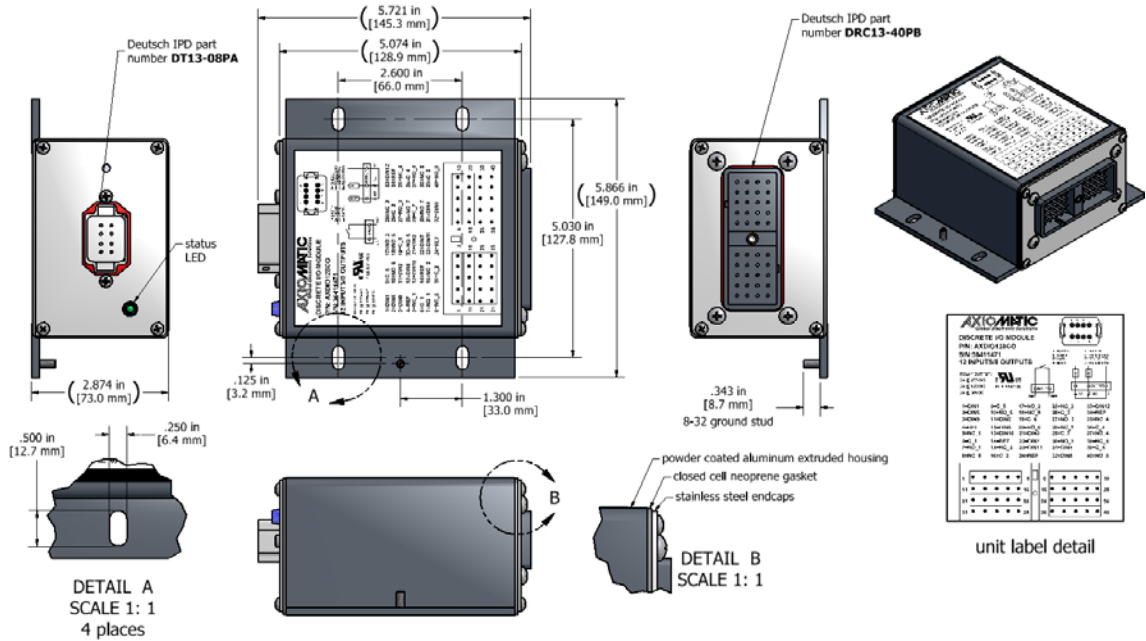|	
Outputs	Sets 8 Form C relay outputs. Resistive load: • 2A NO)/2 A (NC) at 277 VAC • 2 A (NO)/2 A (NC) at 125 VAC • 2 A (NO)/2 A (NC) at 30 VDC Dielectric strength: • 4,000 VAC, 50/60 Hz for 1 min between coil and contacts • 750 VAC, 50/60 Hz for 1 min between contacts of same polarity There is no special overcurrent/overvoltage protection on the relay outputs. The user is advised to provide a fast acting 3A fuse or an adequate external protection if necessary.

