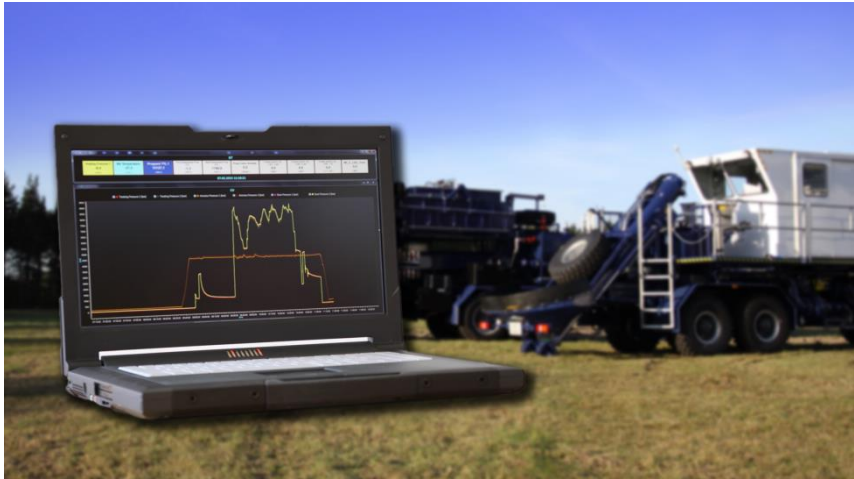




PRIME WELL SERVICE INSTRUMENTATION

ROYAL OAKS ENERGY SERVICES



Prime Well Service Instrumentation

DMS / DMH - Oilfield Data Acquisition System



Royal Oaks ES is the exclusive distributor for Mexico and South America

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Our newly developed Data Acquisition (DAQ) system for coiled tubing operations, allows you to monitor the following parameters:

- ✓ 8 Analog inputs (two of these are equipped with intrinsic safety barriers):
 - Pressures: Circulating, wellhead
 - Temperature (N2)
 - Weight
 - Pipe Heavy and Pipe Light separate as two separate channels.
- ✓ 4 Frequency inputs
 - Any Rates (Pump, Turbine, N2, ...)
 - All rate channels include a totalizer.
 - It is also possible to combine channels together, such as for example Pump Rate Curb Side and Pump Rate Road Side of a Twin Pump.
- ✓ 2 Encoder inputs
 - 2 x Depth and Speed (both of one channel)

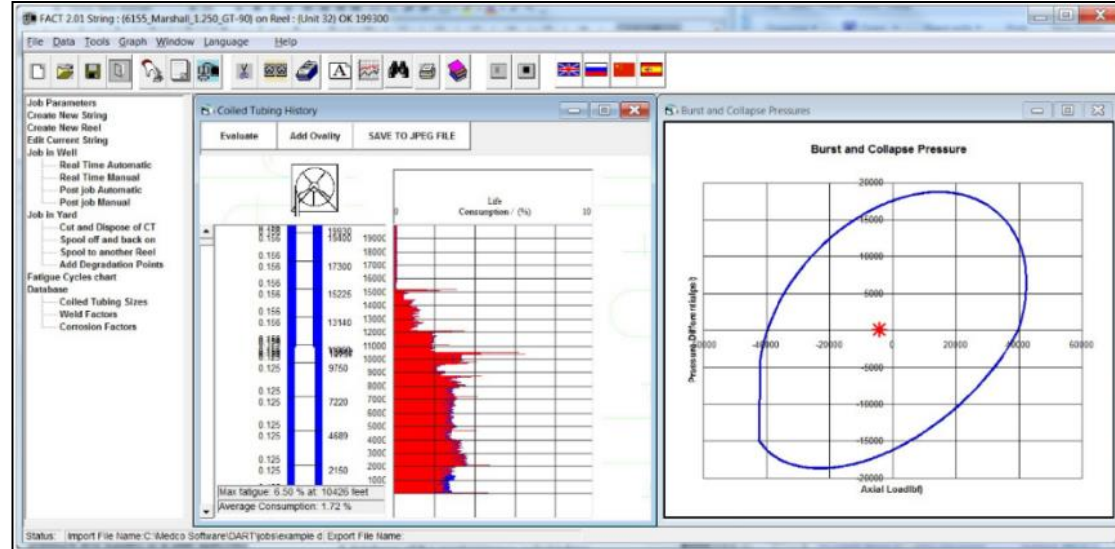


Use case Coiled Tubing

To perform Coiled Tubing jobs, at least two different units are required: the CTU and the pump. Depending on the job, there can be also additional equipment such as an Acid- or Chemical system, a Nitrogen unit or a Datavan.

