DOCTOR

Doctor DK-100/200 On-Line Surveillance System Software Reference Guide

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Chapter 1 – DK-100/200 Software Installation

1.1 The DK-100/200 System

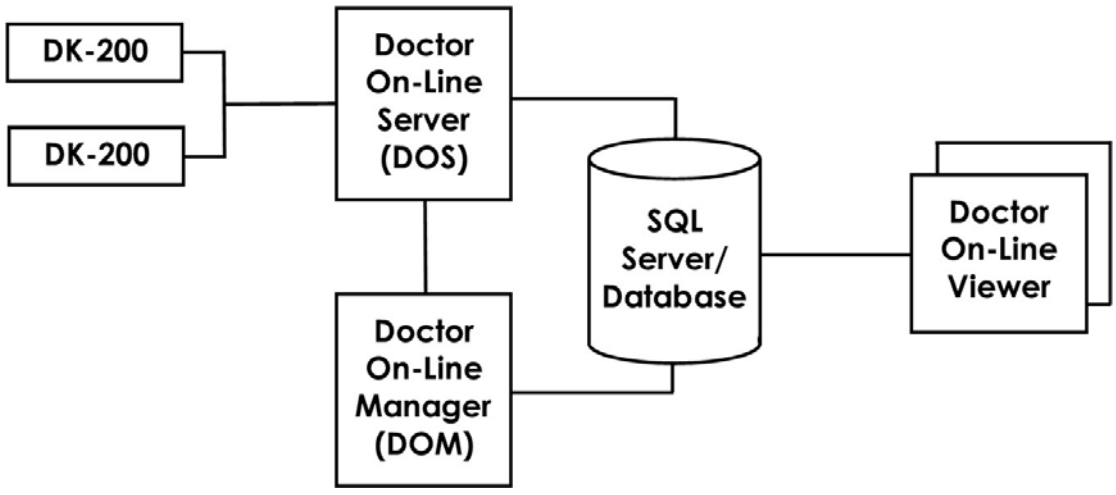
The software that supports the DK-100/200 engine surveillance systems comprises four basic elements as shown in the diagram below, namely

1. The *SQL Database* (under control of the *SQL Server*) that holds engine configurations and measured data;
2. *The Doctor On-line Server,* or *DOS* for short, that handles data between the system and the DK-100/200 hardware;
3. The *Doctor On-Line Manager*, or *DOM* for short, that acts as the means of configuring the system;
4. The *Viewer* which, as it says, is the means of viewing and analysing results acquired by the system.

Note: If you purchased a pre-defined engine configuration as part of the *Doctor Database Setup Service*, this will be installed at the final installation step.

A typical system will comprise a single Doctor *On-Line Server (DOS)*, *SQL Server/Database* and *Doctor On-Line Manager (DOM)*, but multiple *Viewers* can access the system to enable different users to analyse the data, whether on a vessel or on-shore. Once installed, the user should have no requirement to access the *Doctor On-Line Server* or the *SQL Server/Database* directly – they do their job in the background. The user will typically access the *DOM* for setup and configuration, and the *Viewer* for looking at and analysing results. The *DOM* should be closed once setup is complete.

This manual describes the *DOM* and the *Viewer* user interfaces.



1.2 Overview of DK-100/200 Software Installation

There are a number of steps that have to be followed for a full installation of the DK-100/200 application and support software. These are summarised below:

1. Set up your network infrastructure and enter the desired network information into the DK-100/200 units.
2. Install the *SQL Server (*which controls the *SQL Database*).
3. Install the *Doctor On-Line Manager* (*DOM*) and *Doctor On-line Server (DOS)* onto the local host computer. Note that this computer must be on the same local network (ie. same sub-net) as the DK-100/200 units.
4. Install one or more *Viewers* as required.

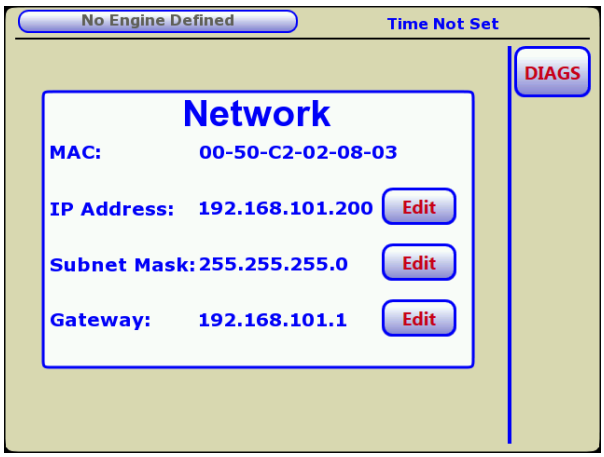
Installation files are supplied on a single USB flashdrive. Applications are held in a folder called *Applications*. Manuals and support documents are in a folder called *Documentation* and, if you have ordered a customised database, this is in a folder called *Customer Specific Files*. Installation is described in detail in the following sections.

Note that, in a typical installation, the *Doctor On-Line Manager* (*DOM*), *Doctor On-line Server (DOS)*, and *SQL Server/Database* will all reside on the same computer. It is assumed in this manual that this is the case (though the *SQL Server/Database* can reside on another machine). Refer to section 3.14 for when the database resides on a different computer.

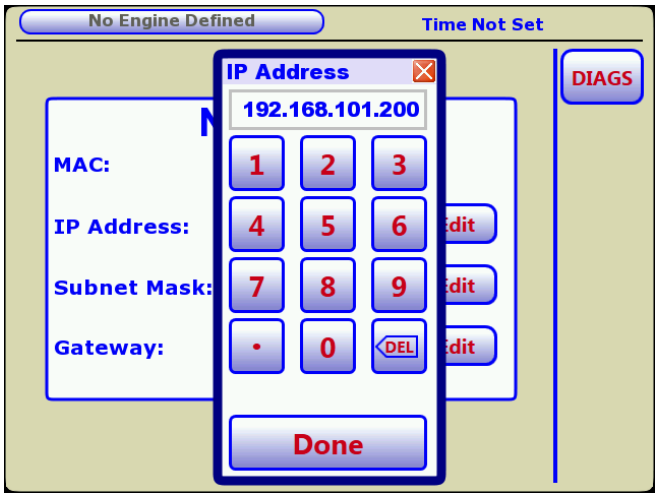
1.3 Setting Up Your Network

The network for the DK-100/200 system is set up as for any network. Ensure that the IP address and other network settings are compatible with the overall infrastructure. It is assumed here that the network is installed and operating. You may wish to liaise with your IT department regarding network infrastructure.