Communication

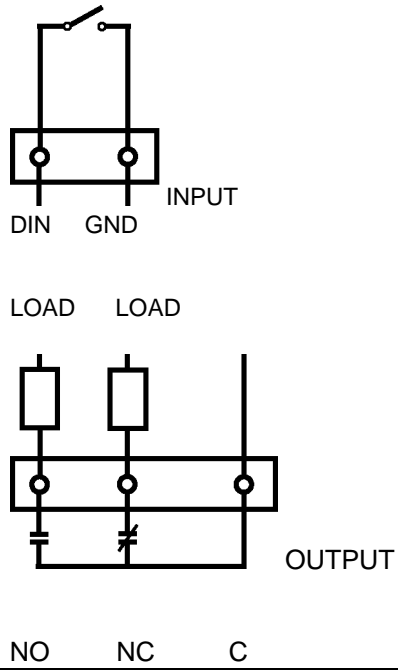|	
CAN	1 CAN 2.0B port, protocol CANopen® Baud Rate: 125 kbps (default) Digital isolation is provided for the CAN line. *A SAE J1939 model, P/N: AXDIO128, is available.* Other features of the CAN communications interface include: • Has two configurable "slew rates" to accommodate different CAN connections • Default Node-ID 127 • The controller transmits DI Read State 8-bit (6000h) and DO Read State 8-bit (2200h) on TPDO1 (by default) • A watchdog timer to require a reboot when the microprocessor locks • The AXDIO128CO is designed to remain powered during engine cranking.
Network Termination	According to the CAN standard, it is necessary to terminate the network with external termination resistors. The resistors are 120 Ohm, 0.25W minimum, metal film or similar type. They should be placed between CAN_H and CAN_L terminals at both ends of the network.
RS-232	1 RS-232 port is available for debugging purposes. ASCII Text Format, 115200 Baud Rate Data – 8 bit, Parity – None, Stop – 1 bit. Flow Control – Xon/Xoff. Short circuit protection to ground.

General Specifications

Microprocessor	ADUC843
Isolation	The power supply is galvanically isolated from digital inputs and earth ground.
Indicator	LED indicator remains RED when a network error occurs. It flashes green when the module is able to send messages over the bus but there is no network activity detected by the module. It stays ON and is GREEN when it is operating normally and is powered.
CANopen® Profile	The CANopen® Discrete I/O Module is compliant with the following CiA profiles. • CiA DS-301 V4.1 – *CANopen® Application Layer and Communication Profile* (CAN in Automation 2005) • CiA DS-305 V2.0 – Layer *Setting Service (LSS) and Protocols* (CAN in Automation 2006) • CiA DS-401 V3.0 – *CANopen® device profile for Generic I/O modules* (CAN in Automation 2008) The documents are available from the CAN in Automation e.V. website http://www.can-cia.org. *Customer specific proprietary extensions can also be included in the CANopen profile on request.*
User Interface	EDS file is provided to interface to industry standard CANopen tools.
Control Logic	The AXDIO128CO is designed to work either as a stand-alone module, or on a CANopen® network. When connected to the network, it automatically recognizes network connection, claims a network address and can be configured to perform the several application tasks. Refer to the user manual for further details on the CAN interface. The Discrete I/O module is a simple interface between a CiA CANopen ® network and discrete electronic devices in a genset or industrial environment. It can translate voltage levels on the inputs to a bit in a TPDO data byte. The outputs can be either controlled by any discrete input, or it can receive and process a bit in an RPDO data byte to control the relays. The outputs can also be individually or globally enabled/disabled by a discrete input while being controlled by an RPDO message. The unit is a versatile controller compliant with the CiA standard DS-401. It supports many objects from that device profile as well as some manufacturer objects to provide expanded functionality. All objects are user configurable using standard commercially available tools that can interact with a CANopen ® Object Dictionary via an .EDS file. Depending on how it is set up, the user can easily switch from having the relays respond to CAN commands; using the discrete inputs to drive some or all of the outputs; having them go to an individually preset state in error mode; or to enable/disable them using a discrete input(s).
Compliance	UL508 (April 2010) (FTPM2) – Controls for Stationary Engine Driven Assemblies cUL C22.2 No. 14-10 (2010) EMC compliant RoHS compliant Meets the environmental and vibration requirements of generator set applications
Operating Temperature Range	-40 to 85 ℃ (-40 to 185 ℉)
Storage Temperature Range	-50 to 120 ℃ (-58 to 248 ℉)
Humidity	Protected against 95% humidity non-condensing, 30 ℃ to 60 ℃
Protection	IP65, Pollution Degree 3 rating per UL508
Weight	2.73 lbs. (1.24 kg)
Packaging	Rugged aluminum housing, stainless steel end plates, neoprene gaskets 145.30 x 149.00 x 73.00 mm (5.72 x 5.86 x 2.87") L x W x H Connectors, Deutsch IPD P/N: 1 8-pin DT13-08PA, 1 40-pin DRC13-40PB

Mating Sockets	Use the following Deutsch IPD mating plugs to connect to the integral receptacles. Wiring to these mating plugs must be in accordance with all applicable local codes. Suitable field wiring for the rated voltage and current must be used. The rating of the connecting cables must be at least 70°C. Use field wiring suitable for both minimum and maximum ambient temperature.