Each unit can be connected via Ethernet or Wifi to the main Data Acquisition System to reduce the wiring, or via individual signals from each single sensor to keep the costs for the DAS small.

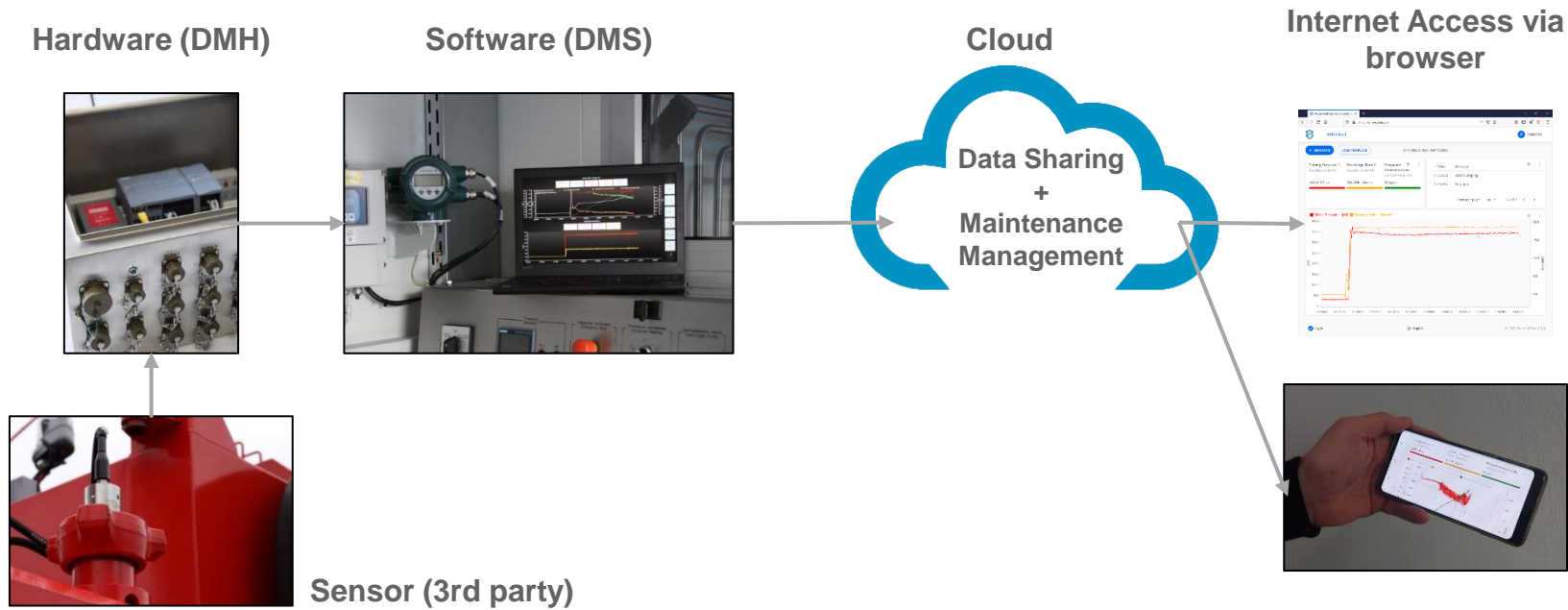
The DMS laptop communicates with the CT Fatigue tracking software, DMS is compatible to the cost effective solution FACT and TAS from Medco and it is also compatible to the modern distributed online systems from Stimline and CoilData.