It is necessary to configure the network settings for each DK-100/200 device on the network and this is done via the front panel on the DK-100/200. On the screen first shown at power-up, tap the **DIAGS** (diagnostics) button followed by the **NETWORK SETTINGS** button. The screen below will be displayed.



The MAC address of the DK-100/200 unit is displayed. The IP Address, Subnet mask and Gateway for the ethernet network are changed by tapping the appropriate **EDIT** button. An example of the IP Address edit screen is shown below. Simply enter the desired IP address with the dot separator in the correct places and tap **DONE**. If you enter an incorrect syntax, the **DONE** button will be greyed out.



The same applies to the Subnet mask and Gateway entries.

IMPORTANT: Note that, once editing is completed, the unit must be power-cycled for updated network settings to take effect.

All units on leaving the factory have settings as in the table below. Note that all units on a network must have a unique IP address. It is essential, therefore, that appropriate IP addresses are set.

Factory Network Settings

IP Address	192.168.101.101
Subnet Mask	255.255.255.000
Gateway	192.168.101.1

1.4 Installing the *SQL Server*

The *SQL Server* has its own standalone installation procedure. Files for installing the *SQL Server* are found in *Applications/SQLServer* on the USB flashdrive.

Refer to the *SQL Server Installation Guide* for this operation. Note that the *SQL Database* is created using the *DOM*, so there is no database installation as such. The *SQL Database* is then controlled by the *SQL Server*.

1.5 Installing the *Doctor On-Line Manager* (*DOM*) and *Doctor On-line Server (DOS)*

Your *DOM* and *DOS* applications are supplied on the USB flashdrive. Insert the USB drive into a convenient USB socket on your PC and navigate to *Applications/DoctorOnlineServer* using *Windows Explorer* (Win 7) or *File Explorer* (Win 10). Double-click on *Doctor6OnlineServerSetup.exe* to start the installation process and follow the on-screen instructions. This will install both the *Doctor On-Line Manager (DOM)* and *Doctor On-line Server (DOS)* applications.

At the end of the installation process, the *DOM* shortcut will be placed on your desktop.

Note that you must configure the firewall in your computer to allow the *Doctor On-Line Manager* (*DOM*) and *Doctor On-line Server (DOS)* access to your network. Details of this are included in the *SQL Server Installation Guide*.

1.6 Installing the *Viewer* Software

Your *Viewer* application is supplied on the USB flashdrive. Insert the USB drive into a convenient USB socket on your PC and navigate to *Applications/DoctorOnlineViewer* using *Windows Explorer* (Win 7) or *File Explorer* (Win 10). Double-click on *Doctor6OnlineViewerSetup.exe* to start the installation process and follow the on-screen instructions.

At the end of the installation process, the *Viewer* shortcut will be placed on your desktop.

1.7 Installing a Pre-Defined Doctor Database

If you purchased the Database Setup Service from Icon Research with your system, you will have been supplied with an appropriate database for all of the engines on this vessel/site. The file is contained in folder *Customer Specific Files*.

Installation of the Doctor database is carried in the *DOM* setup. Refer to Chapter 3 for details.

Chapter 2 – The Viewer

Note that screens in the *Viewer* application will refer to the DK-100 or DK-200 as appropriate. The type of instrument you have is set in the *System Preferences* screen. As many screens are the same, screenshots in the manual show the DK-200 version only.

2.1 Overview

The primary purpose of the *Viewer* application is to enable users to view measurements acquired by the DK-100/200 system. It also allows settings to be altered. Measurements are scheduled and controlled by the *Doctor On-Line Server*, or *DOS*, and are stored in the *SQL Database*. The *Viewer* accesses the database to enable data to be viewed in different formats. Multiple *Viewers* can be installed on any computers that have access to the *SQL Server/Database* via a local network or the internet.

2.2 Setting Up the Viewer

Before a *Viewer* can access the *SQL Database*, it has to be registered with the *SQL Server* as a user. There are two steps in this process:

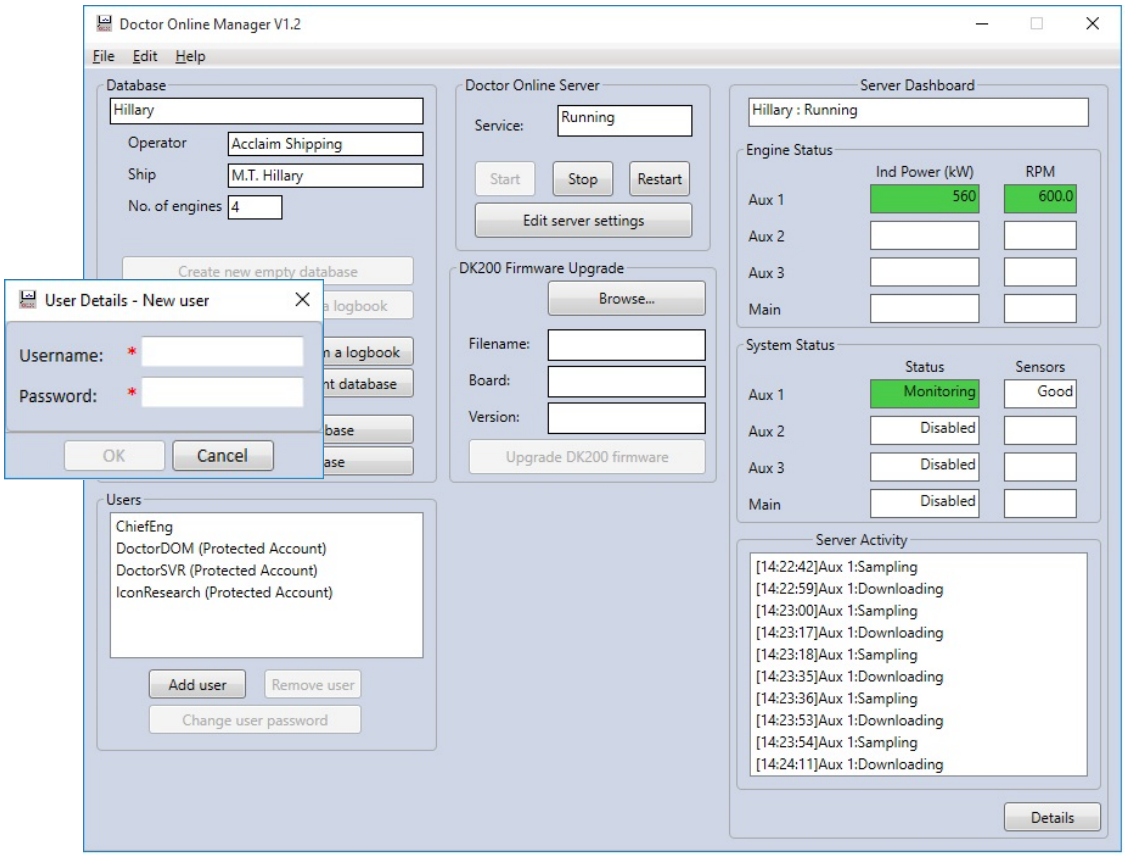
1. Using the *DOM*, add a new user to the list of *Users* by defining a username and password.
2. Enter the same permissions into the *Viewer* application for it to be allowed access to the database.