Receptacle	Mating Socket (Refer to www.laddinc.com for more information on the wedgelock and contacts for this mating plug.)
Power and CAN bus: DT13-08PA	DT06-08SA with wedgelock W8S
I/O Interface Receptacle: DRC13-40PB	DRC16-40SB DRC18-40SB with sockets 0462-201-16141

Axiomatic offers a mating connector plug kit, P/N **AX070200**, that includes the 8 pin and 40 pin (unkeyed) plugs and sockets.

Electrical Pin Out – Power and CAN	

1   2   3   4

8   7   6   5

FRONT VIEW
MODULE MOUNTED CONNECTOR
DEUTSCH P/N: DT13-08PA

1 = PWR+   5 = SHIELD
2 = CAN-H   6 = RS-232 GND
3 = CAN-L   7 = RS-232 TXD
4 = PWR-   8 = RS-232 RXD

(Mating plug is DT06-08SA with wedgelock W8S and sockets 0462-201-16141.)

Electrical Wiring – I/O

INPUT

DIN   GND

LOAD   LOAD

OUTPUT

NO   NC   C

Electrical Pin Out – 40 Pin Connector	**FRONT VIEW OF** **MODULE MOUNTED CONNECTOR** **DEUTSCH P/N: DRC13-40PB**

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POLARIZING KEY

	INPUTS			GND	OUTPUTS			OUTPUTS				
1	●	●	●	●	●	5	6	●	●	●	●	●	10
11	●	●	●	●	●	15	16	●	●	●	●	●	20
21	●	●	●	●	●	25	26	●	●	●	●	●	30
31	●	●	●	●	●	35	36	●	●	●	●	●	40

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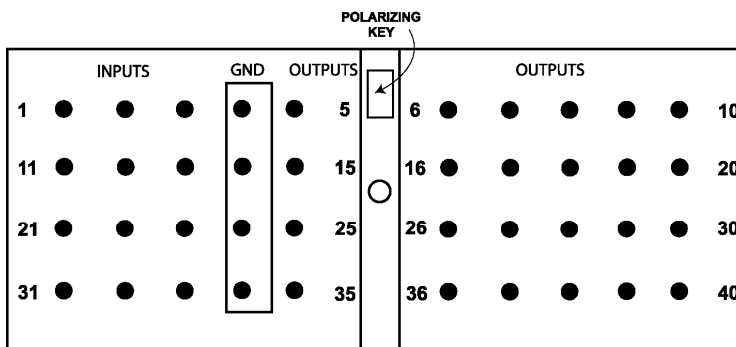
NO - Normally Open
NC - Normally Closed
C - Common

INPUTS	Pin	OUTPUTS	Pin
DIN1	1	NC_1	5
DIN2	11	C_1	6
DIN3	21	NO_1	7
DIN4	31	NC_2	15
DIN5	2	C_2	16
DIN6	12	NO_2	17
DIN7	22	NC_3	25
DIN8	32	C_3	26
DIN9	3	NO_3	27
DIN10	13	NC_4	35
DIN11	23	C_4	36
DIN12	33	NO_4	37
GND	4	NC_5	8
GND	14	C_5	9
GND	24	NO_5	10
GND	34	NC_6	18
		C_6	19
		NO_6	20
		NC_7	28
		C_7	29
		NO_7	30
		NC_8	38
		C_8	39
		NO_8	40

Note: CANopen® is a registered community trade mark of CAN in Automation e.V.

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 Approvals/Limitations and Return Materials Process as described on www.axiomatic.com/service.html.

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