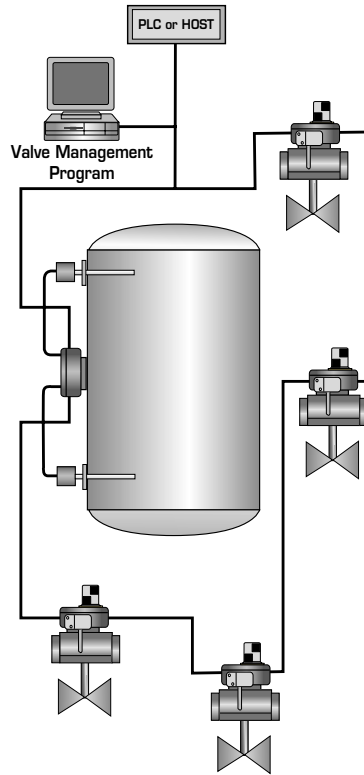




Network Monitors with ModBus® Interface Capability

Intellis™ 7500

ModBus® Network Systems



MODBUS®

The ModBus® protocol has been placed in the public domain, operates over a serial interface and is supported by almost every PLC, DCS, and operator interface (OI) company. A single ModBus Intellis system will accommodate up to 10 independent automated valve networks having a maximum of 100 valves per network. The ModBus protocol provides for 800 programmable discrete I/O points on each network or 8000 points per system. More complex systems may be developed, including redundancy of network communications and control.

Intellis™ ModBus® Overview

Physical Media	Twisted pair for communications, two wires for power
Maximum Distance	3000 ft.
Maximum Network Monitors per System	100/network 10 networks/system
Maximum I/O Points per System	800/network 8000/system
Current Consumption Per Network Monitor	47 mA
Interface Capability	All PLC's & DCS w/Modbus Port.
Communications Method	Master/slave with cyclic polling
Error Checking	CRC check
Network Topology	Closed loop bus
Transmission Speed	9.6 kbps
Redundancy	Yes
Valve Specific Diagnostics	Yes

ModBus®

How The System Operates

Field Network

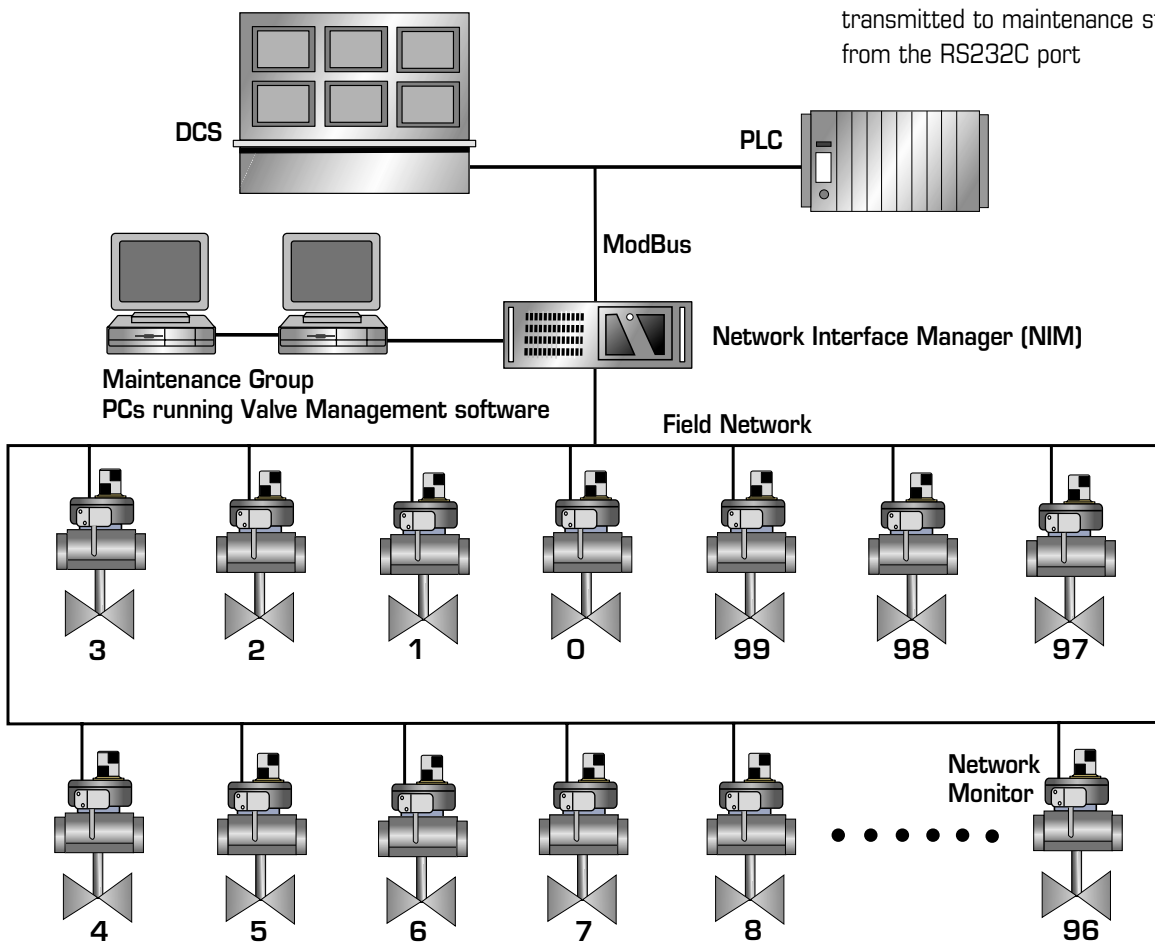
A field network consists of a group of Network Monitors interconnected with a common communications protocol. With the ModBus Intellis™ System, I/O service and diagnostics are communicated over a local area field network.