The two steps are described in detail below.

1. Adding a user to the *SQL Server*

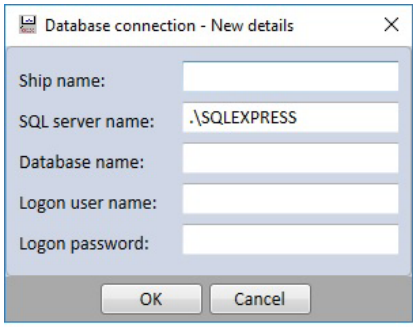
The main screen of the DOM is shown below. In the *Users* panel click on **Add user** and the pop-up screen appears. Enter a *Username* and *Password* of your choice. Remember these as you will need them to register the *Viewer* in the next step. Note that users can be removed and edited in the same pane.

Once entered, the *Username* will appear in the *Users* list.



2. <u>Registering the *Viewer* as a new user</u>

Click on the *Doctor Viewer* icon on your desktop to launch the *Viewer*. If the *Viewer* has not already been registered with a *DOM*, the following window will appear.



Insert entries as follows:

Ship name – enter the vessel name (no particular format)

SQL server name – do not change this if the *Viewer* is running on the same computer as the *SQL Server/Database* ie. keep as .*SQLEXPRESS*. If the *Viewer* is running on a different computer, you must specify the location of the *SQL Server/Database*. You can do this in one of two ways:

a) if you know the IP address of the *SQL Server/Database* computer, enter this in the format, for example, *192.168.101.1\SQLEXPRESS*;

b) if you know the name of the *SQL Server/Database* computer, enter this in the format, for example, *SNOWHITE\SQLEXPRESS*.

Database name – this is the name specified in the *DOM* (in the top left corner of the *DOM* main screen in field *Database*)

Logon user name – this is the one specified in the *DOM* in the list of *Users*

Logon password – the password that was specified when the new user was created in the *DOM*.

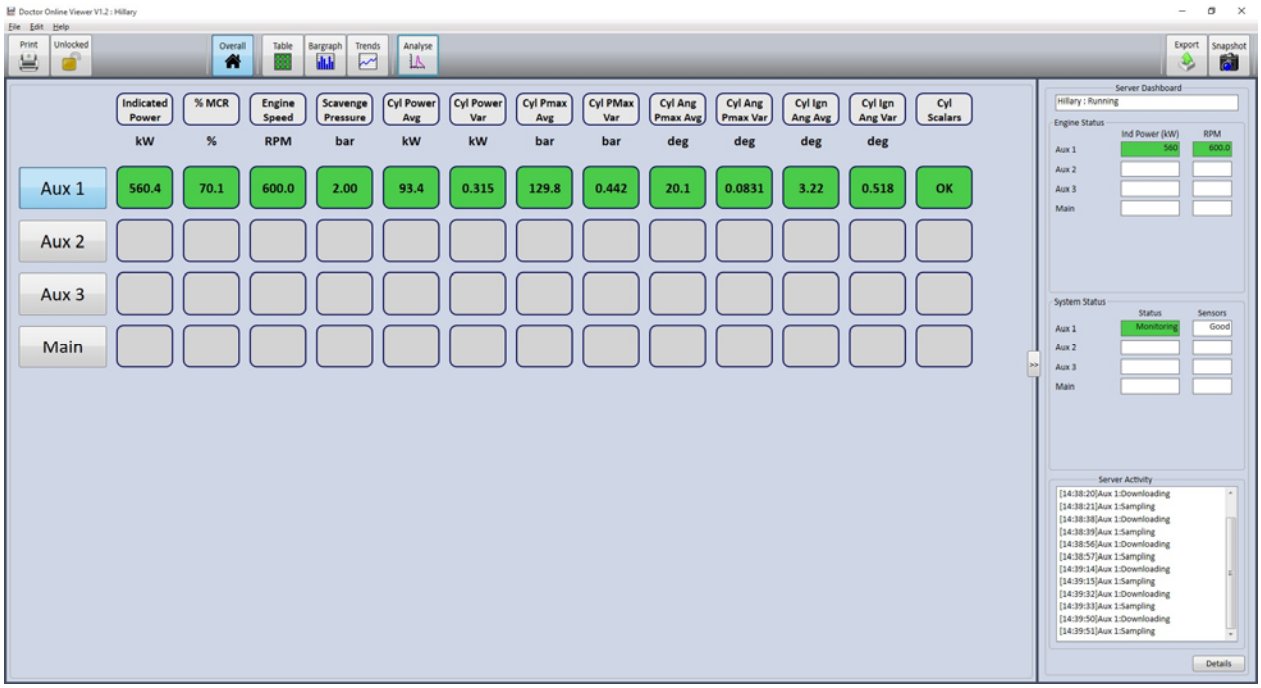
Click **OK**. If any of the entries are not recognised by the *SQL Server/Database* (as defined in the *DOM*), you will not be able to proceed. Check the entries and try again.

2.3 *Overall* View

The *Viewer* allows a summary of all the engines to be viewed, or details of each engine individually.

The screen below shows the overall view, or summary, of all the engines. You can return to this screen any time by clicking on **Overall** in the menu bar at the top of the display.

Overall view shows scalar values for all of the engines. Twelve scalar parameters are always displayed and these are selected in the *DOM* under *Shipwide Settings* (see Chapter 3 for details of how to select scalars in and out of the list). The column furthest to the right side labelled *Cyl Scalars* is a summary of the cylinder scalars for the corresponding engine. If all cylinder parameters are within limits, the cell is green with text *OK*. If the cell is yellow or red, it indicates that a cylinder parameter is out of limits.



