Is unaccounted hydrocarbon draining your bottom line?

When the stakes are high, any amount of unaccounted hydrocarbon drains the bottom line. That’s why companies like yours count on proven, accurate measurement technology and industry expertise from Daniel to improve service, reduce costs and add value.

Daniel® Company Overview

For more than 75 years, Daniel Measurement and Control, Inc. has served the fiscal custody transfer market. Daniel’s natural gas and liquid flow measurement products, systems, and services are known around the world in the oil and gas industry. Daniel is synonymous with quality products, industry expertise and reliable and innovative engineering that deliver advanced technology. Daniel is well positioned to serve its customers with locations throughout the world.

Daniel empowers customers to achieve their business objectives by providing excellent service, helping to reduce costs, and adding value.

As Daniel continues to innovate and build its product technology and global organization, you can be confident that Daniel is stronger than ever. A subsidiary of Emerson Electric Co. ($7.3 billion revenue/NYSE:EMR) and part of the Emerson Process Management group of companies, Daniel has financial strength, staying power and proven history.

Change and continuous improvement mean success for Daniel customers. One commitment remains constant - to continue to earn and keep our customers’ trust.
Daniel® S600 Flow Computer

The Daniel® S600, the most advanced flow computer for custody transfer applications

Daniel is a global leader in providing fiscal measurement, flow control, analytical products, services and integrated solutions primarily for oil and gas industries.

The Daniel S600 represents the next generation of flow computer. Developed for worldwide fiscal measurement, the Daniel S600 not only defines a new standard for ease of use, but also delivers unparalleled levels of performance and flexibility.

Equally at home in either oil or gas applications, the Daniel S600 offers a range of features which will help you increase productivity while reducing costs. It also gives you the peace of mind of knowing that whatever your future requirements, the Daniel S600 can adapt quickly, easily and cost-effectively.

Applications Include:

- Fiscal measurement
- Custody transfer
- Batch loading
- Meter proving
- Multi-meter runs
- Flow control

COMBINING MODERN TECHNOLOGY, ADVANCED WINDOWS®-BASED CONFIGURATION AND A WEALTH OF EXPERIENCE TO MEET YOUR NEEDS.
Power and flexibility

Multiprocessor capability
Whatever your oil and gas custody transfer needs, you’ll find the Daniel S600 fits the bill perfectly. With an Intel® microprocessor and math co-processor at its heart, and six microprocessors on each I/O board, it has the processing muscle to provide fast, highly accurate calculations. Its modular design and exceptional connectivity give you superb adaptability.

Reduced support costs
The Daniel S600 is designed to be used either as a stand-alone solution or as a system component. The intelligent I/O board fits both gas and liquid applications. A signal I/O board can support two meter runs and header. Adding additional I/O boards allows expansion up to ten meter runs and two headers. Common flowmeter types such as orifice, ultrasonic, turbine, positive displacement, coriolis, annubar and V-Cone can be configured. There is no need for multiple cards for different applications.

- Intel® performance
- High accuracy
- Windows®-based set up
- Modular I/O; easy to expand
- Flexible communications
- Compact
- Remote I/O capability

- Liquid and gas in a single computer
- Up to ten meter runs
- Connects to all common flowmeter types
- Prover capability
- Calculations to API and ISO standards

THE DANIEL S600 IS EASILY CONFIGURED WITH DANIEL CONFIG 600™
Enhanced productivity through ease of use

Time saving options
In addition to its high computing power and extended capabilities, the Daniel S600 is extremely easy to set up and use. The unit is supplied with the Daniel Config 600™ configuration package which gives you fast, intuitive control from a PC. Featuring Windows® compatibility, this package allows you to implement a wide range of time-saving options, such as template-based programming and instant configuration, plus automatic generation of documentation, reports modbus registers and front panel displays.

Novice and expert modes
The Daniel S600 allows both the novice and expert user to develop a configuration to meet specific needs. It has all of the capabilities you would expect from a high-end flow computer: scaling, I/O assignment, constants, communications - all of which are easy to access and modify.

And, there is much more. Using IPL 600, the Interactive Program Loader (a component of Config 600), the user can upload existing configurations.

Application specific data (i.e. scaling, bore size, and K-factor) can be configured using keypad or an internet browser. For expert users, Config 600 Lite and Config 600 Pro can be used for customization of the application.

