

## OptiDrive/EagleDrive Modbus Module Product Specification

### Features

- Modbus RTU network interface
- Works with any Invertek OptiDrive/Anacon EagleDrive
- Closed loop control optio
  - External hall-effect type sensor
  - PID values programmable via network
- Integrated Power Meter Function
  - Estimates kWh used by this drive
- Diagnostic LED for Network Status
- Powered from drive – no external supply required



### Electrical Specifications

| Parameter                           | Min | Typical | Max  |
|-------------------------------------|-----|---------|------|
| Nominal Supply Voltage (From Drive) |     | 10Vdc   |      |
| Ambient Operating Temperature (°C)  | 0   | 25°C    | 50°C |
| Supply Current (mA)                 |     | < 30mA  |      |
| Sensor Supply Current Output (mA)   |     |         | 15mA |

### Communciations Specification

#### Summary of capabilities

- Modbus RTU protocol
- Selectable Physical medium
  - RS422 (4-wire)
  - RS485 (2-wire)
- Selectable baud rate – 1200 or 9600
- Network connection pass-through
  - Dual RJ-45 sockets (2 or 4 wire)
- Supports 1/8<sup>th</sup> unit load, for 255 devices per network
- Dip-switch or Plug in Module address selection
- Slew rate limited for improved performance

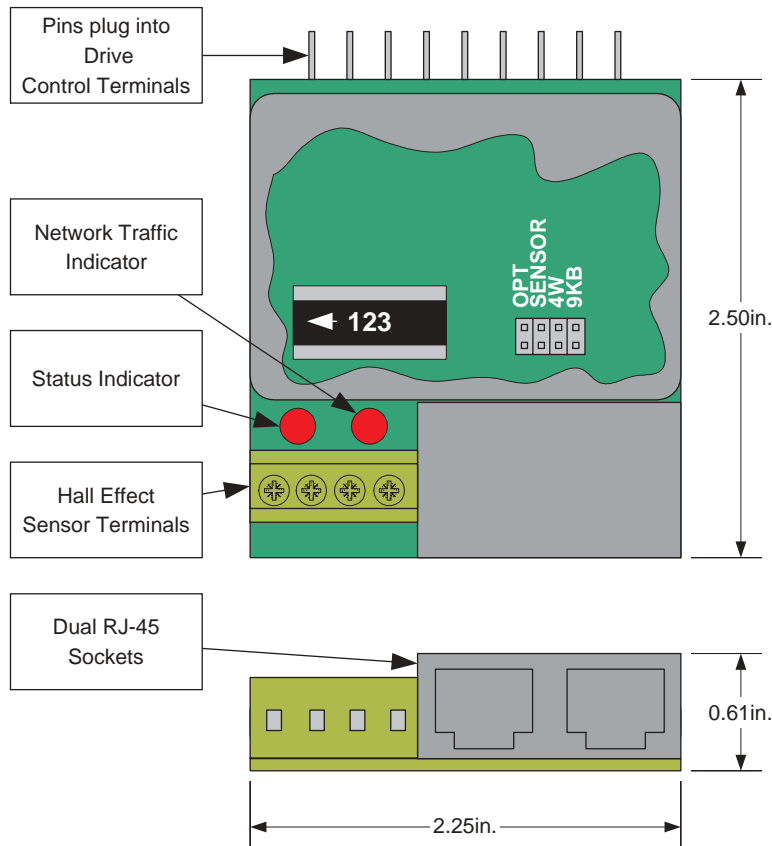
## Eagle Drive Setup

The following parameters must be set correctly to enable Modbus communications:

- Drive P-08 (Motor Rated Current) must agree with Modbus Register 8.
- Drive R-10 (Motor Rated Speed) must agree with Modbus Register 18.
- Drive P-12 (Terminal/Keypad Control) must be set '0' to enable terminal control.
- Drive R-16 (Analog Input Format) must be set to '0-10V' option.
- Drive P-25 (Analog Output Function) must be set to '1' to enable current sense output.

## Mechanical Specification

The Modbus Module is a compact assembly which installs on the front of an Drive by connecting to the Drive's control terminal Block.