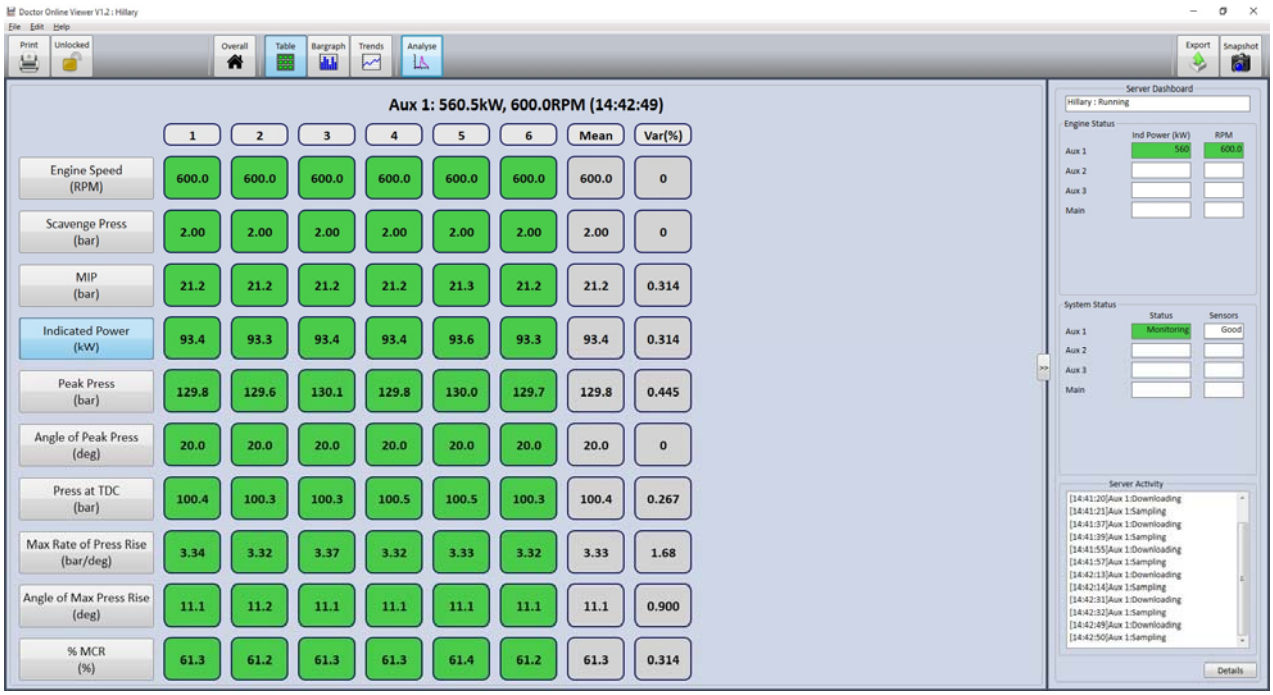
The panel on the right side contains a summary of the system status. This can be hidden or shown by clicking on the arrowheads at the midpoint of the frame.

2.4 Engine Views

For further details on a particular engine, click on the engine name in the left column to set the focus, and then click on the view that you wish for the engine.

Table View

For example, to see a table summary of Aux 1, click on **Aux 1** followed by **Table** in the menu bar. The screen below will appear.

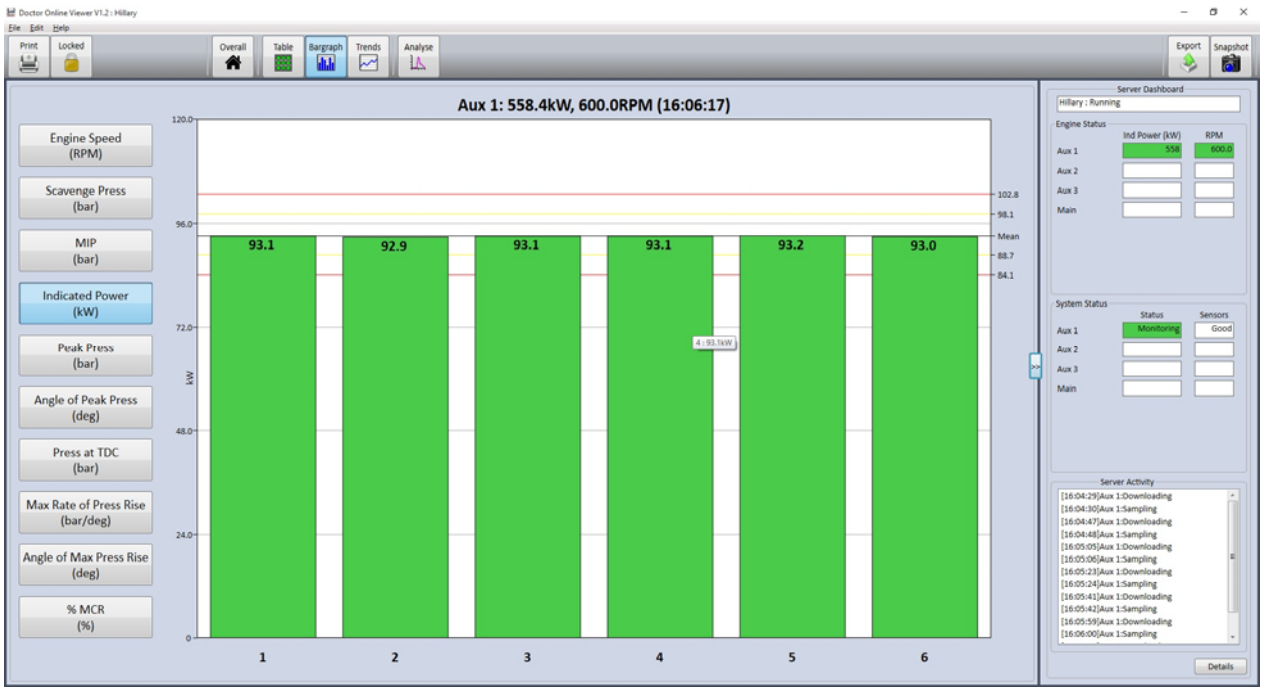


Ten parameters are displayed and these are selected in the *DOM*. In this example, *Aux 1 Scalars* are being displayed. Note that different scalars can be selected for different engines. This is because it is typically desirable to view different scalars for a main 2-stroke engine compared with 4-stroke auxiliaries. See Chapter 3 for selecting engine scalars.