Network Monitor

Each Network Monitor is assigned a number from 0 to 99 which is called its address number. This number identifies one Network Monitor from all the other Network Monitors in the system.

Network Interface Manager

Data is transferred serially in "select-check" form from the Network Monitor to the Network Interface Manager (NIM). One hundred valves are polled by the NIM in approximately two seconds. Interfacing to a host computer is implemented via a ModBus port in the NIM while on-line diagnostics are transmitted to maintenance stations from the RS232C port



Number of I/O points on a single network.

Because each network may connect up to 100 Network Monitors, the total number of programmable discrete I/O points would be 800 per network. If the two points utilized for temperature and supply pressure monitoring of each Network Monitor were not counted, this would leave a total of 600 I/O points per network.

Number of I/O points on a single system.

Since each Network Interface Manager can accommodate up to 10 independent field networks, a single ModBus system may serially connect up to 1000 Network Monitors or 8000 I/O points.

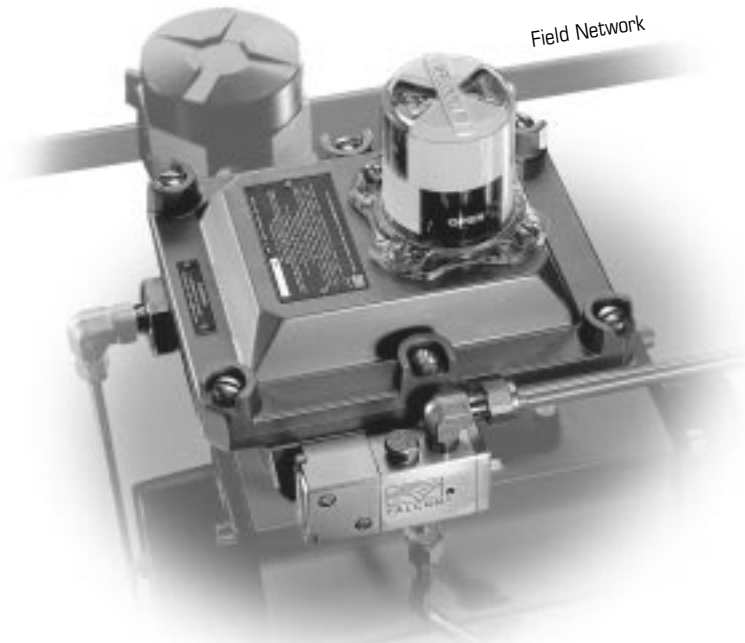
Intellis™ 7500

ModBus® Network Systems

NETWORK MONITORS

A ModBus® Network System is established by integrating an OnBoard I/O module directly within the Westlock Network Monitor. Each I/O module has the capability to accept input/output signals from automated valves, position sensors, solenoid valves, emissions monitors and external devices (level alarms, temperature and pressure sensors, flow switches, etc.)

Automated Valve Network Monitor



The Automated Valve Network Monitor couples directly to the pneumatic actuator. It houses three functional components; position sensors, low-power solenoid valve, and an OnBoard I/O module. The OnBoard I/O module is capable of accepting five input and two output devices.

ONBOARD I/O CARD

- INPUT 1:** Valve Position Sensor (open)
- INPUT 2:** Valve Position Sensor (closed)
- INPUT 3:** Temperature Monitor (internal electronics)
- INPUT 4:** External Device or
Optional Pressure Monitor (supply air)
- INPUT 5:** External Device
- OUTPUT 1:** Solenoid Valve (actuation control)
- OUTPUT 2:** Dual Coil Application or External Device

External Device Network Monitor



An External Device Network Monitor is available for control or monitoring of non-valve related devices (sensors, alarms, actuators, indicating lights, etc.).

