

**Technical Datasheet #AX031801**  
**Discrete I/O**  
**P/N: AX031801**  
**12 inputs, 8 relay outputs, CANopen®**

**Description:** The Discrete I/O Module reads 12 discrete inputs and sets 8 Form C relay outputs while networking with other CAN devices (CANopen®) in a machine control system. The unit is a battery powered device with the ability to withstand engine cranking, reverse polarity and transient power conditions. A bi-color LED indicates operational status.

The AX031801 has a number of setpoints that allow the user to configure it for their application. The setpoints can also be saved to a file and flashed into other AX031801 modules over the CAN bus. Settings are saved to non-volatile memory upon command.

The AX031801 features a rugged enclosure, gasketing and watertight connectors for an IP67 rating.

**Applications:** Power Generator Sets, Diesel Engine Control Systems

- Modules are designed for mounting on power generator sets or remotely up to 30 ft.
- Multiple AX031801 modules can be used on a CAN network.



**Ordering Part Numbers:**

CANopen® Discrete I/O Controller, 250 kbps: **AX031801**

EDS File

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

### Inputs

Power Supply Input	12V or 24VDC nominal (9...32 VDC power supply range)
Supply Current	42mA @ 12Vdc Typical 23 mA @ 24Vdc Typical
Protection	Reverse polarity protection is provided. Power supply input section protects against transient surges and short circuits.
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: <ul style="list-style-type: none"> <li>• 2A NO)/2 A (NC) at 277 VAC</li> <li>• 2 A (NO)/2 A (NC) at 125 VAC</li> <li>• 2 A (NO)/2 A (NC) at 30 VDC</li> </ul> Dielectric strength: <ul style="list-style-type: none"> <li>• 4,000 VAC, 50/60 Hz for 1 min between coil and contacts</li> <li>• 750 VAC, 50/60 Hz for 1 min between contacts of same polarity</li> </ul> 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.
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### Communication

CAN	1 CAN 2.0B port, protocol CANopen® For SAE J1939 models, see TDAX031800. Digital isolation is provided for the CAN line.  Other features of the CAN communications interface include: <ul style="list-style-type: none"> <li>• A watchdog timer to require a reboot when the microprocessor locks.</li> <li>• The AX031801 is designed to remain powered during engine cranking.</li> </ul>
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.

### General Specifications

Microprocessor	STM32F405RG
Indicator	LED indicator blinks Green/Red when a network error occurs, remains Red in case of a temperature fault being detected, and blinks Red if it indicates a power supply fault by default. Furthermore, it blinks Green when the LED indicator is operating normally and is powered. These settings are adjustable and can be configured afterwards through Electronic Assist.
User Interface	EDS File Standard CANopen tools (not supplied)
Operating Temperature Range	-40 to 85 °C (-40 to 185 °F)
Storage Temperature Range	-50 to 120 °C (-58 to 248 °F)
Humidity	Protected against 95% humidity non-condensing, 30 °C to 60 °C
Protection	IP67
Weight	2.73 lbs. (1.24 kg)
Vibration	4.3 G for off-engine mounting

Control Logic	The AX031801 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 following application tasks. For a more detailed description of the configurable sources, refer to the user manual.
Enclosure	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 Refer to Figure 1.0, Dimensional Drawing.