The mean (or average) and the percentage variance for each scalar are shown in the columns on the right side.

Bargraphs

Bargraphs (one column per cylinder) can be viewed for each engine scalar by clicking on **Bargraph** in the menu bar. The corresponding bargraph for the available scalars is selected by clicking on its name in the left column. The example screen below is displayed by clicking **Indicated power (kW)**. The value for each cylinder is shown at the top of the cylinder column and a *Mean* line is drawn across the columns.



Right-clicking on the display area brings up a dialogue box where you can select via tick boxes whether certain viewing options are visible or not. These are *Show mean*, *Show alarms* and *Show values*.

Trend Graphs

Trend graphs are available for every scalar, whether engine-wide or specific to cylinders. Trend graphs are displayed by clicking the **Trends** button in the menu bar. Engine scalars are displayed by clicking the **Engine** tab in the top left corner, while cylinder scalars are selected by clicking **Cylinder**. The screen below shows *Cyl Pmax Avg* (average of the peak pressure for all cylinders in the engine) under the *Engine* selection.

Available scalars are the same as in the *Overall* screen, and are selectable using the *DOM*. A blue dot on the trace corresponds to a measurement. Clicking on the dot moves the cursor to that position, and the cursor values are shown in the box to the right of the traces display. The storage rate for measurements is specified in the *DOM*.

Alarm levels are shown in corresponding colours (yellow for alert and red for alarm). Alarm levels track changes in load or RPM as specified in alarm settings in the *DOM*. The example shows an upwards shift in load towards the right of the graph.

The panel at the bottom of the screen enables historical data to be examined. Click on the appropriate span of measurements that you wish to see (**Hour**, **Day** etc), and then drag the scroll bar underneath left or right to scroll through the data.

The trend screen can update new data automatically as it comes in. This feature can be turned on or off by clicking on the **Live Update** button. When the *Live Update* button is green, the display acts like a chart recorder in that, as new data arrives, the trace scrolls to the left. If you use the span buttons and scroll bar, *Live Update* is turned off. When you have finished looking at historical data, click the **Live Update** button to return to current time and turn the chart recorder feature back on.

A typical *Cylinder* trend display is shown below, selected by clicking on the **Cylinder** tab.

Its operation is similar to the *Engine* trend except that all cylinder traces are displayed. (In the example above, the cylinder values are actually on top of each other). The cursor readout on the right shows a bargraph of each cylinder with its value. The colour of the trace on the main display corresponds to the cylinder colour on the bargraph.

Note that any test can be deleted from a trend graph. Place the cursor on the measurement that you wish to delete and right-click on the display area. A button labelled *Delete cursor test* appears. Click on this button to delete the measurement – you will be asked to confirm this action.

Also note that any measurement that has a note associated with it is highlighted by a triangle instead of a circle. Notes can be entered and read in the *Analysis* screens.

If you move from *Trend View* to *Analysis*, all measurements that were visible in the trend will be available in the *Analysis* hierarchy for further analysis. This is a quick way of selecting historical data for further investigation. Any new live data will also be displayed in the hierarchy as it comes in.

2.5 Analysis

Clicking on the **Analysis** button on the menu bar enables the full analysis and diagnostic functions of the Doctor Analysis Software to be used. All features are supported as in the portable version – the only difference is that the hierarchy does not allow for the addition of operators, ships and engines as this is done via the *DOM* on the on-line version.

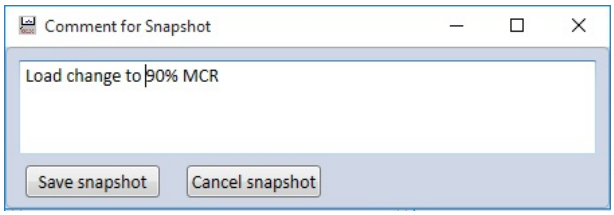
Note that, if you move from *Trend View* to *Analysis*, all measurements that were visible in the trend will be available in the *Analysis* hierarchy for further analysis. This is a quick way of selecting historical data for further investigation. Any new live data will also be displayed in the hierarchy as it comes in.

Refer to the *Doctor Software Version 6 Step-by-Step Guide* for details on the analysis features.

To exit the Analysis functionality, click on the **Home** symbol in the top left corner of the menu bar.

2.6 Snapshot Function

It is sometimes useful to be able to store a set of measurements on demand. This is achieved by clicking on the **Snapshot** symbol on the right of the menu bar. The following dialogue box appears with some example text.



Here you can enter a comment which will be stored , and you can save or cancel the snapshot. Note that a snapshot will appear as an additional measurement on the trend graphs and logbooks.

2.7 Exporting a Logbook

You can export a copy of the latest live measurement for all engines at any time as a logbook (.ilb file). Click on the **Export** button or click **File..Export**. Rename the file and save it to an appropriate folder.

2.8 Print Hardcopy

A hardcopy of a screen can be obtained at any time by clicking on the **Print** button on the main menu bar, or by clicking **File..Print**.

2.9 Password Control and Changing Settings

To prevent unauthorised or accidental alteration of key parameters in the on-line software application, various settings are password protected. Clicking on the **Locked** padlock symbol in the menu bar, or clicking **Edit..Enter password**, brings up the following dialogue box.

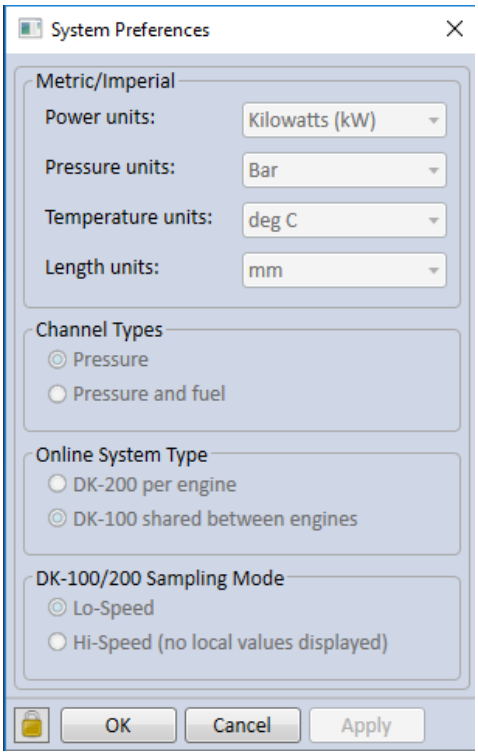
Enter your password and click **Unlock** to unlock the system. Once unlocked, all settings can be altered. The default password is '*doctor*', but this can be changed by clicking on the **Change password** button. When the system is unlocked, the padlock symbol on the menu bar shows an open padlock as a

reminder that the system is unlocked. Each configuration screen also has a padlock in the bottom left corner which brings up the same screen as above.

