I/A Series® Hardware
Gateway for Modbus Devices

The Gateway for Modbus Devices allows the integration of data from third party Modbus-compatible devices into I/A Series databases so that the data may be accessed by standard I/A Series control blocks.

Devices with which the Gateway can successfully communicate are those which support Modbus protocol. These devices must support the appropriate Modbus function codes from the list in Table 1, and operate in the Modicon Remote Terminal Unit (RTU) mode.

The Gateway can communicate with any of AEG Schneider Automation's Programmable Controllers that have a Modbus Port, such as the Modicon 484, 584, 884, and 984 products.

The Gateway interfaces to the Modbus via direct connections to a device or via Modbus modems, using an RS-232-C compatible port.

Table 1. Modbus Function Codes

Code	Function
0x01	Read Coil Status
0x02	Read Input Status
0x03	Read Holding Registers
0x04	Read Input Registers
0x05	Force Single Coil
0x06	Preset Single Register
0x0F	Force Multiple Coils
0x10	Preset Multiple Registers

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Product Specifications

The Gateway:

- Accommodates Modbus devices.

- Utilizes standard I/A Series Gateway Processor hardware.

- Supports the following standard I/A Series type blocks:

AIN	EXC	MOVLV
ALMPRI	GDEV	MTR
AOUT	IND	PATALM
CALC	MAIN	REALM
CHARC	MCIN	TIM
COUT	MCOUT	VLV
DEP	MON	

- Uses Message Pass-Through (MPT) to provide an interface for application programs that communicate with the Modbus Plus via standard I/A Series Inter-Process Communication (IPC) connected services. Any message that is understood by the target device can be sent using MPT. This includes reading and writing data, and downloading programs to the device or getting status information from the device. The Peer Processor provides CRC error checking at the Link Layer. All other error checking and handling must be done by the application program.

PACKAGING AND ARCHITECTURE

The Gateway is packaged as a non-expandable single width Z-Module which, when installed in an I/A Series mounting Structure Bus, accesses the Nodebus. Modbus interface module connections are made via cable connectors secured to the top or bottom of the mounting structure that houses the Gateway module. The Gateway hardware architecture consists of the following elements:

- Processor
- Dynamic RAM Memory
- Nodebus Interface
- RS-232-C Interface I/O port

DIAGNOSTICS

The Gateway uses three types of diagnostic tests to detect and/or isolate faults:

- Power-up self-checks
- Run-time and watchdog timer checks
- Off-line diagnostics

Power-up self-checks are initiated when power is applied to the Gateway. These checks perform sequential tests on various Gateway functional elements. Red and green indicators at the front of the Gateway module reflect the successful (or unsuccessful) completion of the various phases of the start-up sequence.

The run-time and watchdog timer checks provide continuous monitoring of Gateway functions during normal system operations. The operator is informed of a malfunction by a printed or displayed system message.

Off-line diagnostics are temporarily loaded into the system for the purpose of performing comprehensive tests and checks on various system station devices. By using the off-line diagnostics, you can isolate or confirm the Gateway.

FUNCTIONAL SPECIFICATIONS

The Gateway communicates with Devices via RS-232-C serial data link communications in the Modbus (RTU) format. The Gateway hardware is identical to that of the I/A Series Gateway Processor.

The Gateway collects the required data from the Devices, performs the necessary conversions, and then stores the converted data in its control database for incorporation into the I/A Series based plant management functions and operator displays. Data may also be written out to the individual devices from the I/A Series network.

A special block, MDSCAN, is used to define the devices I/O point specifications for a Compound. The Gateway supports MDSCAN blocks to perform I/O operations on devices. Only one MDSCAN block may reside in a Compound, and each MDSCAN block may access up to 125 analog or 2000 digital points from any one device. The actual number of points accessed, however, is dependent on the block's scan rate, the configuration of the Compound, and the communication limit of the device.

The System Health Displays for the Gateway appear in a format similar to that of the Control Processor, so that the displays view the Gateway as a Control Processor and the devices as Fieldbus Modules (FBMs). This feature allows the system engineer/operator to use the System Health displays to disconnect a failed device or to restore communications to one that had failed.

FUNCTIONAL SPECIFICATIONS

Processor Type
80C86 Microprocessor with 8087 Co-processor

Memory
32K byte EEPROM; 896K byte parity DRAM

Port
One RS-232-C port

Channel Performance
Asynchronous I/O port at 9600 bits/second

Intra-System Communication
Redundant Nodebus

Power Requirements
INPUT VOLTAGE REDUNDANT
24 V, ac or dc (nominal)
CONSUMPTION
14.45 W (maximum), 13.23 W (average)

Isolation
The RS-232-C channel is isolated from the system power source. All signals for the RS-232-C are isolated for 500 V.

Internal Diagnostics
Self-checking performed at power-up. Runtime checks and watchdog timer function performed during operation.

ENVIRONMENTAL SPECIFICATIONS(a)

Operating
TEMPERATURE
0 to 60°C (32 to 140°F)
RELATIVE HUMIDITY
5 to 95% (Noncondensing)
ALTITUDE
-300 to +3,000 m (-1,000 to +10,000 ft)

Storage
TEMPERATURE
-40 to +70°C (-40 to +158°F)
RELATIVE HUMIDITY
5 to 95% (Noncondensing)
ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

Contamination
Class G3 (Harsh) as defined in ISA Standard S71.04.

(a) The environmental limits of this module may be enhanced by the type of enclosure containing the module. [Refer to the applicable Product Specification Sheet (PSS) which describes the specific type of enclosure that is to be used.]

PHYSICAL SPECIFICATIONS

Mounting
May be placed in any system mounting structure.

Mass (Maximum)
2.2 kg (4.9 lb)

Indicators
Red and green light-emitting diodes (LEDs) indicate diagnostic status.

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