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1 DMS Installation

1.1 Installing the DMS

To start installing the DMS software simply run

After doing so will be prompted to install SQL Server.

![Figure 1.1: SQL Install]

Press the **Install** button and the setup will begin installing.

Note that if SQL Server is detected on the device from a previous installation, this step will be skipped and the setup will proceed to directly installing the DMS.

Wait for the setup to copy all the files.
Once it is done copying the files you will be asked to restart the computer for the installation to proceed. Press Yes to restart now.

When the computer restarts wait for the InstallShield Wizard to complete its task. At this point the InstallShield Wizard will be running in the background, wait for the next prompt before doing anything else.
Figure 1.4: DMS Installation

Press **Next** to continue.

Figure 1.5: User name and Organization

You are now required to provide a user name and an organisation name.

After both text boxes have been filled with this information press **Next**. In the next window press **Install**.
After the setup has finished installing the software you will be given two options: Finish the setup or you can select Launch DMS and then press Finish to open DMS after closing the InstallShield Wizard.

*Figure 1.6: Ready to Install*

*Figure 1.7: Finished installing*
2 Getting started

2.1 DMS First Look

Once you’re done installing the software, the setup will create a shortcut icon from which you can run it, called DMS.exe.

Figure 2.1: DMS icon

Run DMS.exe. Windows firewall will detect this application and the following message will pop up:

Figure 2.2: Windows Firewall

Tick all networks and click Allow access.
After being granted access DMS will start creating the files it needs to run, as well as loading sample data from an actual job for testing purposes. Wait until the process is complete after which the main DMS window will be displayed.

![DMS Main Window](image)

**Figure 2.3: Loading sample data**

![DMS Main Window](image)

**Figure 2.4: DMS main window**
Here is a brief overview of what each box does (Check individual Chapters for detailed information):

- **Data Reader** - Select which units to read data from.
- **Data Creator** - Create and add data calculated from received data.
- **Data Sender** - Send data over TCP/IP or Serial connections.
- **Digital Display View** - Digital display of job data
- **Chart View** - Chart display of job data
- **Data Table View** - Job Data Table
- **Load** - Load saved Digital Displays and Charts.
- **Save** - Save Digital Displays and Charts with their current settings.
- **Close Windows** - Close all Digital Display View and Chart View.
- **Settings** - DMS settings.
- **Import** - Import jobs from .txt files.
- **Export** - Export jobs as .txt files.
- **Job Report** - Manage job reports.
- **DMH** - Open the DMH config tool.

### DEMO MODE

If your DMS software is not licensed, you are going to see the message DEMO MODE in the main DMS window. **You can still use and test, via the provided sample job file, the important functions of the DMS in DEMO MODE** but there are advantages to having a license. More on these advantages and on getting a license in the **Settings** chapter.
3 Quick Start

Quick Start-up steps (See individual chapters for details):

Figure 3.1: Set role in system

Figure 3.2: Configure network connection
**Figure 3.3: Configure unit and channel lists**

**Figure 3.4: Data Reader, choose units**
At this point you are receiving data. The next step is to set up **Data Creator** and **Wellbore View**.

Note that the channels you create with Data Creator can be used in Wellbore View and the channels created with Wellbore View can be used in Data Creator. Thus you can either configure Data Creator or Wellbore view next depending on your requirements.

**Figure 3.6: Start Data Creator**
The next step is to open:
- Chart Views
- Digital Display Views
- Data Table View

The last step is sending your data if and when it is needed:

![Figure 3.7: Data Sender connection set-up](image)

![Figure 3.8: Start Data Sender](image)
4 Settings

The settings function allows you to set up your DMS’s role, network connection, language, measurement units, database management, licenses and you can get information about the software.

4.1 Role in system

One of the most important settings is the role in system one. This determines how and where the DMS gets its data from. There are are 3 choices to choose from. For the system to be working properly you require one computer to be working as Primary Server. It will store and manage data. For safety purposes you can use a secondary computer set on secondary server. It will store data independently from the primary, but will automatically take all the settings from the primary. Once the primary has been started the secondary starts automatically aswell. Every other computer can work as a client that can read data from either primary or secondary.

4.2 Primary Server

You set your DMS as primary server thus having permission to read, to write and edit your own database that others can only read from. You can also read from other databases on the network.

Note that you **cannot** use Data Reader, Data Creator or Data Sender unless set as Primary Server!
4.3 Secondary Server

You set your DMS as secondary server that will be able to read and write its own database (independent from the primary’s) and act as a backup in case the primary server goes offline (if primary crashes secondary takes over but does not automatically become a primary server). **Data Reader, Data Creator and Data Sender will not be available** for the secondary server. You can read from other databases on the network.

4.4 Client

You set your DMS as a client thus being able to read data from the available databases, but are not able to write or edit any data. You cannot access **Data Reader, Data Creator and Data Sender**.

4.5 Network Connection

In the Network Connection tab, you can set up your connection by choosing one of available connections to your device by clicking **Choose**.

![Network Connection](image)

**Figure 4.2: Network Connection**

Select connection and click **OK**.
Now you can see the connection name, a description of said network, your IP address on the network and the status of the network. Once connected to a network you can read the databases on the network and be a secondary server as backup.

Figure 4.4: Ethernet connection
4.6 **Unit and channel lists**

From the **Unit and channel lists** tab you can view, add, create and edit your unit's names, settings and channels.

![Units and channel lists](image)

*Figure 4.5: Units and channel lists*

If you wish to add a new unit, remove a unit or edit an existing one simply press the **Add**, **Edit** or **Remove** button.

Once a unit been configured and saved it will appear in this list, with the name you've given it, the ID and the connection parameters.
Figure 4.6: Unit set-up

You can set up a name, a displayed name in one of the languages available for the DMS in case you are using multiple (if not the field can be empty), the ID of the unit and the provider.