To lock the system, click on the **Unlocked** padlock symbol in the menu bar, or click **Edit..Enter password**, and click **Lock** in the password box.

Important note: Password control is system-wide, and does not apply only to a user's own computer. If a user of the *DOM* or a *Viewer* changes the password, then this is changed for all users. Therefore, take care when changing the password that all users with password control authorisation are informed of a password change.

Unlocking the system allows settings to be changed in exactly the same way as is done in the *DOM*. This means that users of the *Viewers* can make changes using the **Edit** dropdown in the menu bar. Refer to Chapter 3 for details of how to change the various settings. Note that, if the system is locked, settings can still be viewed but cannot be changed. For example, clicking **Edit..System preferences** shows the dialogue box below. Parameters can be viewed but are greyed out, indicating that they cannot be changed.



Chapter 3 – Doctor On-Line Manager

Note that screens in the *Doctor On-Line Manager* application will refer to the DK-100 or DK-200 as appropriate. The type of instrument you have is set in the *System Preferences* screen. As many screens are the same, screenshots in the manual show the DK-200 version only.

3.1 Overview

The *Doctor On-Line Manager*, or *DOM*, is the tool used for setting up the *Doctor On-Line Server (DOS)* and *SQL Server/Database*. Once setup is complete the *DOM* should be closed down. Typical tasks that are carried out using the *DOM* are:

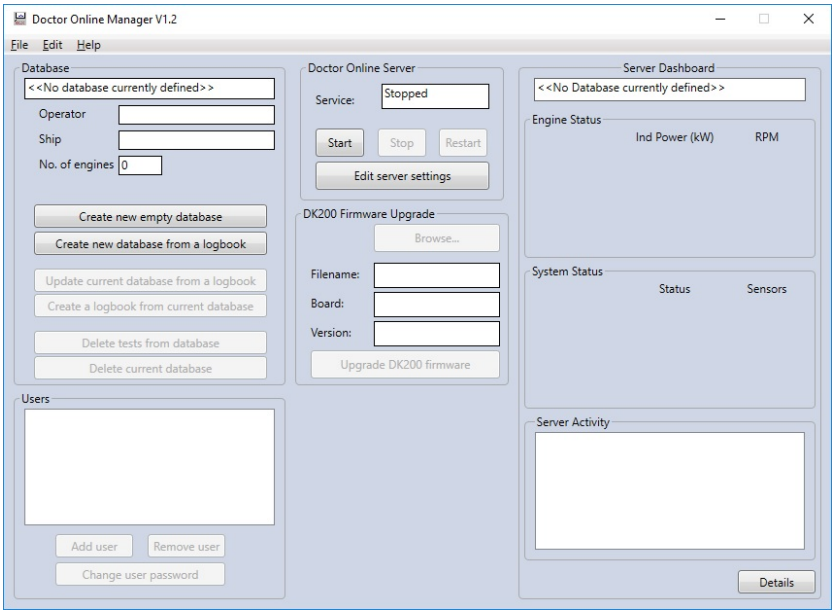
- Creating or loading a database;
- Entering engine data, measurement configurations and alarm limits;
- Controlling and editing the *Doctor On-line Server (DOS*) settings;
- Upgrading DK-100/200 firmware.

You may have received a pre-configured database ready to use. Details of how this is loaded are shown in the next section.

Note the following sections assume that the SQL database is resident on the same PC as the *DOM*. Refer to section 3.14 for how to link the SQL database to the *DOM* when they are on different PC's.

3.2 Setting Up Your Database

The first task that has to be done is to set up your database. Click on the *Doctor On-Line Manager* icon on your desktop and, if no database has been set up before, the following screen will appear.

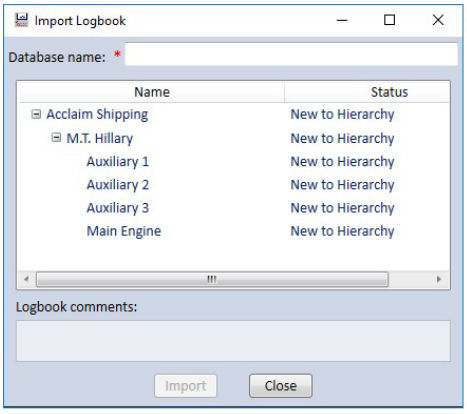


You now have two options, namely,

a) Create a new empty database by inserting details yourself, or

b) Create a new database from a logbook.

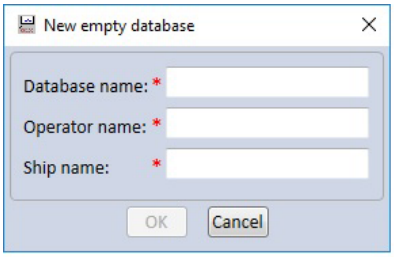
If you have been supplied with a pre-defined database, click **Create new database from a logbook**. Navigate to the appropriate .ilb file (found in folder *Customer Specific Files* on the USB flashdrive), click **Open** and the following screen will appear.



Enter a *Database name* in the top field (5 - 30 characters) – this will be the name used by the *SQL Server/Database*. It is suggested that the vessel name is used, or similar. Click **Import** to load the database.

If you do not have a pre-defined database, parameters will have to be entered manually. Start this process by clicking **Create a new empty database**.

The first screen that appears is shown below.



Enter a *Database name* in the top field (5 - 30 characters) – this will be the name used by the *SQL Server/Database*. It is suggested that the vessel name is used, or similar. Then enter *Operator name* and *Vessel name* and click **OK**. When the message *Database has been created* appears, click **OK**.

Note:

Once the database has been created, a number of operations on the database can be carried out at any time, namely:

Delete tests from database – follow on-screen instructions to delete tests backwards in time from a date that you specify.

