

## INSIDE THIS ISSUE:

Meet our  
members... 2

District  
Cooling Goes  
Remote... 1

Modbus Q&A 4

Modbus  
Resources 5

## Conformance tested ...

**Lenze's i550 inverter** recently completed Modbus Organization conformance testing. The i550 is recommended in applications with pumps and fans, conveyors, formers, winders, traveling drives, tool and hoist drives.

The device's distinguishing features include its space-saving design, zero-clearance mounting, and a modular system that enables various configurations, based on machine requirements.



*i550 inverter*

[Learn more](#) and download a spec. sheet.

**Control Solutions**, a veteran member of the Modbus Organization, has also been busy testing more of its extensive product line, adding 10 new devices to its growing list of certified products.

This includes the Babel Buster SPX, one of the company's **Babel Buster®** family of Modbus gateways and the **ValuPoint®** series of programmable I/O devices, designed for expansion of distributed building automation control systems. These devices can be used as slave I/O or programmable controllers.



*Babel Buster SPX*



*ValuPoint VP4-0610*

Learn more about the [Modbus Conformance Testing Program](#).



## District Cooling Goes Remote ...

It is hot in Dubai! Fully 70% of electricity consumption in a given building is for air conditioning.

In this application, chilled water is delivered through underground insulated pipes to offices, industrial plants, and residential buildings to cool the indoor air of the buildings within each district. Specially designed units in each building use the chilled water to lower the temperature of air passing through the building's air conditioning system.

The output of one cooling plant is enough to meet the cooling-energy demand of dozens of buildings. District cooling can be run on electricity or natural

continued on page 3...

## New Modbus Resources

Thank-you to Vladislav K. for offering a link to [JLibModbus](#). Hosted on sourceforge, this project is an implementation of the Modbus protocol in Java. jSSC and RXTX are used to communicate via serial port. The library is an active project, undergoing continual testing and improvement.

Also check out [Unserver CE](#) to communicate to field devices via Modbus. It allows developers to organize Modbus addresses into logical groups (tags) and then to update their values via HTTP Representational state transfer (REST) or RESTful API with support for caching, polling, data type conversion and logging. The free version is fully featured, but the duration of one working session is limited.

## Meet Our Members...

**iRidium Ltd** is a Russian-based IT company that started in 2006 installing company home automation and home theater automation projects.

It went on to develop iRidium mobile, a software package used to create unique, functional graphic interfaces for controlling Modbus and other automation systems, audio/video equipment or media servers from any device or gadget operating on the iOS,

OS X, Windows 7/8, or Android platform. Available for download from The App Store and Google Play, iRidium is easily implemented and customized by users with varying degrees of technical knowledge.

iRidium enables connection of control panels to the controller in the Master-Slave mode where the control panel is always a Master Client. iRidium allows you to send and receive data about the state of variables on real-time

basis using Modbus TCP, RTU or ASCII protocols.

On April 7 iRidium announced the release of a new software product for home automation systems — iRidium lite. iRidium lite is intended for installers of home and building automation systems and system integrators.



*Joining the Modbus Organization is easy and affordable.*

*Download the [membership application](#) to learn more.*

**Lenze Americas** develops motion control solutions that help customers meet ambitious performance and productivity goals. The company's complete product line features ultra-efficient, general-purpose inverters, innovative amplifier servos, servo automation systems, and gear motors and mechanical components.

The company offers individual products, drive solutions, complete automations systems, and

**Ges Teknik AS** started working in the building automation industry in 2003. Since then, the company has expanded its offerings, providing OEM solutions and technical support for heating, cooling, ventilation, fluid control, and other building automation systems.

Its offerings include the WEBVISION 5 building management system that integrates all the automation and technical systems

existing in a building.

WEBVISION 5 supports standard protocols such as BACnet, M-Bus, Modbus, and OPC.



engineering services and tools from one single source.

