Compressor Works

ACI Services, Inc.

Issue XII

May 2011

CompresXpress 1000™

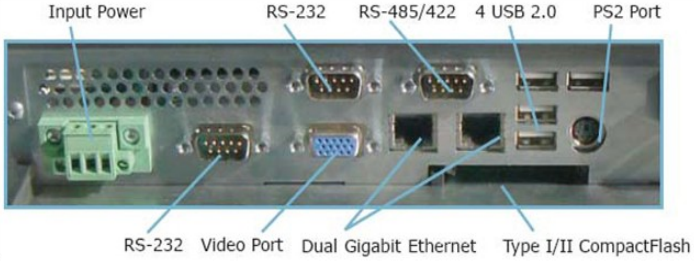
At last, there are no more manual calculations, no more programming of constraint equations, no more operating well-below the maximum safe load, and no more unexplained damage to compressor crosshead pin bushings and piston rods. All this is possible with ACI's newest product: **CompresXpress Model 1000™.**

CompresXpress Model 1000™ is a standalone compressor control module that interfaces to an existing control system. This product, developed on ACI's behalf by Control Systems International Inc., manages load steps to allow compressors to run safely to full load capacity by incorporating ACI's eRCM™ software model into the control system.

eRCM technology is built upon decades of compression experience and has been field proven by major gas companies to increase the throughput and efficiency of reciprocating compressors. Now available in a control module, eRCM runs in real time to continuously calculate the rod loads, pin reversals, power, and other operating parameters for each compressor load step configuration. Thus, end users not only know if their units are nearing unsafe operating limits, such as pin non-reversals, they also know exactly how close and which throws are involved. Running the eRCM model of the actual compressor configuration in real time, CompresXpress 1000 automatically adjusts load steps and speed based on changing process conditions.

The CompresXpress 1000 can deliver a significant increase in compressor efficiency, which can subsequently increase unit throughput, extend compressor life, and improve reliability. CompresXpress 1000's return on investment is often measured in days. It is common for users to realize 5% to 15% or even more throughput. CompresXpress 1000 protects equipment according to OEM specified limits and methodologies. The integrated eRCM software provides Full Safety Checks: by throw (rod loads, pin reversals, and crank pin forces), by cylinder end (low volumetric efficiencies, discharge temperatures and internal pressures) and by stage (interstage pressures and cooler issues). Using outputs from the control, critical compressor data can be displayed for each throw, cylinder end and stage of the compressor.

CompresXpress 1000 interfaces to an existing PLC or controller via MODBUS serial or Ethernet communications. It can be reconfigured to support hardware changes, new conditions, or even a different compressor. Standard features of this powerful con-



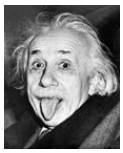
Inside this issue:

Look for ACI at these events:

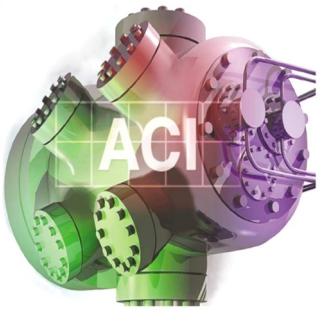
EGCR

May 10-12 in Pittsburgh, PA

Solve the brain teaser on page 4 first and win.



Compression Problem Solvers



We Optimize it

We Design It

We Build It

CompresXpress 1000™ (cont.)

trol include a low power, fan-less Intel Atom N270 Processor; 1 GB DRAM; on board video with analog VGA port; extensive connectivity as shown, CompactFlash to replace CD-ROM and floppy drives; USB retention bracket; 24 VDC power and 120 - 240 VAC optional; UL, cUL, RoHS & CE approvals; Class 1 & 11 Division 2 approved when installed in a NEMA enclosure; and 2-year warranty. Phone support is available 24-7-365.