DAQ - System Overview

Data Acquisition is the process of sampling signals that measure real world physical conditions and converting the resulting samples into digital numeric values that can be manipulated by a computer.* The Prime system consists of sensors, a sensor junction box (DMH) and a PC-software (DMS) for recording, visualization, simulation and reporting. The cloud adds an easy-to-use remote transmit option for access via any web browser. The hardware can be configured and troubleshooted by using a dedicated configuration software, local and remotely.



* Source: https://en.wikipedia.org/wiki/Data_acquisition



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DMS – Data Management Software

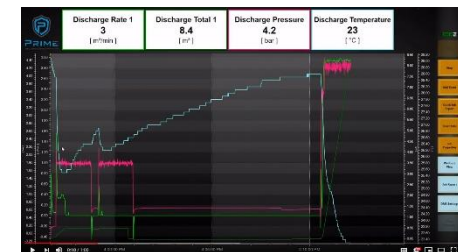
The Prime DMS is a real-time Data Acquisition software suite. It is designed to meet the operator's and engineer's needs, by integrating an intuitive interface with advanced function for analyzing and reporting of the well treatment on site, or post job in the office. ASCII job data can be also imported from separate acquired CSV-files or read from 3rd party equipment.

The online monitoring function is used to observe ongoing jobs in real time. Automatic unit detection simplifies the start-up in the field to a few clicks. Saved configurations can start automatically.

The advanced reporting functions include data optimization like filtering or graphical formatting, as well as automatically generated post job reports with a clear focus on intuitive handling and time savings.

The use of digital gauges, charts, tables and other windows can be set up to the specific needs of the customer and saved in recallable templates.

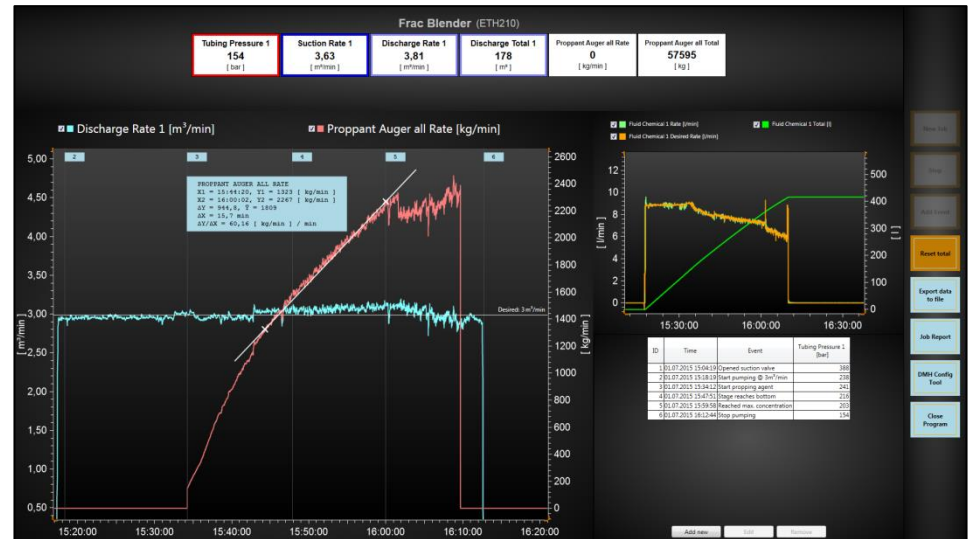
DMS can run on any typical MS Windows PC like laptops, workstations, tablets and vehicle PCs.





DMS – Key Features

- Intuitive and modern interface
- Real-time recording
- Multiple charts and digital displays
- Import and export data (CSV/Excel)
- Visual and audible alarms
- Multiscreen usage
- Connects to any compatible hardware (TCP via Ethernet or Wifi, Serial)
- Data processing (filter, offset, ...)
- Recallable window templates
- Logging of event with current timestamp
- Exporting of pictures
- Generation of automatic post job reports
- Mathematical function in real-time or post-job
- Collection and combination of data from different sources in once (e.g. Frac- or CT-fleets)





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DMS Cloud / MMS

DMS Cloud offers the industry's most cost effective and easy to use solution to enhance your local data acquisition products into the cloud. Grant access to view data in any web browser, on any PC, tablet or smartphone. Just click the automatically generated, password protected link to open your data in any web browser. For full access, simply setup user accounts.