Formerly known as AC Tech, Lenze Americas is a subsidiary of Lenze SE and is headquartered in Uxbridge, Massachusetts. Lenze SE corporate headquarters are located in Germany.

Lenze's automation solutions can be found in a wide range of industries, including consumer goods packaging, material handling and logistics, automotive, robotics, and commercial pumps/fans. With a global network of engineers, sales representatives, and manufacturing facilities, Lenze is well-positioned to meet the motion control needs of customers around the world.

# Lenze

## District Cooling Goes Remote, cont'd ...

gas, and can use either regular water or seawater. District cooling constitutes a new form of energy service.

District cooling systems can replace any type of air conditioning system, but primarily compete with air-cooled reciprocating chiller systems serving large buildings that consume large amounts of electricity. These systems are subject to a difficult operating environment, including extreme heat, saline humidity and windborne sand. Over time, performance, efficiency, and reliability suffer, leading to significant maintenance costs and ultimately to equipment replacement.

Emirates Central Cooling Systems Corporation (EMPOWER) was established in 2003 to enable the real estate sector of Dubai to use energy resources efficiently through District Cooling Services (DCS). EMPOWER is a joint venture between Dubai Electricity and Water Authority (DEWA) and TECOM Investments, a member of Dubai Holding through a Royal Decree issued by the Ruler of Dubai.

EMPOWER began with a single temporary plant serving the financial district of Dubai, and has grown exponentially, serving more than 45,000 customers in 2015. Its district cooling capacity today, exceeds 1 million Refrigeration Tons (RT).

### eWON connects 330 remote sites

Unfortunately, continuous construction work and regular road digging, led to a collapse of the fiber optic communication between cooling sites, bringing headaches to control room operators.

Member company EWON, brought the power of advanced wireless solutions to resolve the issues for the automation team.

Various SCADA control rooms supervise cooling stations located in Discovery Gardens, Jumeirah Lake Towers and Palm Jumeirah district, totalizing more than 330 remote sites that need to be fine-tuned and optimized for perfect operation.



*District Cooling Plant supplies chilled water to the Burj Khalifa and Dubai Mall.*

With the help of ANG Automation, a skilled system integrator from Dubai Silicon Oasis, EMPOWER intensively tested the eWON solution for more than six months on a dozen sites before standardizing the solution to the entire project.

Each remote location handles sophisticated automation, involving PLCs of different makes (Schneider, Mitsubishi and Rockwell), as well as BTU meters, using M-Bus communication protocol. With eWON's flexibility, in terms of I/O-drivers and communication ports, the remote cooling plant communicates securely in wireless 3G with its SCADA through encrypted VPN tunnels.

### Significant Project Outcomes

- Fiber optic upgrade to secure wireless 3G+ communication
- Protocol conversion: Schneider Electric, Mitsubishi, Rockwell, M-Bus to Modbus TCP
- Flexibility in terms of I/O drivers and communication ports
- Secure VPN communication in wireless 3G to the SCADA systems



# Q&A from the Modbus Discussion Forum

## Modbus Response Time Calculation...

### Abraham Februno wrote:

I have a problem with communication using Modbus RTU, for the engineering and construction phase for an oleo chemicals plant.

Our idea is to use Modbus RTU with RS485 serial communication line load-shedding system in power generation. We have Power logic control in each of Low/High Voltage panel, and I want to try to communicate between the subsystem (Power logic metering Schneider PM5035 and main system DCS Yokogawa Centum VP (IFAT-integration test), with no issue.

But I have worries, because actually we have a lot subsystems on the site including PLCs (Modicon). Could somebody tell me know to calculate the response time (bidirectional)? Let's say the data is 100 byte/subsystem and speed is 19600 kbs. How to calculate if:

1. Single subsystem connected.
2. Multiple subsystems connected.

### Patrick L answered:

The actual response time of a device will usually vary from time to time. I think that the easiest way to find out is to ask the manufacturer. If they do not know, I am afraid that you may need to use an oscilloscope and measure. Send a command to the device and see how long it takes for it to answer.