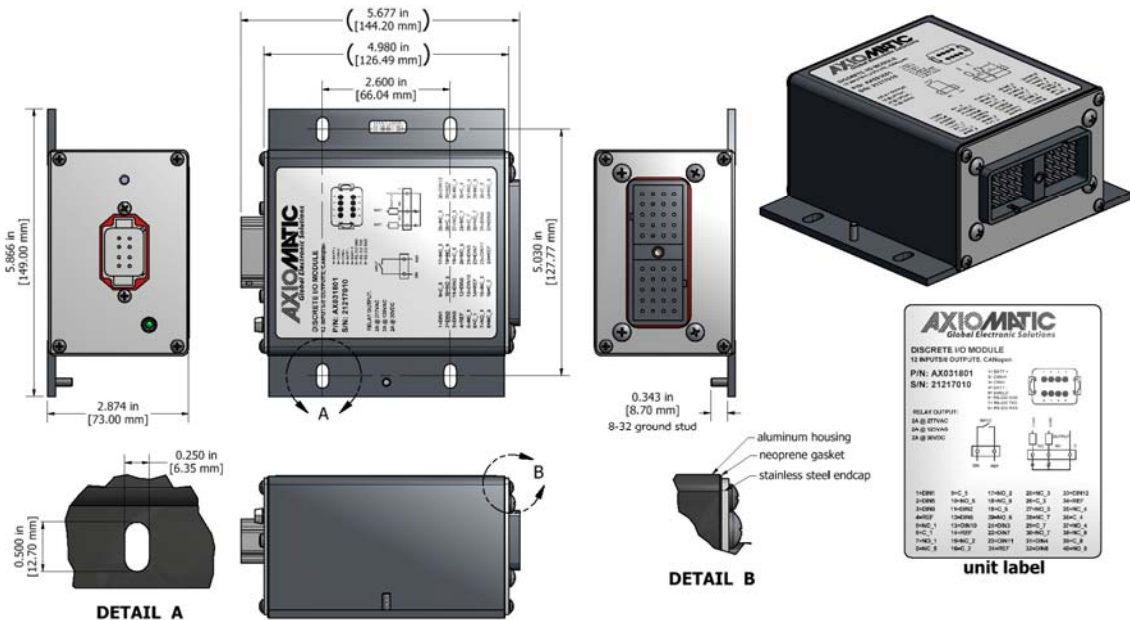
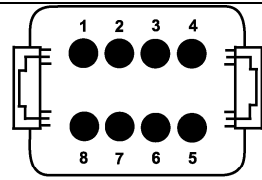


Figure 1.0 - Dimensional Drawing

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.						
	<table border="1"> <tr> <td>Receptacle</td> <td>Mating Socket (Refer to <a href="http://www.laddinc.com">www.laddinc.com</a> for more information on the wedglock and contacts for this mating plug.)</td> </tr> <tr> <td>Power and CAN bus: DT13-08PA</td> <td>DT06-08SA with wedglock W8S</td> </tr> <tr> <td>I/O Interface Receptacle: DRC13-40PB</td> <td>DRC16-40SE-B DRC18-40SB DRC16-40S with sockets 0462-201-16141</td> </tr> </table>	Receptacle	Mating Socket (Refer to <a href="http://www.laddinc.com">www.laddinc.com</a> for more information on the wedglock and contacts for this mating plug.)	Power and CAN bus: DT13-08PA	DT06-08SA with wedglock W8S	I/O Interface Receptacle: DRC13-40PB	DRC16-40SE-B DRC18-40SB DRC16-40S with sockets 0462-201-16141
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	Axiomatic offers a mating connector plug kit, P/N <b>AX070200</b> , that includes the 8 pin and 40 pin (unkeyed) plugs and sockets.						