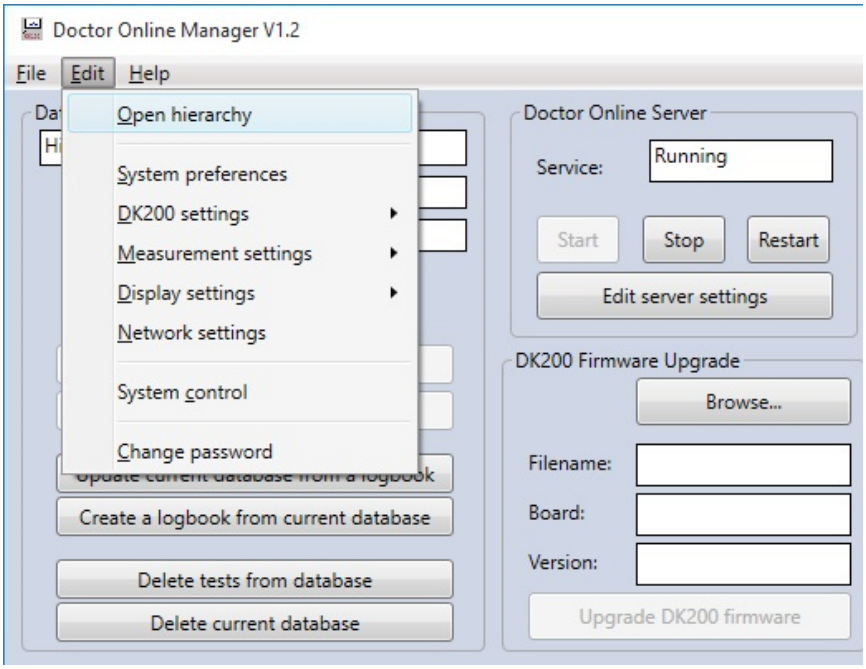
Update current database from a logbook – enables entire system configuration to be entered from a logbook which has the same operator and vessel name.

Create a logbook from current database – this creates a logbook in a location that you specify containing the complete database.

Delete current database – this deletes the entire database. Answer **YES** (to proceed) or **NO** (to cancel the operation). Note that this action is irreversible.

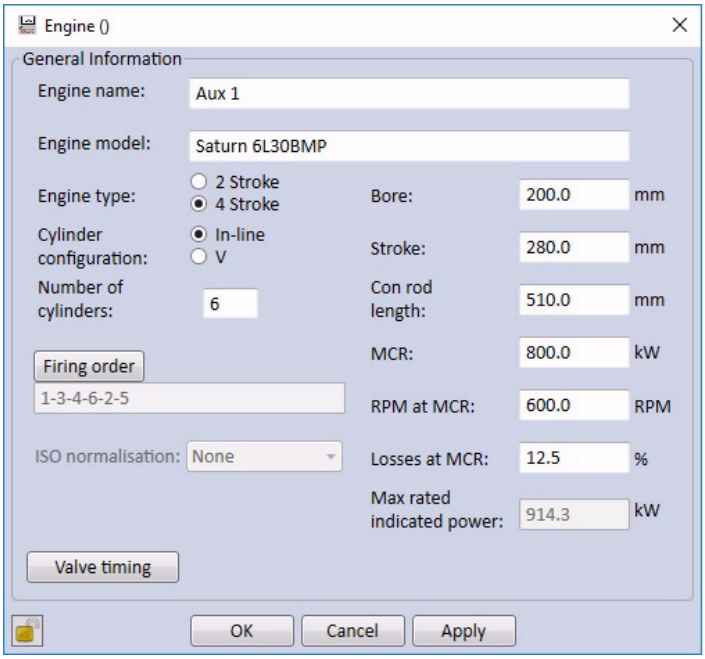
3.3 Entering Engine Parameters into your Database

You are now ready to enter engine details into your database. Start by clicking **Edit** on the menu bar. The list of editable functions appears in the list as shown below. It is recommended that you carry out your setup as in the order in the list.



Click **Open hierarchy**. You can right-click on the Operator name and Ship name to edit or add details if you wish. Now right-click on the *Ship name* and click **Add engine**. The following screen appears. Enter the parameters required (those with a red asterisk must be entered).

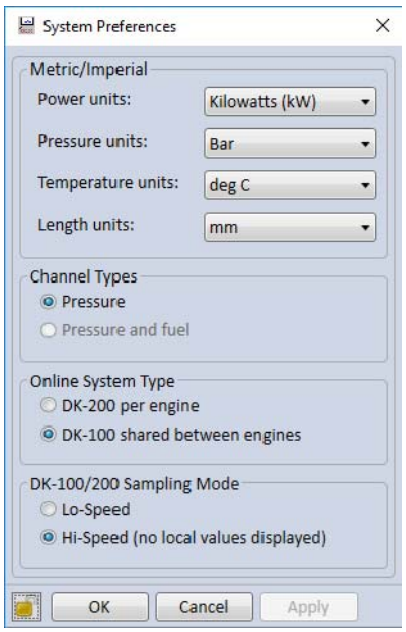
Note that a password is required before any changes can be made. Enter your password as required. You can also click on the padlock in any settings screen to unlock the system. Refer to the section on *Password Control* for further details.



Remember to complete the firing order. You can enter *Valve timing* parameters and an ISO normalisation option if you wish. Click **Apply** or **OK** to save and exit. As you add an engine, the appropriate number of engines is shown in the *No of engines* field on the main database screen. Note that you can copy and paste engines that contain the same parameters to speed up the entry process – simply change the engine name once pasted.

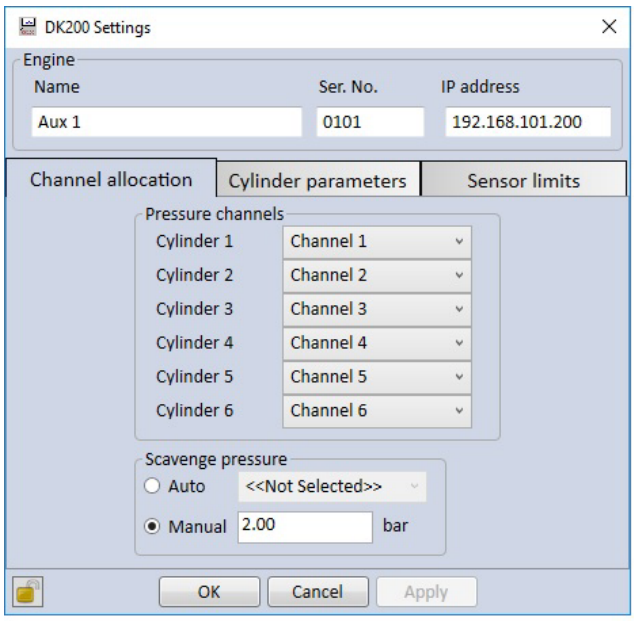
Tip: if you have a number of engines that are the same eg. auxiliaries, enter all configuration information for one engine (Engine Parameters, DK200 Settings, Measurement Settings and Display Settings), then copy and paste to the next engine. This saves a lot of data entry.