A few years ago, I made an Excel sheet that calculates line time on Modbus, but one needs to know the response time for the slave and the master. Email me at pal@hms.se, if you want a copy.

### Lynn August Linse replied:

Response time can also be affected by unexpected events. I'm not sure if the vendors in these cases would even acknowledge the odd behavior, so you should also do some field tests.

For example, I once linked to a Modbus RTU inspection machine, which normally answered in less than 1/2 second. However, if it was busy doing a "rejected inspection," then it took up to five seconds to respond. This did NOT mean it ignored comms for five seconds; it means it buffered any requests and answered them ALL after the delay in a very non-Modbus flood. So if you polled every one second, it would return five responses in a burst.

Another example: I once worked on a device which (for some reason — reduce IRQ load?) disabled its serial port for ~250 msec if it saw a request for ANOTHER slave address. So a single device could be polled flat out, but a multi-drop had to be polled with care not to poll subsequent nodes too fast.

[Read more or add your comments](#) to this thread.

## Modbus RS485 Loop...

### rjcarreiro asked:

I am attempting to install a system of six controllers, each of which sends and receives data from two sensors, on an RS485 loop. I am using a Modbus address for each of the controllers.

When connecting the two-wire RS485 in one direction (A to B), I can only read half of the sensors. When the two-wire is reversed (B to A), I can read the other half of the sensors.

Is there any known cause of this problem?

### David\_2 commented:

I assume that one group of sensors is manufacturer/model X and that the other group of sensors is manufacturer/model Y.

There is no "standard" for labeling the data lines. Every manufacturer picks its own labels.

I've had an RS-485 Modbus product from one division within a company label the opposite of another division.

Wire the network so that all the (+)'s are on one line, all the (-)'s on the other, even if you must wire A to B.

This happens all the time when mixing brands on the same multi-drop network.

### ICP DAS added:

It may also be a biasing issue or termination resistors. If you measure the voltage across the D+ and D- terminals, you should see a static voltage when no communication is happening. Check for significant voltage drops. Ideally, you should see about 5 VDC. When you start to communicate, you will see a fluctuation in voltage. If the range drops too low, you can add a repeater to strengthen the signal or a hub to just separate the two sets of devices.

[Read more or add your comments](#) to this thread.

## The Modbus Community

- Technical discussions
- Knowledge aggregation
- Contact with Modbus users

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### The Modbus Organization Mission

The Modbus Organization, Inc. is a group of independent users and suppliers of automation devices that seeks to drive the adoption of the Modbus communication protocol suite and the evolution to address architectures for distributed automation systems across multiple market segments. Modbus Organization also provides the infrastructure to obtain and share information about the protocols, their application, and certification to simplify implementation by users resulting in reduced costs.

# Modbus Resources

## Modbus Q&A...

The Modbus Community is the premier on-line engineering discussion forum. Sponsored by the Modbus Organization and supported by Control.com, check out Q&A from the [Modbus Community](#) website or log-in and have the threads you want emailed directly to you.

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## Modbus conformance certification...

The Modbus Conformance Testing Program provides independent verification that a broad array of qualifications has been met in compliance with Modbus specifications. It provides verification that a device's design and configuration process will proceed smoothly and that products were developed in accordance with key Modbus criteria. [Learn more...](#)

## Looking for the Modbus specifications and implementation guides?

The Modbus specifications and guides for implementing Modbus over serial line or Modbus TCP can be downloaded freely from the Modbus.org [Technical Resources page](#).

## Order the Modbus TCP Developer Toolkit

The Modbus TCP Toolkit provides all the necessary pieces to develop a Modbus TCP/IP-compliant device, including documentation, diagnostic tools, sample source code, and pre-test software to prepare for Modbus conformance certification.

[Learn more...](#)