In the connection parameters portion you can specify the connection type LAN/WLAN/Serial and the corresponding protocol for the connection. If LAN/WLAN is selected, you need to specify the IP of the unit and the ports used for communicating (if a unit sends data on only one port a secondary server cannot be connected. You can set just 1 port but that means you will not be using the 2nd port for a secondary server as a backup.

If you’re using a serial connection you have to select a Default port, the Baudrate, the number of data bits, the parity and the number of stop bits.
The next panel is the Data format which allows you to specify whether that unit sends data with date and time. To enable this simply tick the box next to Date and time in incoming data (data is saved with computer time irrespective of this option). You can manage the format of the data by selecting the separator used after date and time and between the values in the data stream (see example above).

The Channel list section allows you to specify a .txt file from which to load channel settings for this unit. You can Browse and Edit an existing one or you can Create new. The Generate list from data function connects to your unit and creates a channel list based on the available channels of that unit.

![Image of unit configuration panel]

Figure 4.7: Unit set-up

### Data format examples

<table>
<thead>
<tr>
<th>Date and time in incoming data</th>
<th>Separator after date and time</th>
<th>Separator between values</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>tabulator</td>
<td>semicolon</td>
<td>19.04.2016 10:30:50 1;2;3;4...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10:30:50.123;1,2,3,4...</td>
</tr>
<tr>
<td>✓</td>
<td>semicolon</td>
<td>comma</td>
<td>19.04.2016 10:30:50;1,2,3,4...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10:30:50.123;1,2,3,4...</td>
</tr>
<tr>
<td>✓</td>
<td>semicolon</td>
<td>tabulator</td>
<td>19.04.2016 10:30:50;1 2 3 4...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10:30:50.123;1 2 3 4...</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>semicolon</td>
<td>1;2;3;4...</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>tabulator</td>
<td>1 2 3 4...</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>comma</td>
<td>1,2,3,4...</td>
</tr>
</tbody>
</table>

Figure 4.8: Data format examples
Move up and Move down are functions that facilitate the reordering of the channels. Remove deletes your currently selected channel. Add channel adds a new channel to your list.

You can also select the visibility of each channel by ticking or unticking the Is visible box corresponding to that channel and you can select whether to display the channel in a specific color throughout all the DMS functions or not. Note that editing visibility and color display will take effect for every job done afterwards but it will not retroactively apply to old jobs.

Once proper settings have been input the unit can be test by pressing the Test button. In this new window you can see the incoming data, the channels, the data ASCII stream, and the table created from the incoming data.
Figure 4.10: Unit test

Once you’re done testing you can **Close** the test window and then press **OK** to save your newly created unit.

### 4.7 Measurement unit system

Figure 4.11: Measurement unit system
In the Measurement unit system, you can select the unit of measurement that you are using from a list of predefined ones or create your own custom units.

By selecting **New size and unit** you get to create a new physical size and unit in one of the given languages.

![Create unit of measurement](image1)

**Figure 4.12: Create unit of measurement**

By selecting **New Unit**, you get to add the unit of measurement of an already existing physical size by setting the Factor and Offset in reference to the main unit. You can create custom units.

The **Edit** button is only usable after having selected a unit from the existing ones and allows you to edit that unit.

![Edit unit of measurement](image2)

**Figure 4.13: Edit unit of measurement**
4.8 Database management

The Database management windows contains information regarding the maximum space size of the database, the actual space reserved for it on the hard drive and the current size of the database.

Figure 4.16: Database management

Three functions are present here:
- Archive job(s)
- Retrieve job(s)
- Remove job(s)

Archiving job(s)
Clicking the **Archive job(s)** button will open a new window, where you can set the destination folder of the archive save file.

![Select folder](image1)

**Figure 4.15: Archive job(s), select folder**

Clicking **OK** takes you to the job selection window, where you select the jobs you want to archive by ticking the box on the right side.

![Job selection](image2)

**Figure 4.17: Archive job(s), selecting job(s)**

Press **Archive job(s)** once you have selected the job(s) you want to archive. A status window will appear.

![Status window](image3)

**Figure: Archive job(s), status**
After the operation is complete a dialog box will appear, asking whether you want to delete your selected job(s) from the database or not (they have already been saved). Click Yes or No accordingly.

![Job deletion confirmation](image)

*Figure: Job deletion confirmation*

**Retrieving job(s)**

The retrieve job(s) button opens a new window from where you can select the source folder of your backup files.

![Retrieve job(s)](image)

*Figure: Retrieve job(s)*

After you have selected the folder click **OK**. From the new window you can select the job(s) you want to retrieve by ticking the box on the right side corresponding to each job(s).

![Retrieve job(s), job selection](image)

*Figure: Retrieve job(s), job selection*
After clicking **Retrieve job(s)** a status window will appear. Click **OK**.

![Retrieve job(s) status](image)

*Figure: Retrieve job(s), status*

**Removing job(s)**

The remove job(s) button allows you to remove job(s) from the DMS database. Select the job(s) you want to remove by ticking the box on the right side corresponding to the job(s) you want to delete.

![Remove job(s), job selection and confirmation](image)

*Figure: Remove job(s), job selection and confirmation*
4.8 Main View

The main view tab allows you to change the size of the buttons from DMS’s main view window as well as their visibility. You can select which of these functions you want displayed by ticking or unticking the box next to their name.

Figure 4.18: Main view settings

Figure 4.19: Main view after changing settings
4.9 Language

From the language tab you can select the display language of the DMS by selecting one of the existing ones.

Figure 4.20: Language Settings

4.10 License

The license tab allows you to manage your license for this software. Running DMS without a license puts it in DEMO MODE. Whilst every essential function is available in DEMO MODE buying a license offers access to some extra features like Data Creator and Data Sender using an unlimited number of channels for your digital and chart views.