The CompresXpress 1000 controller normally will be installed inside a unit control panel or other suitable weatherproof location. As an option, the controller can be pre-installed in a NEMA 4 enclosure for mounting by the customer. CompresXpress 1000 is designed for the following operating environment.

	Operating
Temperature	32° to 122°F
Humidity	20% to 80% RH, Non-condensing
Shock	15g peak acceleration 11 msec
Vibration	0.006" p/p
(5-2000 Hz)	1.0g max acceleration
Altitude	Sea level to 10,000 ft

The eRCM Viewer file used to calculate the output parameters is the same file that is used by the Windows eRCM Viewer™ application, and loading it into the CompresXpress 1000 is a quick and easy task. This completely eliminates the need for all the tedious programming associated with entering complex unloading constraint equations into a PLC. The CompresXpress 1000 is a MODBUS slave device, meaning that the polling requests are initiated by the Unit Control Panel. CompresXpress is also available as a full compressor unit Control Panel.

New Online Parts Ordering System

The age-old question remains: "How best to manage company Engine & Compressor Parts Inventory?"

This has been the frustrating question ever since the production and marketing of engines and compressors. There are many reasons why this still remains a challenge, including size and diversification of a company's fleet of OEM equipment, gathering of all pertinent information for this diversified fleet, inability to control part number changes, and each OEM producing unique Bills of Materials.

ACI has developed a program that can greatly assist the customer in addressing all of the above issues. It will also assist in being able to better manage your total parts inventory through collaborative efforts between the customer's inventory, the OEM and ACI.

This program allows you to sort by S/N (Build Parts Requirements), by Part Number, by description, and by manufacturer. Along with a separate sort which can give you the parts legacy of any part in the system. Giving you the ability to see how a part has evolved from the original part number to its current number.

You also have the ability to sort by customer name, frame S/N, by station then frame, by frame model, station and frame S/N and lastly by Compressor model.

Another feature of this program is the collection of the unit S/N data which includes all the assembly sheets and the component parts that make up that assembly sheet on a particular unit.

Having this information in a single database along with the other sort capabilities, gives you a tool that you can use to better manage your parts requirements. One important point to keep in mind with this program is that if you built a pipeline today, and loaded the data as described, you would know, by part number EXACTLY how many of each specific part you would have in your entire fleet. Also, it gives you the capability to know where, what units, models or stations use that particular part.

ACI's online parts ordering is uniquely different from those like the Maximo program, in that Maximo only captures data recorded for a specific unit when a part is ordered and recorded. Although this is great, the difficulty remains in knowing when, and if, a specific part has been entered for each and every unit that uses that part. This could take a very long time to collect the data and know that the collected data is complete.

Every company has their own inventory philosophy. However, wouldn't it be valuable to know the part number's total quantity in use and use that information to set stocking levels? Maybe even more important would be to review certain key components with the OEM distributors to see what they will stock to support your equipment.

This is just one approach that ACI has taken in trying to solve that Age Old problem of "How best to manage the Compressor Parts Inventory." Please feel free to visit www.ACIServicesInc.com and click the login link to sign up.

Another Project Success Story: Refinery Compression Re-rate

A North American refinery utilizes several motor-driven reciprocating Cooper Bessemer LM 5 and 6 throw compressors in their hydrogen compression process. Each compressor is block mounted with three stages of compression. The compressors have been in service for many years and were incorporated into a major expansion project of the hydrogen process at the refinery.

In 2009 and continuing through the present time, ACI Services, Inc. has been contracted to evaluate, recondition and re-rate the stages of compression in accordance with the new pressures and capacity of the new hydrogen process facility being installed. ACI partnered with BETA Machinery Analysis in Calgary, AB, Unico Mechanical Services in Benicia, CA, GE Energy Motors in Peterborough, ON, and Hoerbiger Corporation of America in Ft. Lauderdale, FL to provide the compression engineering, procurement, and compressor products to rerate each compressor to accommodate the upgrade of the hydrogen process facility.