**For assistance call 512-233-6219**

## Modbus Implementation

No parity, 8 data bits, 1 stop bit

## Register Map

| Register | Upper Byte                | Lower Byte                | Commands   | Type |
|----------|---------------------------|---------------------------|------------|------|
| 1        |                           | Bit 0: Start/Stop         | 03, 06, 08 | R/W  |
| 2        |                           | Motor Speed (0-100%)      | 03, 06, 08 | R/W  |
| 3        | P Value                   |                           | 03, 06, 08 | R/W  |
| 4        | I Value                   |                           | 03, 06, 08 | R/W  |
| 5        | D Value                   |                           | 03, 06, 08 | R/W  |
| 6        | Current Motor Speed (RPM) |                           | 03         | R    |
| 7        | Current (Amps * 10)       |                           | 03         | R    |
| 8        | Motor FLA (Amps * 10)     |                           | 03, 06, 08 | R/W  |
| 9        | Configuration Jumpers     |                           | 03         | R    |
| 10       |                           | Default Speed (0-100%)    | 06         | R/W  |
| 11       | Version Major             | Version Minor             | 03         | R    |
| 12       | Watt Hours (Wh)           |                           | 03, 06, 08 | R/W  |
| 13       | 1000's Watt Hours (kWh)   |                           | 03, 06, 08 | R/W  |
| 14       |                           | Bit 0: Default Start/Stop | 06         | R/W  |
| 15       |                           | Group 1 Address           | 06         | R/W  |
| 16       |                           | Group 2 Address           | 06         | R/W  |
| 17       |                           | Motor PF (1-100%)         | 03, 06, 08 | R/W  |
| 18       | Motor Rated Speed (RPM)   |                           | 03, 06, 08 | R/W  |
| 19       | Motor Rated Voltage       |                           | 03, 06, 08 | R/W  |

Notes:

1. PID Values control the response characteristic in closed-loop mode. The values are not important in open-loop mode.
2. Motor PF trims the kWh calculation to allow for the motors PF. A value of 100 equals a PF of unity. The default value is 70 (PF = 0.7).
3. When Motor Speed is set to 100%, the drive will run at Motor Rated Speed.
4. The following configuration registers must be set correctly for the module to calculate Power Consumption:
  - a. Register 8 – Motor FLA
  - b. Register 17 – Motor PF (or leave at default)
  - c. Register 19 – Motor Rated Voltage
5. The kWh registers accumulate until zeroed by the Modbus master. If not zeroed they will eventually over-run.

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## Installer

All drive parameters must be programmed using the front panel keypad or with an EagleEye programming device. Drive parameters are not configurable through the Modbus interface.

### Dip Switch Address Selection

|        |        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|--------|
| SW1-8  | SW1-7  | SW1-6  | SW1-5  | SW1-4  | SW1-3  | SW1-2  | SW1-1  |
| Addr 7 | Addr 6 | Addr 5 | Addr 4 | Addr 3 | Addr 2 | Addr 1 | Addr 0 |

Or set addresses with a Plug-in Address module. This method requires no knowledge of binary coding. Each module is a factory programmed and labelled with a fixed address.

### Jumper Options

A 3 way 0.1" header and shunts are used to select various options. The black plastic cover must be removed to access the header. Factory settings are indicated.

|      |        |        |
|------|--------|--------|
| JP1  | JP2    | JP3    |
| Baud | 4-Wire | Sensor |

- Sensor     Fit jumper to enable closed loop control using external sensor. If network control is enabled, the sensor will be used to control set speed in RPM. If local analog control is selected, the sensors only function is to detect locked rotor. If jumper position is open, the sensor input will be ignored.
- 4-Wire     Fit Jumper to select 4-wire (RS422) communications. Default (jumper open) is 2-wire (RS485) communications.
- Baud       Fit jumper to select 9600 baud. Default (open) is 1200 baud.

## Connections

| Ref | Type                                       | Function                | Pin | Detail                  |
|-----|--|-------------------------|-----|-------------------------|
| J1  | 4 position<br>0.2" Screw<br>Terminal Block | Hall Sensor Signals     | 1   | +5V output (15mA)       |
|     |  |                         | 2   | Sensor Signal (Digital) |
|     |  |                         | 3   | 0V - Common             |
|     |  |                         | 4   | Unused                  |
| J2  | RJ45 (x2)                                  | Modbus Network (In/Out) | 1   | Pass through            |
|     |  |                         | 2   | Pass through            |
|     |  |                         | 3   | TX+ (4wire) A (2wire)   |
|     |  |                         | 4   | RX- (4wire)             |
|     |  |                         | 5   | RX+ (4wire)             |
|     |  |                         | 6   | TX- (4wire) B (2wire)   |
|     |  |                         | 7   | Pass through            |
|     |  |                         | 8   | Pass through            |

**For assistance call 512-233-6219**

**Modbus Module with Optional Hall Effect Sensor**



**Drive with Modbus Module Installed**



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