Figure 4.22: License settings

To get a license you can contact your software provider for a dongle (hardware key) or make a request for a license file (software key) using the **Buy license file** button.
### Figure 4.21: License options

<table>
<thead>
<tr>
<th>Standard features</th>
<th>Basic</th>
<th>Professional</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Reader</td>
<td>✓</td>
<td>✓</td>
<td>Connecting and recording data from units</td>
</tr>
<tr>
<td>Data Creator</td>
<td></td>
<td>✓</td>
<td>Creating new data calculated form received data</td>
</tr>
<tr>
<td>Data Sender</td>
<td></td>
<td>✓</td>
<td>Sending data to other computers/programs (e.g. M-Frac)</td>
</tr>
<tr>
<td>Digital Display View</td>
<td>✓</td>
<td>✓</td>
<td>Displaying Digital Data</td>
</tr>
<tr>
<td>Chart View</td>
<td>✓</td>
<td>✓</td>
<td>Visualizing data on charts</td>
</tr>
<tr>
<td>Data Table View</td>
<td>✓</td>
<td>✓</td>
<td>Displaying data in table</td>
</tr>
<tr>
<td>Import data</td>
<td>✓</td>
<td>✓</td>
<td>Importing data form text files</td>
</tr>
<tr>
<td>Export data</td>
<td>✓</td>
<td>✓</td>
<td>Exporting data to text file</td>
</tr>
<tr>
<td>Job Report</td>
<td></td>
<td>✓</td>
<td>Automatic job reporting based on custom templates</td>
</tr>
<tr>
<td>Load/Save templates</td>
<td>✓</td>
<td>✓</td>
<td>Loading, saving actual view and settings as templates</td>
</tr>
<tr>
<td>Backup Data</td>
<td></td>
<td></td>
<td>Connecting and synchronizing settings with first computer. Recording the same data independently on second computer</td>
</tr>
</tbody>
</table>

1. USB Dongle (hardware key)

![USB Dongle](image)

*Figure 4.23: USB Dongle*

The dongle can be used on any system that has the DMS installed and grant full privileges as long as it is plugged into the device.
2. License file

The license file is a software key that grants the computer it is installed on the ability to run the DMS in full mode. It can only be used on the device it has been installed on.

![License file request](image)

**Figure 4.24: License file request**

Once you have gotten the license file you can simply use the **Activate license file** button and select the license file from your storage device.

4.11 Help

![Help window](image)

**Figure 4.25: Help**

In the help window you can find the DMS User Guide in English and Russian.
4.12 About

In this tab you can find information about the owner of the software, and the version of the software currently on your device.

![Image of DMS Settings]

*Figure 4.26: About*

When changing or editing options in the Settings panel make sure to save these changes either by using the **OK** button or the **Apply** button. Closing tabs using either X or Cancel will not save the changes.
5 Data Reader

5.1 Reading Data

The data reader is one of the main tools of the DMS software and it is used for connecting to the units you want to read data from.

![Figure 5.1: Data Reader, selectings units](image1)

In the main Data Reader window, you can view all of the defined units that are online and you can connect to. You can either have an Ethernet connection or a Serial connection to any device. By default, the DMS will be configured with most units you are going to use.

![Figure 5.2: Data Reader, showing offline units](image2)

Whilst the main window shows ONLY the online units by default you can view the offline units as well by selecting the **Show offline units** option towards the top the screen. This will show you every previously defined unit with an unmarked **Online** box.

In the main window you can connect to the desired unit by ticking the corresponding box under **Connect** and then pressing **Next**.
Figure 5.3: Creating a new Job

From here you can start reading from your unit by using the button **New Job** and assigning a name to this job.

Figure 5.4: Assigning a job name

After doing so the Data Reader automatically connects to the unit. Pressing the **Start** button begins the process of reading data from it.

Figure 5.5: Data Reader, receiving data

You can **Pause** this process and resume it via the **Start** button.

Button **Stop** ends the job, can’t be resumed. Can only create a new job.
When you have connected multiple units and want to start a new job with data from all of them, the counter will not go up and no data will be stored in the database until every single unit has established a working connection (data has been received from all the units). Once data has been received from EVERY unit it will be stored in the database and the counter will increase.

If any unit loses its connection after data transmission has already started the other units will keep receiving data. The database of this unit that has lost its connection will be filled with the last value received until a connection is reestablished.

Figure 5.6: Data Reader, unit disconnected
5.2 Clearing Data

The Clear button clears all the data from the current job. It can only be used after the Pause button has been pressed. You can then resume the job by pressing Start.

![Data Reader screenshot showing Clear button and paused status]

Figure 5.7: Data Reader, pause before you can clear

![Data Reader screenshot showing Clear data dialog]

Figure 5.8: Data Reader, clearing data
6 Data Creator

6.1 Creating new channels

The data creator function allows you to **Add** new data to a running or already existing job. Start by selecting a job.

![Data Creator](image1)

**Figure 6.1: Data Creator**

Add new channel.

![Data Creator](image2)

**Figure 6.2: Data Creator, creating custom channel**
Now you can either overwrite previously created channels or create custom channels or your choosing, by specifying a name, its physical size, the unit of measurement and then creating a formula after which it is calculated (you can define the values of the parameters inside the formula).

Once your channel is created you can test the values it gives by using the **Test** button. When you are ready press **OK** and the new channel will be ready to add to the chosen job.

In the Example above the 3 channels corresponding to Proppant Auger 1, 2 and 3 have been selected and summed with an initial constant of 20kg and named AugersTotal.

Once you are done testing your formula and press **OK** the new channel will be displayed in the main Data Creator window.

You can press **Start** and upload your new channel to the job.

![Data Creator](image)

*Figure 6.3: Data Creator, using the created channel*

You can view the status of the operation and the data sent next to the new channel, in the main window. Multiple channels can be created at the same time. You can save your channels by using **Save**.
## USE MODIFIED DATA

Ticking this option will make the DMS use the modified values of the channel data if they exist, if not, it uses their actual values.

The chart function allows the user to modify job data for different purposes (e.g., smoothing values) and these modified values of a certain channel are stored in an auxiliary block, whilst still keeping its default value in its original block. So each channel uses 2 fields to store its data. In the first it stores the value it reads and in the second one the modified value (NULL if no modified value). That means not ticking the use modified data button will read the original values of the channels whilst ticking it will make it use the modified values. Using modified data is impossible with real data (data that's being recorded in real time).
7 Data Sender

7.1 Sending out data / repeating data

The Data Sender allows your computer to send data to another one either from an already existing job or realtime as it’s reading data. As an analogy it works like a data repeater for other computers to connect to.

