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## Modbus Conformance Certified...

With an uptick in devices being tested for conformance to the Modbus specification, we are pleased to announce two more recently conformance-certified products — one tested in our U.S. approved laboratory and the second in China.

Member company Sparling Instruments delivers flow measurement devices for municipal and industrial applications.

Based in Southern California, the company submitted the **Sparling Tigermag** electro-magnetic flowmeter. The newly certified Tigermag Model FM6XX is



*Tigermag, FM6XX*

designed to measure the flow rate of conductive fluid in full pipes.

Doosan Heavy Industries & Construction submitted the GUARDIAN® SIF-ES14 controller board for Modbus certification.

The **DOOSAN SIF-ES14** supports both Modbus TCP and Modbus over Serial Line. The Ethernet interface has four ports, which can be set to 10/100/1000 Mbps.

Doosan is a global company with technologies in the power generation business, as well as seawater desalination solutions, extra-large casting and forging products for power plants, marine vessels, iron and steel forging, and other industrial facilities.



*SIF-ES 14  
Controller Board*

## Remote Modbus Monitoring – Simplified...

ELECSAN S.A. is one of those little boutique companies you typically find in the U.S. in places like Mansfield Heights, Michigan or Sun Prairie, Wisconsin. Like many other tiny controls companies, it's about what you would expect. It's located in a former fish factory, smelling of rockfish, halibut and sea bass started by a couple of guys who left the big company behind to strike out on their own.

But Elecsan isn't in a suburb of Detroit or Cleveland or Houston. It's in the town of Sabadell, 20 km north of Barcelona in Spain's beautiful and historic Catalonia district.

*continued on page 3...*

Without a massive effort to replace those systems, many in remote places, it was going to be tough to provide the kind of remote monitoring that their customers needed...

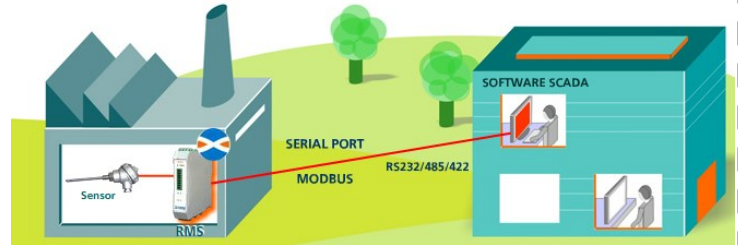
# New Members...



Headquartered in Argentina, **Exemys** specializes in connectivity products for monitoring, acquisition and industrial control. The company's product line includes telemetry systems, media converters, data acquisition products, and a wide variety of accessories. The company has a global presence, selling into the energy, water and sanitation, and industrial markets.

### Modules with Modbus Interface

- 4-20mA / 0-10V to Modbus
- Thermocouple to Modbus
- PT100 to Modbus
- Digital Temperature to Modbus
- Modbus I/O Expansion Module



*Joining the Modbus Organization is easy and affordable.*

*Download the membership application to learn more.*

**IAS Irrigation Systems** was founded in 2004, after its president recognized the disconnect between cranberry bog owners and operators and their

ability to protect their crops, save water and manage their farms while they are away. The company develops and manufactures remote irrigation control systems, remote motor control software (HarvestWatch), and multiple hardware solutions with state-of-the-art wireless, air/plant temperature and soil moisture transmitters.



**POSITAL-FRABA** is a division of the Netherlands-based FRABA Group. POSITAL provides advanced products for position sensing and motion control in many sectors and applications. These include rotary encoders and inclinometers with Modbus RTU and Modbus TCP interfaces.

The POSITAL website features a Quickfinder tool that identifies over 400 encoder products with a Modbus interface. You can refine your search to further limit product choices by revolution, resolution, protection class, material, flange design, flange diameter, shaft diameter, connection type, and accuracy/technology.



*In October 2014, POSITAL announced that its TILTIX Inclinometers were available with Modbus RTU for robust and cost-effective tilt monitoring.*

**POSITAL**  
FRABA

# Remote Modbus Monitoring — Simplified

cont'd from page 1

For more than 15 years, Joan Ramon and his team of specialists at ELECSAN have supplied local and international market with counters, timers, indicators, text displays and other types of off-the-shelf and custom controls, much of it communicating over Modbus networks.