Electrical Pin Out – Power and CAN

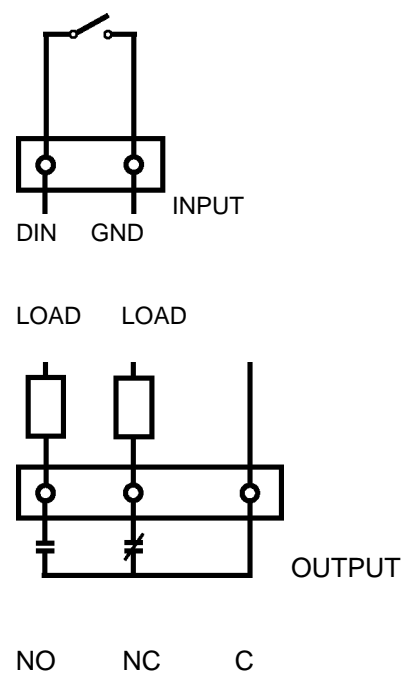


FRONT VIEW  
 MODULE MOUNTED CONNECTOR  
 DEUTSCH P/N: DT13-08PA

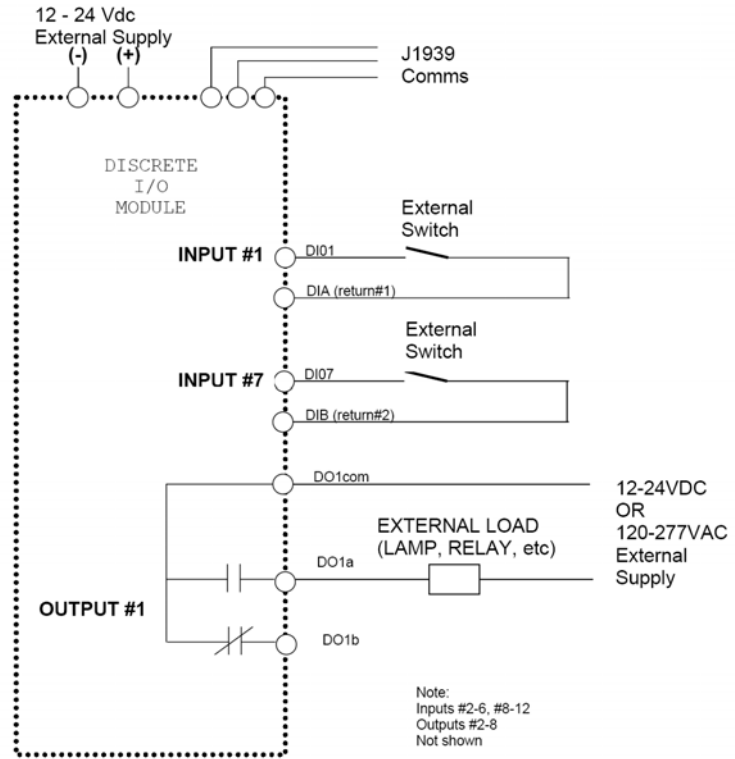
1 = PWR+	5 = SHIELD
2 = CAN-H	6 = RS-232 GND
3 = CAN-L	7 = RS-232 TXD
4 = PWR-	8 = RS-232 RXD

(Mating plug is DT06-08SA with wedgelock W6S and sockets 0462-201-16141.)

Electrical Wiring – I/O

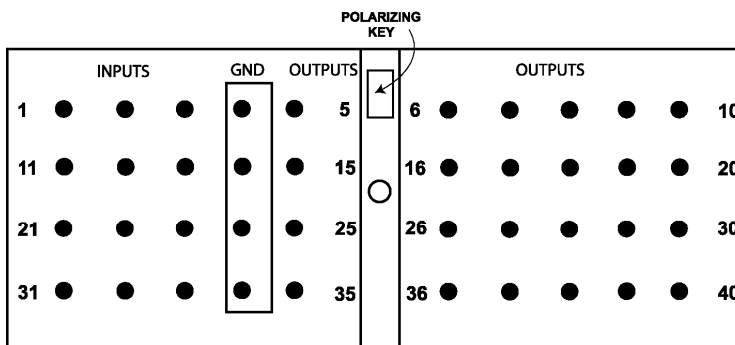


DIO Wiring - Typical



Electrical Pin Out – 40 Pin Connector

**FRONT VIEW OF  
MODULE MOUNTED CONNECTOR  
DEUTSCH P/N: DRC13-40PB**



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

**Mating Connector Part Number:** Deutsch IPD p/n DRC16-40SE-B or DRC18-40SB or DRC16-40S with sockets 0462-201-16141

Notes:

CANopen® is a registered community trademark 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](http://www.axiomatic.com/service.html).*

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