![Data Sender](image)

*Figure 7.1: Data Sender*

When running Data Sender, you will be given the option to select the channels you want to use from a job, import your channels from a saved file (previously saved with the Export channel list button) or load previously saved settings. Select a job by pressing ▼ and then select the channels you want by pressing Select channels in the main window. You can only load settings of previously saved settings when they are available. By ticking used modified data you can send modified data (see end of chapter for details).

![Select channels](image)

*Figure 7.2: Data Sender, selecting channels*

Once you are done setting up your channels press OK and then Next.
Now you must configure the connection’s name, the type of connection (LAN/WLAN or Serial) and the other specific connection type settings such as IP and Port for LAN/WLAN and Port, Baudrate etc. for Serial. Click OK once you’re done.

Now you can see the connection you’ve set up in the main window. You can now Add new connections if you need to aswell as modifying the Channel list. You can Save settings for the progress you’ve done for future use and you can also Export channel list so that you can use the file to load your channels from.
its format and separator. The **send only new data** box, if ticked, will make it so the program doesn't wait for any confirmation of whether the sent data has been received or not, and will keep sending new data. When this option is disabled if a confirmation hasn't been received the old data is buffered and keeps getting sent until one is received.

![Data Sender settings](image)

**Figure 7.5: Data Sender, settings**

Once you have set up everything you need you can then press the **Start** button to start transmitting data. Use the **Stop** or **Pause** buttons to take appropriate action as needed.
<table>
<thead>
<tr>
<th>USE MODIFIED DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ticking this option will make the DMS use the modified values of the channel data if they exist, if not, it uses their actual values. The chart function allows the user to modify job data for different purposes (e.g., smoothing values) and these modified values of a certain channel are stored in an auxiliary block, whilst still keeping its default value in its original block. So each channel uses 2 fields to store its data. In the first it stores the value it reads and in the second one the modified value (NULL if no modified value). That means not ticking the use modified data button will read the original values of the channels whilst ticking it will make it use the modified values. Using modified data is impossible with real data (data that’s being recorded in real time).</td>
</tr>
</tbody>
</table>
8 Digital Display View

8.1 Selecting Channels

The digital display view allows you to select the channels from a job and display the data from those channels as a digital display. When you select the current job the digital display will be updated in realtime.

![Digital Display View, selecting channels](image1)

Figure 8.1: Digital Display View, selecting channels

You can use Move up and down to change the order of the selected channels. The Window title is the header of your digital display.

From Job name you select the job you want to load your channels from. Here you can set up a time period to look for the job in, by selecting the dates for from and to as well as the server type used for those jobs: Primary, Secondary or Both. You can also select the server IP from the left hand side of the screen in case there are multiple servers with jobs on them.

![Digital Display View, selecting job](image2)

Figure 8.2: Digital Display View, selecting job
Figure 8.3: Digital Display View, select channels

The Select button is active after a job has been selected. Clicking it will open the Select button window, where you can select the channels you want to use, set the unit of measurement for your channels and see the channel’s actual value. You can always use this window to check the values of your channels without having to open other views. This is good for both double checking your selection and troubleshooting.

On the left hand side, you have a tab with Connection and Unit name. From there you can select what unit you’re selecting your channels from.

On the top side of the window you have several options for sorting your channels. Sort by channel name will sort the displayed channels alphabetically. Show only selected will hide every other channels that has not been selected. Show hidden channels will show hidden channels.

Hidden channels are channels that you have set as such via the visibility tickbox. You can change the visibility of a channel from the Settings/Unit and channel lists tab. Changes in channel lists will take effect for every job done afterwards and not retroactively to older jobs.
The last option **Show units** will only show the channels that match the selected category of units of measurement the channels fall under e.g. volume, mass. After you’ve selected the job you can now **Select the channels** belonging to that particular job that you want a digital display of. You can see in the first picture that 4 channels have been selected for this example. Press **OK**.

At this point DMS will show you a digital display of your selection.

![Digital Display View](image)

*Figure 8.4: Digital Display View*

### 8.2 Context Menu

![Context Menu](image)

*Figure 8.5: Digital Display View, context menu*

By right clicking inside this display you can edit it.

- From **Color theme** you can change the background and foreground color.
- From **Channels** you can edit the channels that are being displayed.
- From **Print** you can print current view.
- From **Export** you can export the display as an image file type of your choosing.
- From **Settings** you can alter the appearance of the display by changing fonts, colors and add alarms.
8.3 Settings

The Window tab contains label color, font and visibility settings. The Value Boxes tab contains color, font and number of decimals settings for the values. The alarm tab allows you to set up alarms for your channels. You can enable an alarm by ticking the Enable box next to your channel. After that you will be able to assign the upper and lower threshold values and whether you should get an alarm for when one of them is reached. You can select the alarm sound from the box in the upper side.

Meaning of alarm bar colors:

- **Green**: value range between \( \text{min threshold} + 10\% \) and \( \text{max threshold} - 10\% \)
- **Orange**: value range between \([\text{min threshold} \text{ and } \text{min threshold} + 10\%]\) and \([\text{max threshold} - 10\% \text{ and } \text{max threshold}]\)
- **Red**: Out of range

*Figure 8.6: Digital Display View, Alarms*
8.4 Window resizing

You can resize the window however you see fit manually or you can use the built in resize tool that you can use by hovering your mouse over the center right hand side of the display. An arrow will appear which you can click and then select one of the automatic resize options available.

![Digital Display View](image)

*Figure 8.7: Digital Display View, window placement*

| Note that you can open as many Digital and Chart displays as you need with a license as well as an unlimited number of channels simultaneously whilst only 1 channel and 1 display in DEMO MODE.*
9 Chart View

9.1 Selecting channels

The chart view allows you to create charts from the data of the channels you select from a specific job. You can select the current job and have the chart plotted in **realtime** or you plot a chart for an older job. Like on Digital Display View you start by naming the chart in **Window title** and proceed to select your **Job** in **Job name**.