<table>
<thead>
<tr>
<th>CONFIG 600 TOOLS</th>
<th>CONFIG 600 LITE</th>
<th>CONFIG 600 PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC setup program</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Transfer program</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Report editor</td>
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<td>X</td>
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<tr>
<td>Modbus editor</td>
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<tr>
<td>Display editor</td>
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<tr>
<td>Logical™ 2000 scripting language</td>
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<tr>
<td>System editor</td>
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<td>X</td>
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<tr>
<td>Configuration generator</td>
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</table>
High performance, accurate measurement

In today’s oil and gas industry, speed, accuracy and stability are key requirements – which is why we built the Daniel S600 using the most advanced technology available.

Multi-process technology
Using a multiple processor approach, very high calculation speeds are achieved (e.g. AGA8 in 0mS), while a high-accuracy analog-to-digital converter auto-calibrates every cycle against a high-stability reference.

Distribution of the processing workload means that performance is maintained, even with a full loading of ten meter runs. Local processing also means that fast PID loops can be implemented for control purposes.

Functions:
- Batch totalization and correction
- Meter run and station totalization
- 3 term PID control
- Two stations and up to ten meter runs (depends on hardware configuration)
- Flow balancing
- Flow scheduling
- Automatic prove sequence
- Meter factor linearization
- Valve monitor/control
- Sampler control
- Meets API Chapter 21

Communications:
- Chromatograph (Danalyzer™)
- Modbus (ASCii & RTU)
- Ultrasonic Meter
- HART

<table>
<thead>
<tr>
<th>GAS</th>
<th>LIQUID</th>
<th>PROVER</th>
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<tbody>
<tr>
<td>AGA 3</td>
<td>API 2540, API 11-2-1 (M)</td>
<td>Uni-Direction</td>
</tr>
<tr>
<td>AGA 7</td>
<td>API 11-2-2 (M)</td>
<td>Bi-Direction</td>
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<tr>
<td>AGA 8</td>
<td></td>
<td>Master Meter</td>
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<tr>
<td>AGA 5</td>
<td></td>
<td>Compact</td>
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<tr>
<td>NX 19</td>
<td>ISO 91.2</td>
<td>Double Chronometry</td>
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<tr>
<td>ISO 5167</td>
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<tr>
<td>ISO 6976</td>
<td></td>
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<tr>
<td>SGERG</td>
<td></td>
<td>2 or 4 Detector Switches</td>
</tr>
</tbody>
</table>
High performance, accurate measurement
Connecting to the future

- High speed calculations
- All popular calculation types
- Calculation to US/European standards
- Auto-calibration
- Fast PID loops
Connecting to the future

Multiple communications
The Daniel S600 offers two RS232 ports with handshake signals and three differential communications ports. Each of these three ports can be independently configured point-to-point (RS422) or multi-dropped (RS485), supporting both two-wire and four-wire protocol. In addition, there is a 10Base T (Twisted Pair) Ethernet interface utilizing TCP/IP protocols for flexibility and network connectivity. Data can be retrieved and presented in DDE format allowing custom reports to be prepared using various applications, including Microsoft® Excel®.

Future proofed
The processor bus is IEEE standard to allow easy upgrade when it becomes necessary. Code is written in ANSI C for Intel® processor for maximum portability. The PC 104 bus means that cards from over 250 suppliers, with communications and data storage capabilities can be added to further enhance the Daniel S600’s already impressive capability.

▶ Five customer configurable communications ports
▶ TCP/IP Ethernet interface
▶ DDE Interface for data
▶ EFM MODBUS
Technical specifications

CPU Capability:
- 50Mhz i80486DX2
- 16 or 32MB DRAM
- 1MB or 2MB SRAM (Battery Backed)
- 4MB Flash
- Form “C” watchdog relay
- Real-time operating system using Wind River VxWorks

I/O Capability:
- Analog inputs: 0 to 5.2VDC or 0 to 22mA, > 16 bits
- Analog outputs: 0 to 21mA, 12-bit minimum
- 4 Wire RTD: PT100 (-100 to 200°C)
- Digital input: 30Vmax optically isolated
- Digital output: Open collector, 36Vmax, 100mA
- Dual pulse inputs: DC to 10kHz, ISO 6551 level A or B
- Pulse outputs: Open collector, DC to 100Hz
- Prover pulse: Open collector, DC to 5kHz
- Sphere switches: Supports 2 or 4 switch mode
- Densitometer input: DC to 10kHz, 3Vpk-pk

Power:
- Supply voltage: 20-32VDC, 24W (nom.)
- Protection: 1.0A / 250V
- Supply isolation: Galvanically isolated from unit to earth, 240V flash
- Transducer Outputs: 24VDC, 150mA; 15VDC, 100mA

