PROCON CDL
CAT Data Link to Modbus Gateway

User Manual

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1. Introduction

The Procon CDL (PC-CDL) reads data directly from a CAT Data Link ECU and transmission and makes the data available over Modbus RTU for use by a PLC/HMI. The PC-CDL is a simple and easy-to-use solution solution for implementing customized displays by making use of electronic engine data.

2. Installation

Physical mounting is accomplished using the 4 mounting holes found on the upper and lower flanges of the PC-CDL.

Electrical installation is accomplished by following these steps:

1. If using RS485 Modbus RTU, connect RS485+ to pin 12 and RS485- to pin 11.
2. If using RS232 Modbus RTS, connect the RS232 transmit wire from the PLC to pin 9 (RS232 receive) and the RS232 receive wire from the PLC to pin 8 (RS232 transmit).
3. If applicable, connect the signal GND (pin 10) to the signal ground of the PLC's Modbus port.
4. Connect the CAT Data Link + wire to terminal 5 (CDL+) and the CAT Data Link- wire to terminal 6 (CDL-).
5. Connect GND to terminal 4 (CHAS. GND) and a switched +12/24VDC power source to terminal 7 (+12/24V).

Note: The PC-CDL is not waterproofed. If the unit is mounted vertically, ensure the terminal strip is facing downward to reduce the risk of water leaking into th edevice.
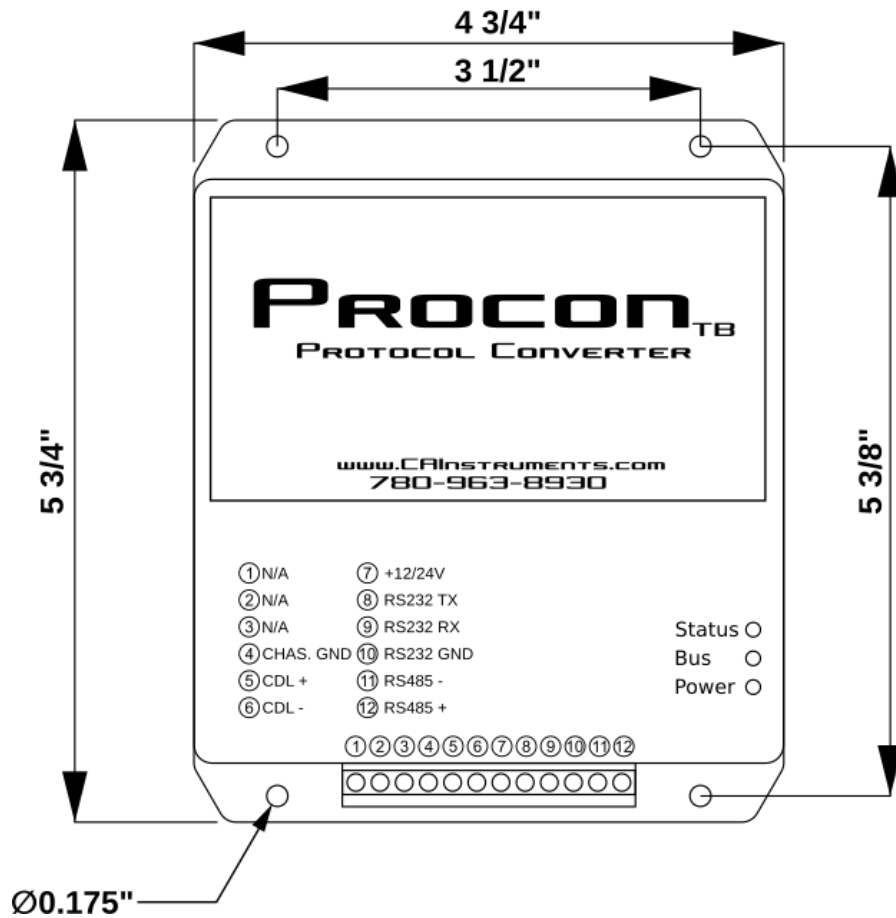
Illustration 1: Mounting dimensions