Afterwards you **Select** the **Channels** you want data displayed from and the axis it’s being displayed on by adding the unit index (an axis is assigned automatically if no index is selected). Multiple channels can be displayed on each axis. In the box at the bottom of the screen, you can visualize how channels are grouped on axes, in the **Axes configuration**.

*(Select channels detailed information on page 37, chapter 8 (8-37))*

![Chart View, selecting channels](image)

**Figure 9.1: Chart View, selecting channels**

Pressing **OK** takes you to the channel settings window.

The channel settings window shows you the channels you have selected and where their values will be displayed in relation to the chart. You can see this under the axis column. You can adjust the order they are displayed in by using the **Move up** and **Move down** buttons. If multiple channels share the same axis, the closest channel to the chart will be the one higher on the list.
Figure 9.1.2: Chart View, channel settings

Press OK to generate the chart.

Figure 9.2: Chart View
9.2 Zooming and panning

The chart view offers many tools to alter it to suit your needs. We will now go over the options you have for customizing your chart.

Hover over a channel in the top side of the window to highlight that channel on the chart.

First off you can tick the channels you want to be displayed or untick them as needed on the top of your screen (in legend):

![Figure 9.3: Chart View, showing/hiding channels](image)

You can **Zoom In** and **Out**, manually or by using your mousewheel. Additionally, holding **Ctrl** while zooming lets you zoom the Y axis only, and holding **Shift** allows you to zoom the X axis only.

![Figure 9.4: Chart View, highlighting a channel](image)

Holding down **Left click** allows you to drag the chart in any direction you please (panning).
9.3 Context Menu

By **right clicking** you open a context menu panel from where you can further manipulate the chart.

**Fit view** scales the chart to fit into the entire window in its entirety and is useful after using zooming functions to getting back to seeing the whole chart. Same effect from **double click**.

**Rectangle function** is set to **Zooming** by default which allows you to zoom in and out by pressing and holding your right mouse button and dragging it to select the area to zoom to. The other function it offers is **Filtering** which allows you to manipulate data on the chart by right clicking, holding it down and dragging the selection box over the area you want to manipulate data in.

**Print** lets you print your chart.

**Export** lets you export your chart as an image file.

![Context Menu](image.png)

The next option from the right click menu is **Show** and it allows you to displaying the X, Y grids, grid strips or Value at mouse position.

![Chart View, axis settings](image.png)

**Figure 9.5: Chart View, axis settings**

**Color theme** allows you to change the background color of the chart.
Figure 9.6: Chart View, background settings

Moving on, the **Annotations** option allows you to select a variety of annotations that you can apply on your chart. You have options like “**With cursor**” that will show the values at the current cursor selection, or you can select “**Growing over time**” and have an annotation tool that displays the difference between 2 specified points on a channel, their X and Y coordinates and information corresponding to the actual values of those points, the between the 2 points and so on. Last but not least you can add either simple notes on the chart or notes anchored to certain points of a channel from **Annotations/Annotation**.

Figure 9.7: Chart View, Annotations
The next option, **Channels**, allows you to select new channels to display on the chart or remove unwanted ones.

(See page 9-42 for details, selecting channels)

![Figure 9.8: Chart View, Replay function channel settings](image-url)
9.4 Modifying data

The box that pops out asks you to select the channel you wish to manipulate data in. By going to **Edit** you can now see how you can manipulate the selected channel:
- set it at a constant value
- add an offset value
- min or max values
- linearize the plot by setting a start and end value

The last box, **Filter**, allows you to use smoothing functions on the selected channel portion. Here’s an example of a channel smoothing operation. You can see the selected region of the channel that is going to be modified inside the red square. Subset size will be set to 55. To start the operation press **Execute**. If you want to filter between a min and max value, you can execute once for the value of min and once more for max.
Figure 9.12: Chart View, editing area

Here’s how the selected channel will look after the smoothing operation has been performed:

Figure 9.13: Chart View, smoothing function
As you can see this has improved the readability of the selected region of the chart. This operation can be repeated as many times the user desires. Also by using the "<<", "<", ">" and ">>" symbols you can go back and forth through the process and keep the format that best suits your needs. Once you are done modifying the chart press OK to go through with your changes or Cancel to not apply the changes.

By pressing OK, you will be asked whether you want to add the modified data to the database or not. The changes you have made are going to be saved but your original data WILL NOT be lost. You will be able to use either the original data or the modified one. See the memo at the end of the Data Sender chapter for more information on using modified data.
9.5 Replay

The **Replay** function allows you to track your data at a specified speed from the beginning. You can specify which channels to track by selecting them above the chart and you can specify the speed at which it replays data from the dropbox. You start the replay function by pressing `play`.

![Replay function](image)

*Figure 9.14: Chart View, Replay function*
9.6 Settings

The **Settings** option allows you to edit the title, the font, the colors of the text used in the chart (includes legend, title, title alignment and whether to display or not). You can also manipulate the range of the units of measurement on either X or Y axis and set to color for the text or the plot of each individual channel (including custom colors).

![Chart View, Settings](image)

*Figure 9.15: Chart View, Settings*
In the **X Axis** window, you can select title visibility, format, font, color, label font and color as well as the period of time you want to have displayed. You can do this by unticking the **Auto scaling** box and then select either a period (e.g. 30 mins) in the show only line or a specific timeframe, by ticking and setting the start and end time from the set range line.

In the **Y axis** window, like in the x axis one you can change colors, fonts as well as setting a manual min/max range or leaving Auto ticked.
10 Load

The **Load** function allows the user to load saved templates consisting of multiple displays of either **Digital Display**, **Chart Display** or **Wellbore View** and their settings at the time of the save.