The integrated asset and maintenance management system offers a cost sensitive fit for purpose solution specially designed for the needs of Well Service companies. Fully automated maintenance scheduling with auto synchronized hour counters reduce labor and potential mistakes. Preventive and corrective action are automatically tracked and readily available at any time. The maintenance relevant technical parameters of any connected equipment is automatically collected and can be plotted.

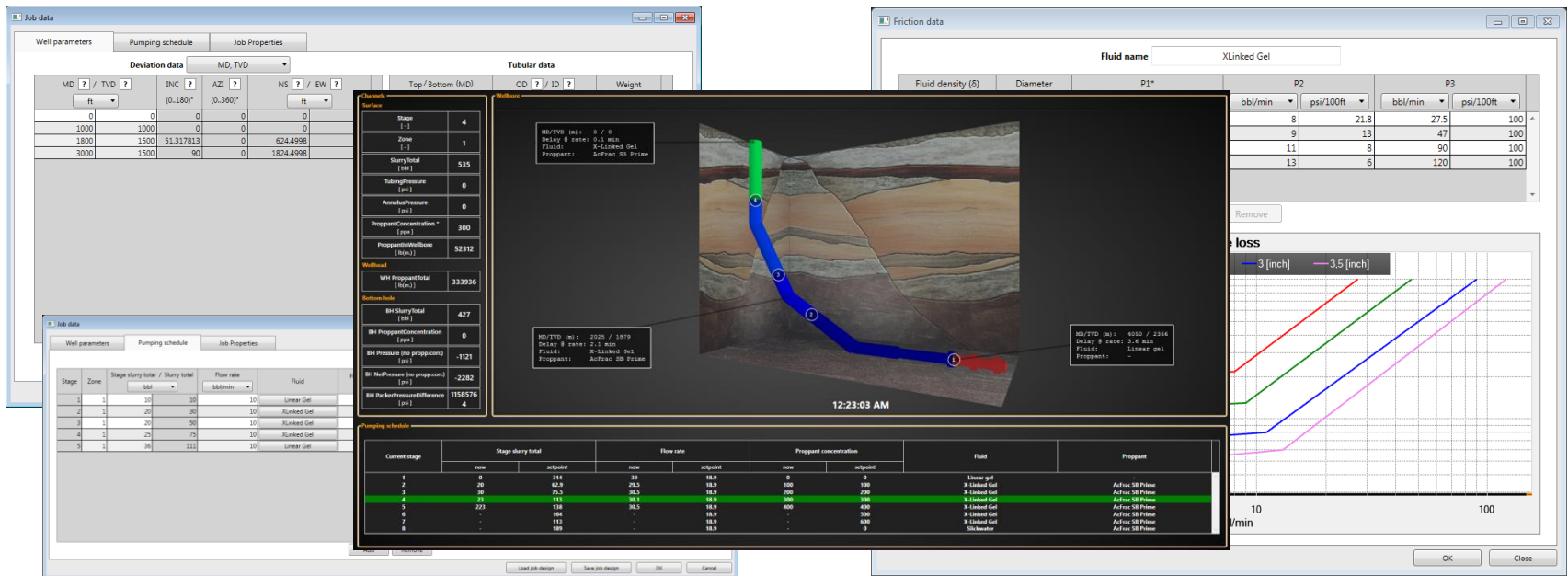


My Company	Assets
Departments	Search...
Employees	<input type="checkbox"/> DESCRIPTION ID WORKHOURS TOTAL ACTIVITIES OPERATIONAL STATUS
Parts	<input type="checkbox"/> Frac Blender 120 BPM BLD-103 1100 Activities (0) ACTIVE
Fleet 1	<input type="checkbox"/> Frac Pump FP-395 6713 Activities (2) ACTIVE
Assets	<input type="checkbox"/> Frac Pump FP-401 3954 Activities (2) ACTIVE
Templates	<input type="checkbox"/> Frac Pump FP-397 1823 Activities (2) ACTIVE
Activities	<input type="checkbox"/> Frac Pump FP-396 3250 Activities (2) ACTIVE
Scheduled Reports	<input type="checkbox"/> Frac Pump FP-1001 1200 Activities (2) ACTIVE
Notifications	<input type="checkbox"/> Frac Pump FP-400 4500 Activities (2) ACTIVE