ACI provided all of the compression project management services bringing the service of each partner to the project in accordance with their expertise. Overall ACI was responsible for providing all engineering analysis of the electric motors, pulsation and vibration analysis, unbalanced forces and couples, performance evaluation, capacity control selection, compressor engineering and design analysis, pulsation vessel design and manufacturing, and compressor product manufacturing.

One of the more interesting aspects of the project, other than developing a unique partnership with all parties providing compression related services, was to design and manufacture new third stage cylinders for the two LM5 compressors. ACI replicated the existing third stage cylinders as the capacity of the third stage of compression had to be increased. The third stage cylinder has a 8.5 in. (216 mm) bore diameter and a maximum working pressure requirement of 3,500 psig (241 bar). ACI custom designed a forged steel bolt-in replacement cylinder (pictured at right) to match the outside envelop of the existing third stage cylinder that minimized piping design and fabrication changes. Additionally, ACI and the customer collaborated during the design process to ensure that the new cylinder was upgraded to accommodate maintenance lessons learned during the operation of the existing equipment, allowing the customer to have a final product that met their overall requirements.

All engineering services, compressor product design analysis, and product procurement and manufacturing were completed ahead of schedule.

Based in part on this experience, the customer has routinely turned to ACI to assist with other compressor related projects at this location and at other locations.

ACI TEAM PROFILE - Chad Carter

ACI Services, Inc. is pleased to announce that Chad Carter has joined the team as an Application Engineer. Chad comes to ACI Services, Inc. with a Bachelor's Degree in Mechanical and Manufacturing Engineering from Miami University of Ohio. He has had prior experience in the gas industry while working for Bi-Con Services, Inc. in a variety of roles during the past few summers.

Chad is very excited to join the workforce and be involved with an array of projects. He is acting as the liaison to the GAS Products division. In the past few months he has had the opportunity to be involved with a large number of people and projects. Chad looks forward to more exciting challenges in the future. If you have any questions or would like to talk about using GAS Products valves please call 740-435-0240 ext. 548.

During his spare time, Chad enjoys working on his race car and antique tractor pulling with his father.

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Norm's Notes

Thanks to Bob Painter and Brandi Perkins, this is our second issue of CompressorWorks already this year. Our big news this issue is that we are a month into a major building addition and office renovation project at our Cambridge headquarters facility. This will give us much needed office, meeting and break room space for our growing team. We'll be a bit unsettled for the next few months and we ask visitors to bear with us as we expand for the future. We expect to complete this project in July.

We welcome Kristen Gilcher to full time employment in engineering. She has worked for us part time over the last year while completing her Associates Degrees in Mechanical and Electrical Engineering from Zane State University.

As reported in this issue, we have introduced another new product: CompresXpress 1000™, which is the result of collaboration with Control Systems International. We are excited about this new product and think that it will revolutionize the way compressors are controlled, maximizing efficiency, throughput and reliability in the process.

Our thoughts and prayers continue to be with Lauren Sperry and Chad Brahler. Lauren continues making slow, but steady progress in physical therapy following a serious stroke in December of last year. Chad continues to serve on active duty with the military in the Middle East, handling customs for personnel and material into and out of the active war zones. We are hopeful for his safe return home in mid-June, and return to work by early July.

W. Norm Shade, PE, President

Brain Teaser

A man went into the bank to cash a check. Distracted by the chitchat the teller gave him the amount of the dollars in cents and the amount of cents in dollars. He put it in his pocket without checking, and on the way home he spent a nickel of it. When he examined the money in his pocket, he noticed that it was exactly twice the amount of the original check. Assuming he had no money in that pocket before going to the bank - what was the amount of the original check?

Send the correct answer to Brandi (bperkins@aciservicesinc.com) and see "what" or "if" you won.

Quote

The problem with running in the rat race, is that if even you win, you're still a rat.

- Will Rogers