![Load Function](image)

**Figure 10.1: Load Function**

The first thing you need to select is the name of the save. Once you click it you can read its description where the name of the units being used in the operation and the opened windows at the time of the save are shown.

Once you have loaded your save you select the job you want to use with the already selected save template. Note that this job’s used channels will be checked against the channels used in the save file and if they do not match you will get the following error:

![Loading template error](image)

**Figure 10.2: Loading template error**

The saved display template will be loaded only if the selected job contains at least one channel (same unit name and channel name) from chosen template.
11 Save

The save button will save all of your **Digital Display**, **Chart views** and **Wellbore views** with their current settings (placement, colors, alarms etc) as a template that you can load later. Note that **Annotations** in **Chart View** will **NOT** be saved.

![Save function, example window placements save](Image)

*Figure 11.1: Save function, example window placements save*

As an example take the window placement in the picture above, the colors, the fonts, channels, custom settings and so on, they will all be saved as they are for future use (except for the actual DMS window placement)

You are asked to give this save file a name. To makes things easier for yourself in the future give it a descriptive name for the operation that’s being executed (ex FracJob), as you can use this save as a template for every future Frac jobs.
Figure 11.2: Save function

As you can see in the Description box on the bottom a unit list and a window list is generated whenever you save a template. It contains the name of the units and the window titles opened at the time of the save and can be seen when loading the save file. You are free to edit the box and add your own comments or change existing ones.
12 Data Table View

The Data Table View displays the channel values of a selected job as a data table. Once selected you have to select the job, give the data table a name and then Select the channels that are to be displayed in the table. You can later Remove channels or Move up or Move down which will determine the position of the channel in the table.

Note: When choosing current job, data is not added automatically and has to be done manually using the refresh button.

Each channel value has a modified field in which a modified value of that channel (in Chart View) is displayed. Using modified data will show both the original value and the modified one.

![Figure 12.1: Data Table View](image)
The import option allows you to import job data from a .txt file. You can import data of different formats.

**Figure 13.1: Import function**

Use **Browse** to select your file.

Imported data can be displayed and filtered like all other jobs created using Chart View. To change the settings of the imported file you first have to expand the settings window by pressing.
The first column contains channel settings. The first channel setting refers to the lines the channel names and channel units will be loaded from. The channel/unit format can be loaded from either of these formats:

```
Channel 1 name; Channel 2 name; Channel 3 name...
Channel 1 unit; Channel 2 unit; Channel 3 unit...
Channel 1 name[Channel 1 unit]; Channel 2 name[Channel 2 unit]; Channel 3 name[Channel 3 unit]...
```

**Figure 13.3: Import function, channel/unit format example**

You can view the loaded names and units in the parsed channel list tab at the bottom left of the import window (default line 1 and line 2 respectively). The second option Channel list in separate file allows you to import the channel names and units from a different file. You can create such a file by pressing Create new. Generate default will assign a generic channel_1...x name and unit_1...x.

The right column contains data settings. **Value data begins at** lets you select the line the actual values start at (your first lines will contain information regarding channel names and units). Next you have to specify the date and time format of your imported file. You can press “?” to see the usable date and time formats.

**Figure 13.4: Import function, date and time format**

The last thing you can configure is the **Separators** that are used in your imported file.
Once you've imported a file, the DMS will show you information regarding this file in the 3 boxes at the bottom of the window. They display the **channels** and units that have been parsed, the **data** pertaining to the channels and an error box which will be empty if there are no issues with settings or the imported file. Below that you can select how many channels you want to have displayed at a time.

If the imported file has been modified and the data format in it isn't adequate a red warning will appear in the error box displaying the line the error is on, a description of the error and a line preview.

![Figure 13.5: Import function, data debug](image)

You can then use this information and correct the issue in the settings or file you want to import. In this example there is an extra "a" in the syntax, "Pma" instead of "PM" on line 6. This can be rectified by opening the .txt file and deleting the letter "a".
Figure 13.6: Text file, error fixing example
14 Export

This function allows you to export job data as a .txt file.

![Channels]

*Figure 14.1: Export*

Exporting can be done either by using the **Selecting channels** button which allows you to manually select the channels you want to export, or by taking these channels from a job you have previously saved by pressing the **Import from saved files** button.

Once the job and channels that are to be exported have been selected you have the option to go through some **Settings** regarding date/time formatting and also data filtering. An important setting is **Unit name format** which is useful when exporting data from more than one unit as you can choose to display the exported channel name in long or short form.

![Settings]

*Figure 14.2: Export function, settings*
After that simply press **Export** and specify a file name.

*Figure 65: Export function, export in progress*
15 Job Report

The job report function allows you to quickly generate job report data from a template.

When opening it you are given the option of loading an existing job report’s settings or you can start a new job report in a template of your choosing. Templates are Word files that you can set up any way you need. The placement of data in the job report is given by the placement of bookmarks in the template, which is a .docx file. When a template is loaded the DMS will scan for the bookmarks in the file and for each bookmark found the user will be able to choose what type of data to add in that field (text, chart etc).

15.1 Creating a template

To create a template, you will need to use Microsoft Word. You will want to add general information that is re-usable, company logos, headers, footers and page format so that you can easily use the template for new jobs.

How to add a bookmark in Microsoft Word:

- Click in the document where you want the bookmark to be placed, or select the text you want to use as a bookmark (text is preferable as you can name it intuitively), then go to Insert and select Bookmark.
- Give the bookmark a name under which it will be saved as and then click Add. You can see the selection that is being bookmarked by clicking Go to.
- Once your bookmark has been added it cannot be seen in the actual document by default. However, you can choose to display them between special faded brackets. To do so go to File, then select Options > Advanced > Show bookmarks.
- Once you are done creating your template click Save and save it in the template folder (by default: C:\DMS\Reports\Templates).
TIP: You can use a job report that was made manually as a template, by editing it and adding the appropriate bookmarks.

Close the template file before trying to load it in the DMS.