DMS – Stimulation / 3D Bottom Hole Pressure Tool

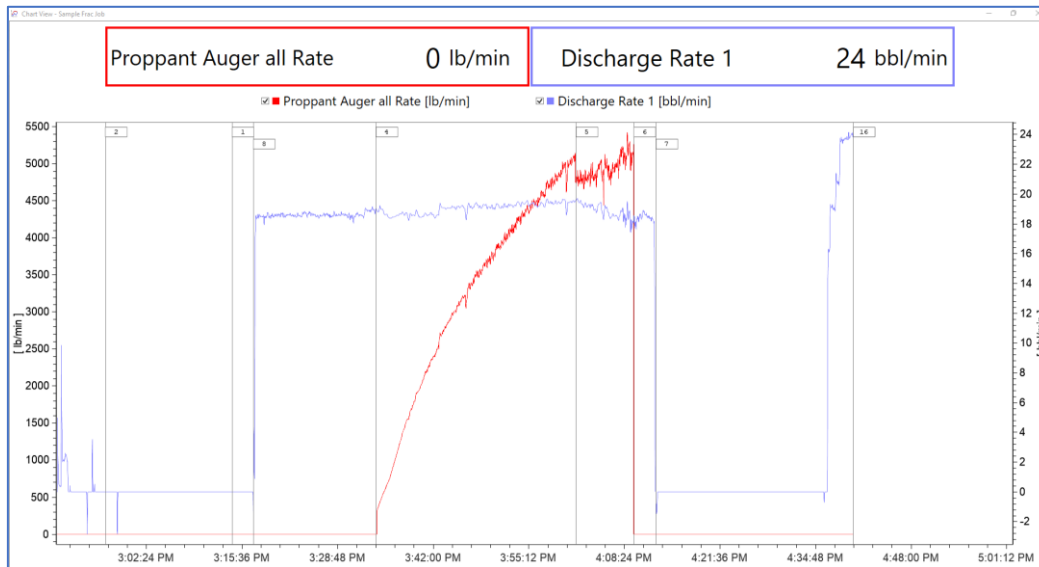
The 3D BHP Tool provides an accurate calculation of the pressure at the bottom of the well. It incorporates the surface pressure, the hydrostatic pressure and the friction pressure loss into a dynamic calculation depending on the well-, fluid- and proppant properties. Wellbore survey data or an approximation of this is used for a representative incorporation and visualization of the well. Fluids and proppants are taken from a data base into a pumping schedule steps.





Event logging

DMS provides a tool for logging events with the current timestamp to the database. These events can be shown in charts and attached to the automatic post job report.