<table>
<thead>
<tr>
<th>BOARD CAPABILITY</th>
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<tbody>
<tr>
<td><strong>PROVER BOARD</strong></td>
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<tr>
<td>Digital input</td>
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<tr>
<td>Digital output</td>
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<tr>
<td>Prover input</td>
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<tr>
<td>Detector switches</td>
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<tr>
<td>Dual Chronometry</td>
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<td>Flight timers</td>
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<table>
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<tr>
<th><strong>CPU BOARD</strong></th>
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<tbody>
<tr>
<td>RS232</td>
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<tr>
<td>RS422</td>
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<tr>
<td>Ethernet</td>
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<table>
<thead>
<tr>
<th><strong>INTELLIGENT I/O BOARD</strong></th>
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<tbody>
<tr>
<td>Analog in</td>
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<tr>
<td>Analog out</td>
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<tr>
<td>4 wire RTD</td>
</tr>
<tr>
<td>Digital input</td>
</tr>
<tr>
<td>Digital output</td>
</tr>
<tr>
<td>Dual pulse inputs</td>
</tr>
<tr>
<td>Densitometer inputs</td>
</tr>
<tr>
<td>Pulse outputs</td>
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<tr>
<td>HART board</td>
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</tbody>
</table>
Mechanical Specifications

Physical:
- **Front panel:** 85mm/3.35" (w) x 270mm/10.63" (h) x 24mm/.94" (d)
- **Case depth:** 304mm/12" (+75mm/2.95" for connectors)
- **Panel cut out:** 65mm/2.56" x 255mm/10.04"
- **Weight:** 4.3Kg/9.8lbs

Operating:
- **Operating temperature:** -0°C/32°F to +50°C/122°F
- **Storage temperature:** -40°C/-40°F to +70°C/158°F
- **Relative humidity:** 90% non-condensing

Panel Case:
- **Structure:** Painted, spot-weld steel outer case, plastic front panel
- **Access:** Circuit boards installed from rear
- **Mounting:** Two concealed screw operated panel clamps
At Daniel, we are focused on providing superior customer service. Through our ongoing practices of continuous improvement, training and development, and solicitation of customer feedback, Daniel Measurement Services, Inc. is committed to being the world’s leading provider of value-added measurement services.

Daniel Measurement Services is comprised of a specialized group of service engineers, technicians, and training personnel who are dedicated to customer satisfaction. This global team is available to respond to your start-up, training, or service needs twenty-four hours a day. Daniel provides solutions to your every service need, any time, anywhere.

Service offerings include:

- Start-up and commissioning
- Product Repair / Upgrades
- Preventive Maintenance
- Educational Services
- Remote Diagnostics
- Warranty Plus!
- Project Management and Integration

Daniel Measurement Services also offers a series of educational courses essential to customer success. Courses can be at the factory or the customer’s location, and are taught by an accredited engineer, technician or other trainer. Courses include product instruction on proper operation of Daniel Valves, Liquid Ultrasonics, Presets, Brooks® Compact Prover™ and other instruments for fiscal flow measurement applications.

Daniel Measurement Services’ commitment to being the world’s leading provider of value-added measurement services, affirms that the Daniel support of customers has never been stronger.
Daniel Measurement and Control, Inc. is the industry leader in designing, constructing and commissioning of complex oil and gas metering systems to exacting standards.

This global organization offers decades of fiscal petroleum flow measurement application experience. Customers rely on Daniel’s Engineered Systems Group’s international fabrication facilities, customized engineering and success in field-testing and support. From the simplest single-stream skid to complex on-site installations, Daniel delivers both natural gas and liquid petroleum turn-key applications. The Daniel Engineered Systems team designs, constructs and commissions the metering project, blending up-to-the-minute technology with decades of understanding what customers need and expect.

Components of a Daniel Engineered System installation typically include meters, valves, provers, flow-control instruments, instrumentation and read-out equipment, and process management components. Computer software and hardware are integrated with the measurement system. Standard calculation methods include AGA 3 (now API-MPMS-14.3), ISO 5167, AGA 5/7/8, AGA 9 and the API Manual for Petroleum Measurement Standards.

Daniel DMSS-2000 Supervisory Control System utilizes a sophisticated Graphical User Interface, database server, and a dedicated PLC for the metering skid/MOV interface. Redundancy is often used for custody transfer systems and/or when system integrity is essential.

A dedicated project manager and project team are assigned to each measurement system project. This team is responsible for overall system design and project construction from start, to finish. A separate internal QA/QC group reviews all design details, inside and outside fabrication, assembly and system testing.

Whether it is a pipeline, offshore production facility, or a loading facility for ocean-going tankers, Daniel Engineered Systems is a proven, single-source solution for customers throughout the world.