IMPORTANT: When selecting the text, you want to bookmark make sure you select ONLY the text and not an extra space before or after it. Older versions of Word treat the selection differently so you might encounter problems when selecting extra blank spaces. By default, clicking on a word in a .docx file also selects a blank space after it. To unselect it you can hold Shift and use the <-> arrows on your keyboard.
15.2 Creating a new Job report from template

Selecting **New from template** will prompt you to select the template you want to load for the job report. Once you have done so, you will get a new window in which you will be able to navigate through all the bookmarks contained in your template. Here is an example template file that is going to be loaded:

![Image of template window]

*Figure 15.1: Job report, available bookmark types*

As you can see it displays the bookmarks, in order, as they are in the .docx file, starting with TextBookmark.

15.3 Text bookmark

Under **Bookmark type** you can select the type of bookmark this will be and depending on your selection you will get a different configuration menu. As the name we've given this bookmark suggests, we want this one to display text. Once **Text** is selected we are given a text box in which we can edit what information we want to have displayed in the Job report. Selecting **Blank** in the type field will just leave this bookmark empty.
After we’re done editing this bookmark we can go to the next one by selecting Next on the bottom of the window, where the total number of loaded bookmarks is displayed.

![Figure 15.2: Job report, text bookmark](image)

### 15.4 Date and time bookmark

Next type is **Date and time** where you can add the current date and time or a custom one with a chosen format.

![Figure 15.3: Job report, date and time bookmark](image)
15.5 Chart View bookmark

Moving on we have the **Chart View** type which allows you to preview and add charts to your job report. You can either create a **New** chart or **Load** one from previously saved reports. First you need to select the job, then by pressing **Open chart view** you add the channels you want to have displayed. Once you are done a chart window will open for you to edit (change area to be shown, add annotations…) if need be. When you’re finished editing it you can close it and it will be included in the job report and it will show as a preview in the bottom side of the window.

![Chart View Screenshot](image)

*Figure 15.4: Job report, chart view bookmark*

The **Picture** type allows you to add a picture to your report, by pressing **Browse** and selecting the picture you want to add.

![Picture Screenshot](image)

*Figure 15.5: Job report, picture bookmark*
15.6 Data table bookmark

The Data Table type is used for adding a data table to your job report. First you have to select the job, and whether to create a new table or to load one from previous settings and then press the Generate table button. You can now select the channels that are to be displayed in your data table. You can also go to Settings at the bottom of the window. From here you can select the format of the data in your table.

Figure 15.6: Job report, adding a data table

When you’re done setting up the table you can press the Export button on the bottom of the window. You will now track the progress of this operation. When it finishes you can Create Table. This will add the table to the job report and you’ll be able to preview it.

Figure 15.7: Job report, generated table
15.7 Value bookmark

Next bookmark is the **Value** one which allows you to display a value from a channel given a condition. The conditions are **min**, **max**, **first**, **last**, **average** (thus the value you get is the minimum value of the selected channel during the selected job, the maximum, the first, the last or the average). You can select start and end date and time.

By ticking **Where** you can also add a second condition that has different parameters: ">", "<" or "=".

![Value bookmark](image)

*Figure 15.8: Job report, value bookmark*

15.8 Wellbore bookmark

The last type of bookmark you can have is the **Wellbore View bookmark**. It allows you to place the graphical representation of the wellbore into your job report. To do this you have to select the **job** from the job dropbox. The next step is selecting whether you want to create a **New** wellbore view (new settings) or loading the settings from a previous save.

When selecting **New**, you then press the **Open Wellbore View** button and set it up. Once you have selected your channels and wellbore settings and the graphic has been generated, you will be able to close the window which will in fact save your current view and display it in the preview box on the bottom of your job report window.
If you don’t want to create a new wellbore view you can load the settings from a previous save by selecting the “choose settings to load” from the dropbox. Afterwards select From loaded settings to load your saved wellbore view.

Now that all the bookmarks have been edited you can Save settings for future use of this template. Press Create report to generate the job report. If you want to make any changes after creating the report, you can go back, make the change and recreate the report. All the created report files are stored in C:\DMS\Reports\"Job identifier" folder.
15.9 E-mailing the job report

Once a job report has been created, the DMS will automatically prompt a new window from which the user can send the job report to a specified email address or addresses, granted an internet connection is available. You can also open this window by pressing the Send email button.

You can add email addresses manually by typing in the Email to box or you can import your local outlook address book by pressing the Add new button. This will show you all the addresses stored in your outlook address book, from which you can select those you want the email to be sent to. Afterwards you can manually select the recipients, manually, by ticking the boxes corresponding to those addresses or by pressing the Select all button. The Subject box will contain the job name by default and can be changed. In the Message box you can write any description you choose to send this email with. The Attachments box allows you to browse the computer for the job reports you want to send, by clicking Browse. You can tick the box next to the job reports you want to send.

Once everything is ready you can choose to either press Show which will open Outlook and display a preview of your email or directly press Send which will send the email without giving you a preview of it.

![Send email](image)

**Figure 15.11: Job report, sending the report via email**
16 Wellbore View

Once you have finished setting everything up the bottom hole concentration window will be displayed. You can visually see the well, the concentration values to the right, the well details on the top side and the channels alongside the color legend on the left side of the display.

![Wellbore View, wellbore simulation](image)

**Figure 16.3: Wellbore View, wellbore simulation**

**Slurry Total** represents the total amount of pumped fluid into the well

**Proppant Concentration** is an actual proppant concentration (measured on surface). It is a main channel chosen in Channel Selecting window.

**BH Slurry Total** represents the total amount of pumped fluid into the perforations

**BH Proppant Concentration** is a bottom hole proppant concentration (main channel recalculated with Wellbore View).

**NOTE:** As a main channel (visible in main view) all available channels can be used. For example, it can be proppant, chemicals or acid concentrations or amount. You can choose for animation channels created with Data Creator aswell!
16.1 Selecting channels

This function is a color coded visual representation of the wellbore based on values (density or otherwise) from a chosen channel, in real time.