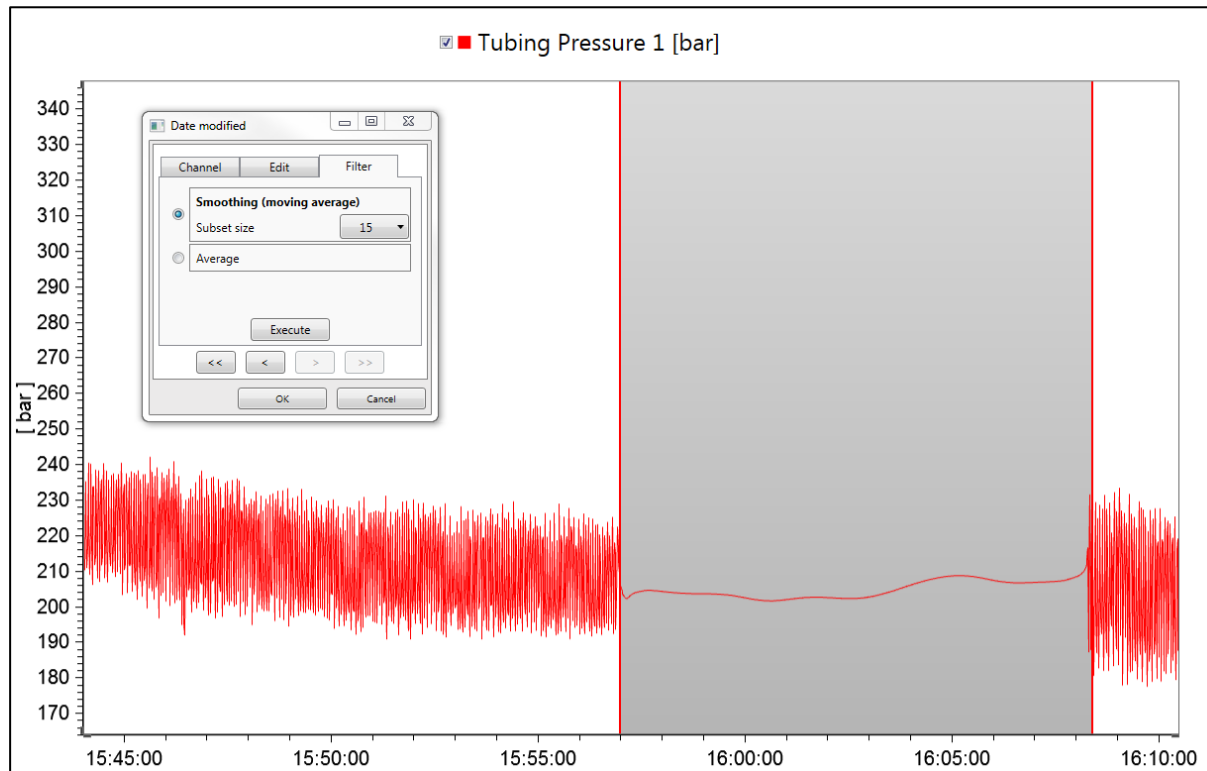


ID	Time	Event	Tubing Pressure 1 [psi]
2	7/1/2015 2:56:43 PM	Pressure test	5474
1	7/1/2015 3:14:14 PM	Start job	36.9
8	7/1/2015 3:17:10 PM	Step 1.	315
4	7/1/2015 3:34:06 PM	Start proppant	3489
5	7/1/2015 4:01:44 PM	Densitometer error	2943
6	7/1/2015 4:09:42 PM	Stop proppant Start flush	2941
7	7/1/2015 4:12:46 PM	Stop pumping	2297
16	7/1/2015 4:40:00 PM	Job end.	2231



Filtering

DMS provides an easy way for filtering fluctuating data to create presentable reports. The modified values are saved additionally as a second set of data and the original data will always be kept in the database.





Reporting tool

DMS provides a simple but customizable reporting tool that can create automatic post job reports within a few clicks. The report is based on a pre-defined word template that can be customized by the user. This template allows operators to customize header information, automatically generated screenshots and tables. All the necessary information can be fed into the system while the job is running. Preliminary or final job reports can be generated within seconds at any time.

Quick Job Report

Job:

Content:

Window template:

Bookmarks:

Job_Name:

Customer_Name:

Customer_Address:

Customer_Contacts:

Job_Location:

Job_Start:

Job_End:

