PRACTICAL TROUBLESHOOTING AND PROBLEM SOLVING OF MODBUS PROTOCOLS

YOU WILL LEARN HOW TO:

- Identify, prevent and troubleshoot Modbus protocol communications problems
- Gain a practical toolkit of skills for working with Modbus
- Work competently with Modbus and RS-232, RS-485, wireless and Ethernet
- Gain skills to fault find your Modbus based Ethernet, RS-232/485, wireless, Ethernet and TCP/IP network problems

WHO SHOULD ATTEND:

Anyone working with or required to troubleshoot industrial communications systems ranging from RS-232 to Fieldbus and Ethernet systems, including:

- Consulting engineers
- Designers
- Design engineers
- Electrical engineers
- Electronic technicians
- Instrumentation and control engineers/technicians
- Network planners
- Plant managers
- Process control engineers
- Shift electricians
- Systems engineers
- System integrators
- Test engineers
Modbus industrial communications systems (based on RS-232/RS-485 and Ethernet) are being installed throughout industry today, from connecting simple instruments to Programmable Logic Controllers to PCs throughout the business part of the enterprise. Communications problems range from simple wiring problems to intermittent transfer of protocol messages. Whilst the main issues with the Modbus protocol will be covered in this workshop, a clear understanding of the protocols and standards that transport Modbus protocol data units are required in order to effectively work with Modbus. This includes such standards as RS-485/RS-232 and Ethernet (preferably industrial Ethernet) and TCP/IP. Modbus, effectively one of the few (arguably, the only) industrial messaging protocols recognised by the Internet world (port 502) has one of the largest installed bases worldwide with more than 7.2 million installed nodes. The Modbus TCP/IP profile has recently been accepted by the International Electro-technical Commission (IEC) as a Publicly Available Specification (IEC PAS 62030) and is now eligible to become part of future editions of the International Standards IEC 61158 and IEC 61784-2. So it enjoys the status of a widely available open standard available to everyone. And thus the popularity. Whilst detractors will say the Modbus protocol lacks some of the refinements of the newer protocols recognised by the Internet world (port 502) has one of the largest installed bases worldwide with more than 7.2 million installed nodes. The Modbus TCP/IP profile has recently been accepted by the International Electro-technical Commission (IEC) as a Publicly Available Specification (IEC PAS 62030) and is now eligible to become part of future editions of the International Standards IEC 61158 and IEC 61784-2. So it enjoys the status of a widely available open standard available to everyone. And thus the popularity. Whilst detractors will say the Modbus protocol lacks some of the refinements of the newer

Practical Sessions
This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

Practical sessions include:
- RS-232 (COM port) basics
- RS-232 point to point communications
- RS-485 basics
- Logging and protocol analysis on serial (RS-232/RS-485) communications system
- Modbus Serial operation: RTU mode
- Modbus Serial operation: ASCII mode
- Setting up a basic Ethernet network
- IP configuration
- Protocol analysis on Ethernet network
- Modbus/TCP
- Modbus (Serial) over IEE802.11 wireless
- Installation and configuration of Modbus/TCP to serial communication gateway

Over-all Troubleshooting Methodology
- Common symptoms, problems and solutions
- How to quickly identify likely causes
- Basic steps
- Communications issues
- Grounding, shielding and noise

Basic Serial Communications Standards
- RS-232
  - Fundamentals
  - Problems: UART settings (baud rate, parity, etc), cabling, DTE/DCE, handshaking, voltage levels, noise
- RS-485
  - Fundamentals
  - Problems: cabling, common mode voltage, voltage levels, transient protection, biasing, termination, control (hardware/software), noise
- RS-485 practical troubleshooting session

The Modbus Serial Standard
- Fundamentals: overall concept, protocol stack
- Modbus RTU vs. Modbus ASCII: frame structures and timing considerations
- Problems: timeouts, checksums (CRC/LRC), incorrect function codes/data parameters, exception responses
- Modbus serial troubleshooting session

Modbus Plus
- Fundamentals
- Problems: cabling, grounding, shielding, terminators, token passing

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