## **Invensys**

### I/A Series<sup>®</sup> Products ADS-SD002



Modbus Slave Driver for Field Device Systems Integrator Modules

The Field Device System Integrator (FDSI) Modbus Slave driver is designed to smoothly integrate single Modbus devices using several different Modbus protocols into an I/A Series® system.

### Features of the FDSI Modbus Slave driver are:

- Integration of single port Modbus devices into an I/A Series system at the fieldbus level
- Exchange of real-time data between Modbus devices and the I/A Series system
- Compliance with the globally accepted and widely used Modbus communication standard
- Simplex (FBM230 or 232) operation of FDSI Fieldbus Modules
- Support for three Modbus protocols: Modbus RTU and Modbus ASCII protocols for serial devices, and Modbus/TCP for Ethernet devices
- Optionally available vendor-specific device variations of Modbus drivers
- FDSI hardware provides a barrier for network security issues
- Availability of standard I/A Series plant management functions and operator displays to Modbus devices
- System Monitor detection of Modbus device connectivity.

### **OVERVIEW**

The Field Device System Integrator (FDSI) Modbus Slave driver enables the integration of vendor independent single-ported Modbus device using one of several Modbus protocols into an I/A Series system.

The Modbus Slave driver allows the I/A Series system to obtain real-time data from attached Modbus devices, manipulate the data using state-of-the-art control algorithms, and make output data available for attached devices to read. The Modbus Slave driver is downloaded to the appropriate FBM, and allows the FBM to translate the data sent to the I/A Series system from the field device or vice-versa.

### **MODBUS SLAVE DRIVER BENEFITS**

Using the Modbus Slave driver with FDSI FBMs provides the benefits described in the following subsections.

### Easy Integration of Modbus Devices

The Modbus Slave driver allows you to include new or existing Modbus-compliant devices in your process, regardless of device manufacturer. Incorporating an open communication standard like Modbus in your system provides a wide range of options when selecting the best field devices for your process.

### I/A Series System Support

The I/A Series system supports three protocols for communication with Modbus devices: Modbus RTU, Modbus ASCII, and Modbus/TCP. For FBMs 230 either Modbus RTU or Modbus ASCII are separately configurable on each port. This support accommodates the transfer of data to and from both single-ported Modbus devices, via a serial or Ethernet connection. I/A Series software also provides standard plant management functions and operator displays for these devices, in addition to startup and communication fault detection and display using System Monitor.

### Flexibility

The Modbus/TCP protocol uses Ethernet and TCP/IP technologies. The simplicity and low cost of Ethernet hardware combined with the high speeds and reliability characterized by Ethernet networks greatly improves plant efficiency and provides the flexibility required to constantly keep up with changing technology. Using an Ethernet network, you can provide remote access to process data over the network.

### HARDWARE

Devices with which the FDSI FBMs can successfully communicate are single port Modbus device that support any of the three Modbus communication protocols. Depending on which Modbus devices and methods of communication you are using you need one of the following FDSI FBMs.

### **FBM230**

The FBM230 is equipped with four ports, each of which can be configured to use either the RS-232, RS-422, or RS-485 physical interface standard. The FBM230 supports single-ported devices utilizing either the Modbus RTU or Modbus ASCII communication protocols, and provides a serial interface between the I/A Series system and the devices. Refer to PSS 21H-2Z30 B4.

### **FBM232**

The FBM232 supports single-ported devices utilizing the Modbus/TCP communication protocol, and provides an Ethernet interface between the I/A Series system and the devices. Refer to PSS 21H-2Z32 B4.

#### **Diagnostics**

The driver can be configured to monitor for loss of communication with the device. Since the FDSI acts as a Modbus Slave, it does not initiate any connections, nor does it send any commands. The FDSI only responds to scan requests and the driver can be configured to indicate failure of communication with the device for a specific amount of time.

Figure 1 illustrates a typical configuration in which a simplex FBM230 is communicating with serial Modbus devices. Figure 2 illustrates a typical configuration in which an FBM is communicating with Ethernet Modbus devices.