3. Modbus RTU Settings

The PC-CDL supports the following Modbus RTU comm settings:

Physical Interface	RS232 or RS485
Baud Rate	9600, 19200, 38400
Parity	None
Data Size	8
Stop Bits	1 or 2
Slave Address	1 to 247

- The maximum number of registers that can be requested in a single query is 125.
- Requests must use function code 3 (read holding registers)

Sample Modbus RTU Request:	Sample Slave Response to the Modbus RTU Request:

To fetch Register 20 to 22
121,03,00,19,00,03,CRC_LO,CRC_HI
 	
    121 =   Slave Address
      03 =   Function Code
      00 =   Starting Address High
      19 =   Starting Address Low
      00 =   No. of Registers High
      03 =   No. of Registers Low
	121,03,06,D1,D2,D2,D4,D5,D6,CRC_LO,CRC_HI
	
	    121 = Slave Address
	      03 = Function Code
	      06 = Byte Count
	  D1 - D6 = Data

4. Troubleshooting

4.1 Scanning the CAT Data Link Databus

Start any troubleshooting by performing scans of the CAT Data Link databuse using the PC-CDL's built-in USB and the CAI ToolBox software. This will often reveal useful information for determining problem causes and will speed up the troubleshooting process. For more information, refer to the CAI ToolBox user manual.

4.2 LED Status Indicators

The PC-CDL has 3 diagnostic LEDs on its front face. They are labeled STATUS, BUS and POWER. The POWER LED is lit when the PC-CDL is powered. When it is receiving valid CAT Data Link data, the BUS LED will light green. When valid Modbus requests are received, the STATUS LED will light green. See the below chart for additional error/operating modes:

LIGHTS	STATUS	ACTION
STATUS: *Off* BUS: *Off* POWER: *Off*	No power	-Apply power -Check power wiring and voltage levels
STATUS: *N/A* BUS: *Off* POWER: *Solid red*	Not receiving CAT Data Link data	-Check the connection to the CAT Data Link bus -Ensure other devices on the bus are powered and working
STATUS: *Flashing Yellow* BUS: *N/A* POWER: *Solid red*	Modbus request error	-Check that the settings of the Modbus master match the settings of the PC-CDL (baud rate, stop bits, slave address) -Ensure the address range requested is valid and within the register map
STATUS: *Off* BUS: *N/A* POWER: *Solid red*	No Modbus requests are being received	-Check that the Modbus master is powered on and running -Check the Modbus (R232/RS485) connections are correct
STATUS: *N/A* BUS: *Pulsing green and yellow* POWER: *Solid red*	Device is in CDL analyzer mode	
BUS and STATUS: Flashing green back and forth POWER: *Solid red*	Device is in flash mode	-Cycle power to the PC-CDL -If the PC-CDL powers immediately into flash mode, contact CAI technical support.

4.3 Checking the CAT Data Link Voltages

Make sure the PC-CDL is powered and the vehicle ignition is on. With a voltage meter set to DC, measure the voltages on the CDL+, CDL-, J1939+, and J1939- wires separately. Each wire must be measured relative to ground.

WIRE	EXPECTED VOLTAGE
CDL +	3.5V – 4.5V
CDL -	0.5V – 1.5V

5. Electrical Specifications and Certification

Num	Rating	Min	Typical	Max	Unit
1	Operating Voltage	9.0	12.0	30.0	V
2	Transient Voltage (Max 3 positive transients, 60 seconds intervals)	-	-	80.0	V
3	Power Consumption (+12/24VDC @ 12VDC)	-	55	150	mA
4	Operating Temperature	-40	-	80.0	°C
5	Repetitive Reverse Polarity Voltage (Voltage at CHAS. GND relative to +12/24VDC)	-	-	200	V
6	Reverse Polarity Duration (CHAS. GND @ +100V relative to +12/24VDC)	-	-	∞	s

6. Contact and Technical Support

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