When you run the Wellbore View program you will be presented with a configuration window. From here you select the Job, the Unit and the channels that you are going to use for displaying (for example: the bottom hole concentration)

![Settings window](image)

Figure 16.1: Wellbore View, job and channel settings

You can only have 1 graphic simulation up at a time, consisting of the channel from Select slurry total and Select main channel (concentration), but you can add additional channels whose values will be calculated and saved as new channels in the database in the “WV” table and passed on as channels for Chart View, Data Table View, Data Sender and Exporting. Only the first opened window will allow you to create data in the database and to select additional channels. Other windows can be open for graphic visualization another channels.

It is advised to leave the Create new channels in “BHC” table (overwrite if exist) option ticked (on by default) for new jobs. Otherwise new channels will not be saved in the database.
16.2 Colors and range

Next you have to select the color and range. Specify a minimum and maximum value and choose the colors you want to use.
16.3 **Well parameters**

Well parameters need to be input only once per job.

![Well parameters](image)

*Figure 16.4: Wellbore View, well parameters*

16.4 **Context Menu**

To change the settings of this window you can **right click** after which a new window will appear with the following functions.

- **Color theme**: Change the display theme.
- **Replay**: Replay job data at a chosen speed.
- **Print**: Print a picture of the current view.
- **Export**: Export the current view as a picture file.
- **Channels**: Opens the initial window used for setting up the channels.
- **Well Parameters**: Well parameters settings.
- **Colors and range**: Colors and range settings
17 The DMH (Data Management Hardware) Config Tool

The GOES mobile data acquisition system is a DMS extension that can be used in parallel with another system, or as a standalone unit. It contains analog and/or frequency (quadrature) inputs and is compatible with DMS and other data acquisition systems.

The DMH Config Tool allows you to configure the DMH by changing settings related to power, network address, channels and device name. It also contains a diagnostic tab where you can monitor hardware errors and alerts.

The DMH

17.1 Connecting to the DMH

After you have selected the DMH Config Tool from the main DMS window, a new window will appear the Connect window.

Figure 17.1: DMH, connect
From here you can choose the device you want to connect to from your defined units from the DMS, or you can connect directly via IP. Once a device has been selected you can connect to it by pressing the **Connect** button in the bottom side of the screen as well as **Disconnect**-ing afterwards.

Selecting this unit from the DMS’s unit list will load the channel names that have been set-up in the DMS and not default names. To be able to choose this unit in the DMS unit list, you must first add it there (see the end of this chapter for details).

### 17.2 Channel settings

In the **Channel settings** window you can change the settings of the DMH’s channels (frequency, analog, totalizer). The DMH’s internal channel voltage and temperature can be displayed in this window.

![DMH Config Tool](image)

**Figure 17.2: DMH, channel settings, frequency inputs**

From the frequency inputs tab, you can see the frequency channels that are being used and change the factor value or select a different filter. The value column contains the current values of these channels.
From the analog inputs tab, you can see the analog channels that are being used, their defined minimum and maximum values, the filter, and their current value. If Value is higher than the Max value or lower than the Min Value, it means there is a sensor fault or a sensor is not connected (out of range).

By pressing the Cal button you can calibrate the channels to account for the sensor’s slight changes over time. After pressing it choose Start Calibration and now you can set the minimum value and press Calibrate, then press Next and set the value either manually by inputing a value or automatically by assigning the current channel value as 0-100%, press Calibrate and the close the window.

Press Save changes to save your new settings to the DMH.
Once a change has been made be sure to press the Save changes button for this change to be saved by the DMH.

In the **Totalizer** tab you can set up the totalizer channels, whether they are enabled or not, the units of measurement or reset their values.

![DMH Config Tool](image)

**Figure 17.5: DMH, channel settings, totalizer**

In the **Internal data** tab, you can see the DMH’s voltage and temperature (optionally)
17.3 Device Name

In the device name window, you can read the current name of the DMH (by pressing the Read from device button) and change it after which you press Apply. When using multiple DMH’s at once you can use this to indentify them by their name.
17.4 IP Settings

In the **IP Settings** window you can set up the DMH’s TCP/IP settings. You can read the current ones by using **Read from device** and you can modify them after which you have to click **Apply**. Pressing and holding the On/Off button + the Reset totals button for 5 seconds or more on the DMH device will reset the network settings to their default values. The default IP address is "192.168.1.150", subnet "255.255.255.0" and gateway "192.168.1.1".

![DMH Config Tool](image)

*Figure 17.8: DMH, IP settings*
17.5 Power Saving

In the **Power Saving** window, you can enable the DMH's minimum voltage level. The device can be started with a voltage lower than the minimum level, however if during its operation it drops beneath this threshold the DMH will shut down. The offline timeout can also be enabled and its values set from this window. This represents the amount of time the DMH will wait for a connection before it turns off.

![Power Saving Window](image)

*Figure 17.9: DMH, power saving*
17.6 **Diagnostic**

The **diagnostic** window shows you DMH operating errors. These errors can be on a yellow background, meaning it’s showing you something that needs to be brought to your attention but is not fatal, or red, which case a critical error has occurred.

*Figure 17.10: DMH, diagnostic*
17.7 Add device to DMS

The add device to DMS window is used for adding the DMH to DMS. By clicking Add to DMS, you will be able to find it there under the name specified in the Device name window, and select its channels.

Figure 17.11: DMH, Add device to DMS

Figure 17.12: DMH, connecting to DMH from Data Reader
You can use an existing channel list by clicking **Browse** and selecting it, or you can create a new one by clicking **Create new**, or **Edit** an existing one.

![Channel list configuration](image)

**Figure 17.13: DMH, channel config**

When creating a new channel list you can name your channels, select their units of measurement (you can create custom units if necessary), choose the display color of your channels, whether a channel will be displayed or not, or completely remove it and add new ones. Your new channel list will be saved with the name from the **Filename** box.
GOES GmbH
German Oilfield Equipment & Services

Address: Muenchener Str. 32
29392 Wesendorf | Germany
Tel: +49(0) 5376 976 47 0
Email: info@goes-well.com