GOES GmbH
Munchnener Str 32
29392 Wesendorf

ID	Time	Logging Pressure 1 (bar)
1	01.07.2015 14:50:00	2108
2	01.07.2015 14:50:00	8179
3	01.07.2015 14:50:00	2412
4	01.07.2015 14:50:00	2412
5	01.07.2015 14:50:00	2412
6	01.07.2015 14:50:00	2412
7	01.07.2015 14:50:00	2412
8	01.07.2015 14:50:00	2412
9	01.07.2015 14:50:00	2412
10	01.07.2015 14:50:00	2412
11	01.07.2015 14:50:00	2412
12	01.07.2015 14:50:00	2412
13	01.07.2015 14:50:00	2412
14	01.07.2015 14:50:00	2412
15	01.07.2015 14:50:00	2412
16	01.07.2015 14:50:00	2412
17	01.07.2015 14:50:00	2412
18	01.07.2015 14:50:00	2412
19	01.07.2015 14:50:00	2412
20	01.07.2015 14:50:00	2412
21	01.07.2015 14:50:00	2412
22	01.07.2015 14:50:00	2412
23	01.07.2015 14:50:00	2412
24	01.07.2015 14:50:00	2412
25	01.07.2015 14:50:00	2412
26	01.07.2015 14:50:00	2412
27	01.07.2015 14:50:00	2412
28	01.07.2015 14:50:00	2412
29	01.07.2015 14:50:00	2412
30	01.07.2015 14:50:00	2412
31	01.07.2015 14:50:00	2412
32	01.07.2015 14:50:00	2412
33	01.07.2015 14:50:00	2412
34	01.07.2015 14:50:00	2412
35	01.07.2015 14:50:00	2412

GOES GmbH
Munchnener Str 32
29392 Wesendorf

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29392 Wesendorf

Frac Job - Celle, #56

REPORT

CUSTOMER

NAME: GOES GmbH
ADDRESS: Münchener Straße 32 29392 Wesendorf
CONTACTS: Adam Czech <Adam.Czech@goes-well.com> Andre Blidon <Andre.Blidon@goes-well.com>

JOB

LOCATION: Celle field, #56
START: 01.07.2015 14:50:00
END: 01.07.2015 16:40:00

Comment

COMMENT: Job complies to design

1 | 3



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Software editions

DMS Lite

- Realtime recording from one unit at a time
- Charts and digital displays
- Fast Reporting tool for local storage
- Set up audible and visual alarms
- Multi screen usage
- Connects to any compatible hardware (TCP or Serial)

DMS Pro

- Realtime recording from multiple units at the same time
- Charts and digital displays
- Fast and Advanced Reporting tools with E-mail function
- Set up audible and visual alarms
- Multi screen usage
- Connects to any compatible hardware (TCP or Serial)
- Logging of events with timestamp to data base
- Detailed data export to CSV
- Send ASCII data via Serial Port and Ethernet

DMS Add-Ons

DMS Pro can be extended by several add-ons to specific applications such as:

- 3D tubing visualization and pumping schedule with fluids and proppants database for realistic real-time calculation of the Bottom Hole Pressure (BHP Tool)
- 2D tubing concentration value visualization (Wellbore View 2D)
- Coiled Tubing specific software functions (FACT / TAS)
- Wireline interface
- Customer specific functions can be implemented on request

System requirements: Windows 7 or higher - 64 bit, 4 GB RAM, 20 GB free space on hdd. Reporting requires MS Word. E-mailing requires MS Outlook.

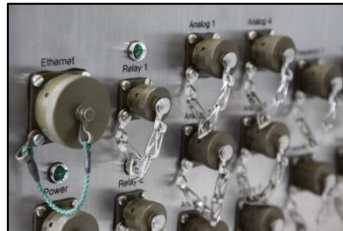


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DMH - Data Management Hardware

The Prime DMH is built on the Siemens platform. The hardware converts electrical signals from the sensors to numeric values. Prime offers many different hardware configurations to suite many applications. Prime can provide suitcase versions as well as systems for permanent installation. The system can be equipped with cold- or hot-weather package. A variety of connections and also the use of intrinsic safe sensors in Ex zones is available. The system also provides digital relay outputs for the auxiliary equipment like alarm notification or overpressure shutdown. As an option, a 7" outdoor touch panel is available.