With many of their customers requesting remote monitoring and control from Elecsan's control products, Joan Ramon faced a significant problem. A lot of the controls Elecsan had delivered over the years were Modbus RTU, not Modbus TCP, and many were point-to-point RS232. When you're a couple of young guys starting out and what you know is control systems, not networking, you deploy some stuff that comes back to bite you. Even those of us with "PE" after our names and years of experience make mistakes that come back to haunt us years later.

But they long ago picked Modbus RTU and it's worked well for them. Without a massive effort to replace those systems, many in remote places, it was going to be tough to provide the kind of remote monitoring that their customers needed.

## Challenge

So Elecsan experimented. They tried serial tunnels and virtual com ports — linking remote Modbus RTU masters with various RTU slaves in other parts of the world. If they set the right message timeouts and prayed to Saint Jordi, the patron saint of Catalonia, sometimes things worked out okay.

Mostly they didn't. Framing timeouts, message timeouts, lost messages... Even if they mistranslated their customers' requirements, it was unlikely a specification would ever read "the system shall work some of the time."

Lots of workarounds were discussed. Most would have been disruptive and expensive, including code changes to all Elecsan industrial controls at customer sites, changes to Elecsan software, addition of computers at remote sites, addition of other software,

and even contracting with a remote cloud service provider. More money, time and disruption to their customers' businesses were almost guaranteed.

## Solution

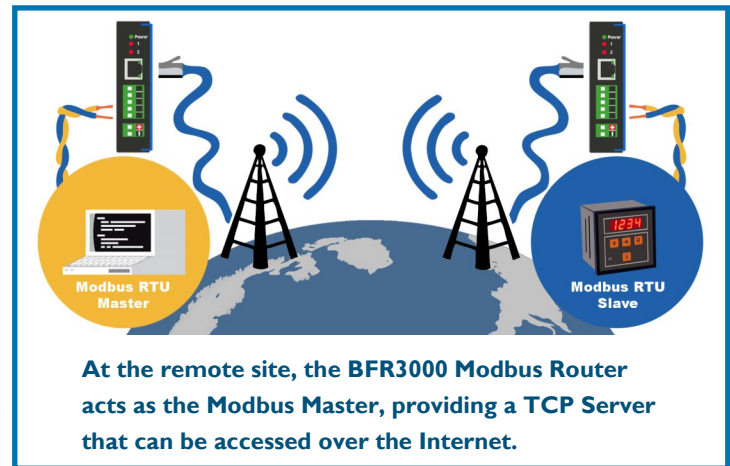
Joan Ramon, like any good engineer, worked his contacts. Having successfully teamed up with Real Time Automation in the past, he figured that we might have a solution. Our new BFR3000 Modbus Router could easily facilitate the remote monitoring without changing any of the pre-existing industrial controls or computer programs, while meeting all Modbus TCP and RTU protocol requirements for reliable communications.

At the remote site, Joan Ramon used the BFR3000 Modbus Router in its TCP Server-to-RTU Master Mode. The BFR3000 became the Modbus Master at the remote site and provided a TCP Server back to Barcelona that he could access over the Internet. For systems in Spain that had a Modbus Master, Joan Ramon used a BFR3000 in RTU Slave-to-TCP Client mode enabling the RTU Master to access the remote slaves as if they were on the same RTU network.

With three operating modes, a friendly user interface, multiple serial interfaces, and the ability to connect TCP Clients to RTU Masters, the BFR3000 became Joan Ramon's go-to device for remote Modbus communication.

## Legacy Opportunities

The opportunity to increase an operation's effectiveness and efficiency with the application of remote monitoring, updating, and troubleshooting its control and automation systems is huge. There is a large installed base of legacy control and automation systems that still work well. But the scarcity of experienced people to troubleshoot



and keep controls up to date is becoming a challenge.