#### Figure 1. Simplex Ethernet Configuration

Figure 2. Simplex Serial Configuration

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### SOFTWARE REQUIREMENTS

The Modbus Slave driver is compatible with all releases of I/A V8.0.b or later.

### **MODBUS SLAVE DEVICE DRIVER OPERATION**

Modbus "function codes" specify the types of actions the Modbus Slave devices must perform. The following Modbus function codes are supported by the FDSI Modbus Slave Driver:

\*Data diagnostic code only.

After the appropriate DCI blocks and ECBs are configured, and device communication enabled, the FDSI FBM waits for any modbus commands and send appropriate replies. On receiving a "write" command from a device the driver updates a local modbus database in FDSI and update also appropriate I/A DCI blocks. Data can also be written from be I/A output blocks to be modbus database in the FDSI. The driver reads from this database and provide responses for scan messages from devices.

Function Code	Description
01	Read Coil Status
02	Read Input Status
03	Read Holding Registers
04	Read Input Registers
05	Force Single Coil
06	Preset Single Register
08*	Loopback Diagnostic Test
15	Force Multiple Coils
16	Preset Multiple Registers

### Installation and Download

Installation of the driver does not require shutting down the I/A Series software or rebooting the I/A Series workstation. Furthermore, any updated driver can be downloaded to the FBM or

FBM pair without disrupting the rest of the I/A Series system.

### **CONFIGURATION**

To configure the FDSI Modbus Slave driver, you must use the FDSI Configurator software, which can be installed on a workstation running the Windows XP® operating system. The FDSI Configurator is required for configuring FBM serial and Ethernet port properties and communication settings.

### **PRODUCT SUPPORT**

The Modbus Slave Field Device System Integrator Software Driver includes 90 days of Customer Support Service with the most recent version of I/A Series at the time of shipment. No guarantee is made or implied that Custom Products be compatible with future products or product versions. The product also includes product media and documentation. Engineering assistance can be provided through the normal channels.

### **SPECIFICATIONS**

Protocols

The Modbus Slave driver offers support for the following protocols:

- Modbus RTU protocol (for serial devices)
- Modbus ASCII protocol (for serial devices)
- Modbus/TCP protocol (for Ethernet devices)

For additional information, refer to the following Modbus protocol documentation:

- Modicon Modbus Protocol Reference Guide Modbus RTU and Modbus ASCII protocols) PI-MBUS–300 Rev. J, MODICON, Inc. Industrial Automation Systems, June 1996
- Open Modbus/TCP Specification (Modbus/TCP protocol) Release 1.0, Schneider Electric, March 1999.

### **Register Address Support**

The Modbus Slave driver supports both five digit and six digit register addresses.

### Data Type and Format

The Modbus Slave driver accepts data from devices in big endian or little endian format; data format is configurable.

### Number of Devices

Since the FDSI acts as a Modbus Slave, FBM 232 appears as one device on the ethernet port. The FBM 230 can provide four slave devices on each of the serial ports.

### **Control Block Support**

Distributed Control Interface (DCI) blocks can be mapped to modbus address locations. The Modbus driver offers control block support for the following ECBs and standard DCI block types:

ECB200	Parent ECB, representing the FBM230 or FBM232
ECB2002	Parent ECB, representing the FBM231 or FBM233
ECB201	Child ECB, representing a device

Table 1. ECBs Supported by the Modbus Slave Driver

BIN	Binary Input
BOUT	Binary Output
IIN	Integer Input
IOUT	Integer Output
BINR	Redundant Binary Input block
RIN	Real Input DCIblock
ROUT	Real Output
RINR	Redundant Real Input DCI block
PAKIN	Packed Input block
PAKOUT	Packed Output block
PLSOUT	Pulse Output block

Table 2. DCI Blocks Supported by the Modbus Slave Driver

Contact your sales representative for instructions on how to order the Modbus Slave Driver for Field Device System Integrator Modules today.

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