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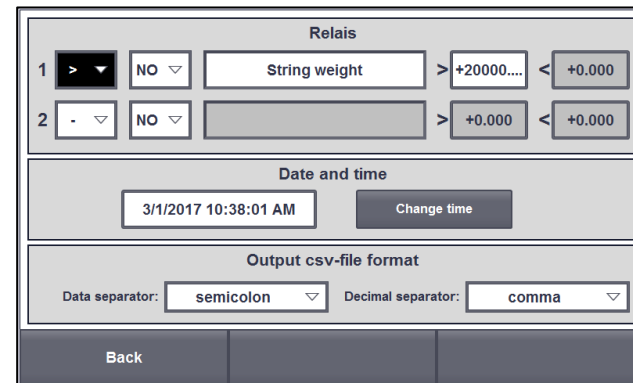
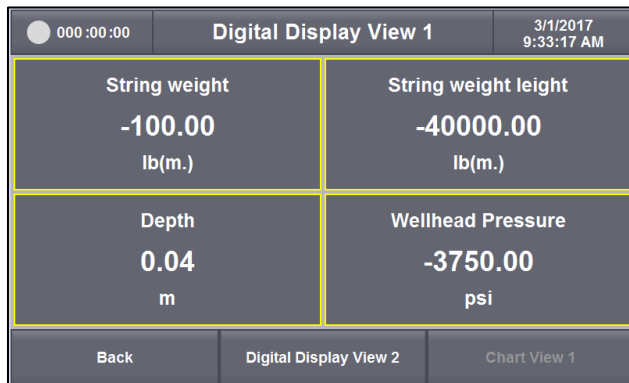
Features

- Siemens PLC
- Waterproof IP65
- Cold- and hot-weather package
- Analog channels for pressure, temperature, electronic flowmeter, level, density, ...
- Frequency/counter channels for pump shaft pickup, turbine, revolutions, ...
- Encoder channels for depth and speed in CT-application or similar
- Relay outputs for external signaling or control functions
- Totalizer function
- Optional Siemens touch display with local storage and USB export
- Fit for purpose build in solutions available
- TCP-ASCII output
- Configuration utility for MS Windows free available
- 3-Year Warranty



Optional touch display features

- Siemens SIMATIC HMI TP700 Comfort Outdoor
- Available as add-on set for any DMH channel configuration
- 7" display
- Waterproof IP66 (Nema4x)
- Shows 4 or 9 channels simultaneously
- Provides internal recording for 50 jobs on an internal SD-card
- Export of acquired data to USB stick
- Easy access to DMH relay settings, totalizer resetting and others





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Use case Frac Davan

The typical Davan installation consist of a hardware system with analog and frequency inputs as well as DMS Pro along with the 3D BHP Tool.

Wellhead sensors, high pressure turbines and densitometers can be connected directly to the hardware inputs.

Data from Blender, Fracpumps and other equipment on site is read by DMS directly from the units via Ethernet or Wifi connection.

Multiple individual screens show the important data directly at the responsible persons work place in the desired format as gauge, chart and in the 3D BHP Tool. The BHP Tool shows the current stages running along the wellbore in real-time until they hit the perforation.

Redundant IT prevents the loss of data in case of computer problems. Usage of rugged industrial IT reduces system failures to a minimum.





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Use case Nitrogen

Some Nitrogen jobs are very cost sensitive and the Data Acquisition should fulfill only the main purpose of documenting the used amount of nitrogen. In this case, a simple system with a digital display and a USB export function is very suitable. If needed, a laptop can be used to get a more advanced Data Acquisition System.

If the nitrogen job is performed in conjunction with Coiled Tubing, the Data Acquisition should send the Nitrogen related data to the CTU or maybe a Datavan since the main display as well as the supervisor are located here.

To fulfill the entire range of Nitrogen applications, a simple build-in hardware with a digital values display and USB export can be used. In conjunction with a laptop or a CTU, the data is transferred via Ethernet or Wifi.





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Contact

Royal Oaks Energy Services, LLC
10777 Westheimer Rd, Suite 100
Houston, Texas 77042 USA

Office: +1 (281) 591-9634
Cell: +1 (504) 638-7801
sales@roes.online • www.roes.online

Prime WSI, Inc.
1544 Sawdust Rd, Ste 301
The Woodlands, Texas 77380 USA

Tel: +1 (866) 203-7744
info@fraccontrols.com • www.fraccontrols.com

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