Even with people trained on a particular control on site, if they seldom use this information, they have to "get up to speed" when problems arise. Meanwhile, the operation suffers loss of production and/or downtime. A remote expert to update, troubleshoot, and maintain controls and automation solves this problem.

For users with a large investment in their systems, adding remote monitoring increases the effectiveness and value of these systems immediately with minimal cost. The opportunity to achieve increased speed, agility and efficiency confers a distinct competitive advantage.

John Rinaldi

Since 1988, [Real Time Automation Inc.](http://Real Time Automation Inc) has been providing networking, gateways, and interfaces for industrial, process, building control and automation systems for users around the world.



# Q&A from the Modbus Discussion Forum

## Modbus RS-485 Connections in Parallel...

### Has100 wrote:

I am using four-wire RS-485 for Modbus communication. I have five Modbus RS-485 slaves, which should communicate with DCS. The DCS (Master) has one RS-485 Modbus port.

My question is: Can I connect the four wires from each RS-485 Modbus slave device in parallel and then send it to Modbus Master RS-485 (DCS)?

Will this configuration work? What will be the things I need to take care of?

### David\_2 answered:

Parallel? Yes, but it depends on whether the RS-485 connection on the DCS side is four-wire or two-wire.

If it is two-wire on the DCS end, then you convert the four-wire to two-wire by jumpering (+) to (+) and (-) to (-), or A to A, B to B and use two wires.

Connecting a third wire to signal ground from device to device is also advisable.

*What will you need to take care of?*

Read my reply in this [thread](#):

Substitute your slave device wherever it mentions the word 'drive' (the slave device in the thread).

Get one working first, then add one at a time.

### Curt Wuollet replied:

Probably not, a daisy chain is recommended. The impedance gets very low with parallel connections.

I must clarify: They are normally bussed in parallel. But it sounded like you want to run a wire to each and connect the near ends in parallel. Like a star topology.

That can cause problems, especially if all the legs are terminated as they should be.

The proper way is to go from node to node terminating at the ends. So they

are in parallel along the transmission line, rather than five transmission lines in parallel.

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

## Modbus Communication Between S7 PLC and NI Master Software...

### rnarias asked:

I'm trying to communicate a master software (from National Instruments) on a PC with an S7 200 Siemens PLC using Modbus RTU. The problem is that I cannot get the S7 200 libraries installed.

I bought a RS232 to 485 converter, but the master software says the port is busy and not connected. What kind of cable do I have to use between the converter and PLC? UTP? Profibus? Other?

### David\_2 commented:

You bought an RS-232/485 converter for a reason. Presumably the S7 has a Modbus slave port that talks on RS-485.

What kind of cable? Most Modbus RTU RS-485 links are two-wire, half duplex. If yours is too, use twisted pair copper wire cable and wire + to + and - to -, or A to A and B to B; and a third wire signal ground should be connected, too.

You'll have to read the documentation for connecting the converter to the PC/ National Instruments serial port, if it didn't come prewired with a DB9 for a PC serial port.

If the master reports that its port is busy, you need to look for other applications or services that take over a

serial port. What other serial communications drivers has that PC had installed? Some other app is hogging the serial port.

### ChrisA wrote:

If the serial port is indeed unable to connect, either through an application or driver problem, then there are options, like using an RS-485 to USB converter, like one from ICP.

You said that your Siemens PLC uses a DB9 connection. Are there any other serial port options? Also, what is the operating system on your PC? Not all converters are compatible with every Windows OS.

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

**Congratulations David\_2, voted a Most Valuable Player on the Control.com Forum!**

## Modbus RTU Standard CRC Format ...

### Marcello posted this question about CRCs and Modbus:

I developed a Modbus RTU slave in C (Windows environment). Is the CRC format [Lobyte] [Hibyte] both in request and answer frame? For calculating the CRC, I used the function that is reported on the standard document and the function should return the CRC in the format [Lo][Hi], but when I try the application with a Modbus master simulator (e.g., SimplyModbus 6.3.6 or Modscan32) the CRCs I receive are always swapped compared to the one calculated from the function. Now, according to the standard, is the function or the simulator wrong!

[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.

### The Modbus Community

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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...](#)