Depending upon the process layout, a wide range of options exist. Standard units are supplied with protective diodes and optical isolation features. External Device Network Monitors are available in a **4 input/2 output** configuration. Power requirements for each external device are considered within the design parameters of the overall system.

ModBus®

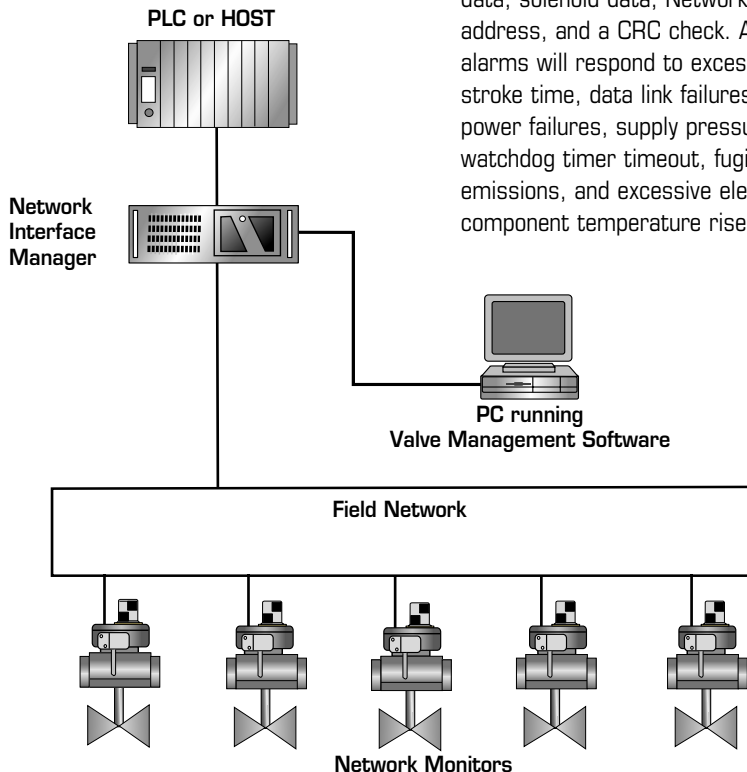


Communications Gateway

The Network Interface Manager (NIM), intended for control room installation, supervises the exchange of signal data on the Field Network and functions as the interface between the Network Monitors and the host. A microprocessor in the NIM regulates data exchange with each Network Monitor.

Interfacing to a PLC or DCS is implemented via a Modbus port in the NIM with diagnostic data being sent to a Maintenance Station via a separate RS232C port.

Each NIM can communicate with 10 independent field communication networks having up to 100 valves per Network or a total of 1000 automated valves. The NIM polls each Network Monitor in rotation confirming position data, solenoid data, Network Monitor address, and a CRC check. Additionally, alarms will respond to excessive valve stroke time, data link failures, local power failures, supply pressure drops, watchdog timer timeout, fugitive emissions, and excessive electronic component temperature rise.



Network Interface Manager Communications

The NIM is an industrial computer used to provide communication between the field communications network and a host controller such as a PLC, PC, or DCS. Communication between the host and the NIM is achieved through a communications link using the Modbus RTU protocol. The communications link is an RS-232C serial link that operates in the RTU mode at 9600 kbps.

The host controller (designated as Master) communicates to the NIM designated as Slave) by a Master-Slave technique, in which only one device (the Master) can initiate transactions referred to as 'queries'; these transaction typically consist of commands for reading or modifying registers, coils or discrete inputs. The NIM (Slave) responds by supplying the requested data to the Master, or by taking the action requested in the query.

Data transfer between the host and the communications network is through shared data tables. The host reads input values from an input data table in the NIM and writes all output values to an output data table in the NIM. The NIM polls the Network Monitor in the network and updates the input data table with the information returned; also, it reads the output data table and sends the open or close commands to the Network Monitors.

WESTLOCK

Westlock Controls Corp.

280 Midland Avenue
Saddle Brook, NJ 07663
201-794-7650
Fax: 201-794-0913

EUROPE

Westlock Controls LTD.

22 Chapman Way
Royal Tunbridge Wells, Kent
TN23EF England
011-44-189-251-6277
Fax: 011-44-189-251-6279

SOUTH AMERICA

Westlock Equipamentos De Controles Ltda.

Rua, Sao Paulo 291 - Alphaville
Banueri, Sao Paulo
SP 06464-130
011-55-11-4191-0930
Fax: 011-55-11-4191-0931

www.westlockcontrols.com