Next, click **Edit .. System preferences**. You can specify the preferences you wish by clicking on the drop-down selections as shown in the screen below. Note that this is where you specify the type of instrument/on-line system you are using (DK-100 or DK-200).



3.4 Setting Up The DK-100/200

DK-100/200 devices are configured by clicking on **Edit..DK-200 Settings** followed by the engine. In this example, we are going to set up *Aux 1* as shown below.

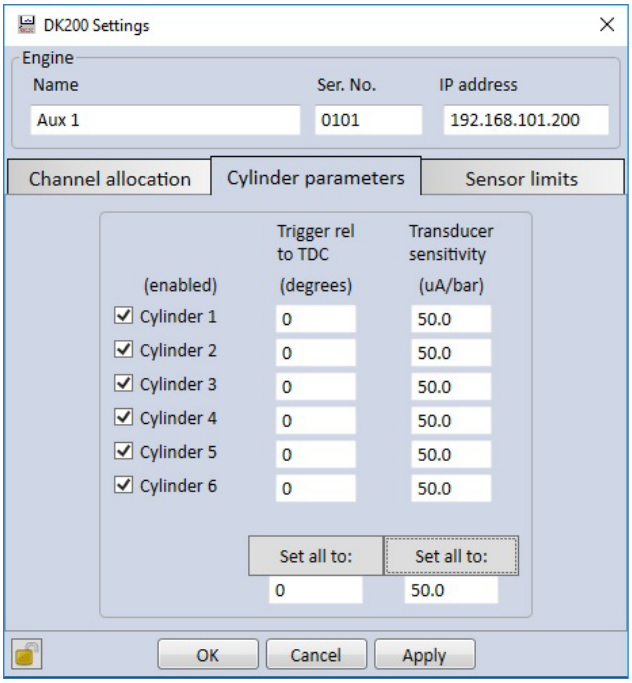


There are three tabs for configuring various attributes of the DK-100/200, namely *Channel Allocation*, *Cylinder parameters* and *Sensor limits*. First, we shall define which channel of the DK-100/200 is connected to which cylinder by clicking on the *Channel Allocation* tab. The screen (above) shows a list of the cylinders for Aux 1. To the right is a drop-down list of available channels. Select the channel that the pressure sensor on the cylinder is physically wired to. For example, if the pressure sensor cable on cylinder 1 is connected to channel 1, cylinder 2 to channel 2 etc, then the list will appear as in the screen above. Typically cylinders and channels are paired by the same number. But if a channel is faulty for some reason, it is possible to move a cylinder to another channel.

If a scavenge pressure sensor has been fitted, click the *Auto* radio button then select the channel to which it is connected from the drop-down list. If there is no scavenge pressure sensor, click the *Manual* radio button and enter the nominal scavenge pressure for the engine.

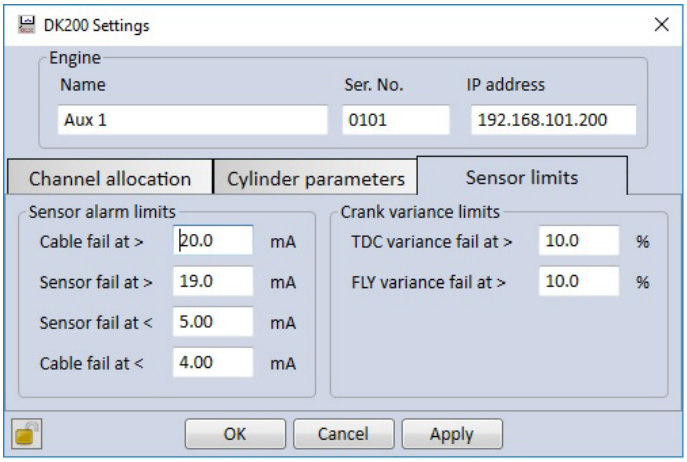
You can click on **Apply** at any time to save your changes. When you are finished, clicking **OK** saves all changes and the dialogue box closes. If you click **Cancel** without clicking **Apply**, all changes in any tab are lost.

Now click on the *Cylinder parameters* tab. The screen below will appear.



In this screen two parameters are set up for each cylinder on the engine, namely the TDC offset (*Trigger rel to TDC*) and the *Transducer sensitivity* for the sensor connected to each cylinder. It is also possible to enable and disable particular cylinder measurements if it is known that there is a problem, for example, a broken cable. Note that the TDC offset adjustment will be made once the engine is running.

The DK-100/200 system has powerful sensor checking facilities, and the limits for these are set under the *Sensor limits* tab, as below.

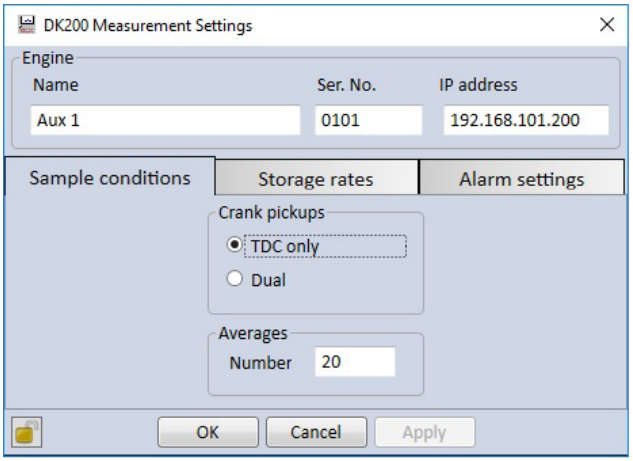


The default limits are shown but these can be adjusted as required. Sensor fail limits indicate that the signal from a sensor is getting close to the limits at

which the signal will clip, and the quiescent (zero-pressure) current or voltage should be checked. Cable fail limits detect an open or shorted cable by checking the maximum and minimum current. High crank sensor variation indicates that the gap between a crank pickup and the TDC marker or flywheel teeth should be adjusted.

3.5 Measurement Settings

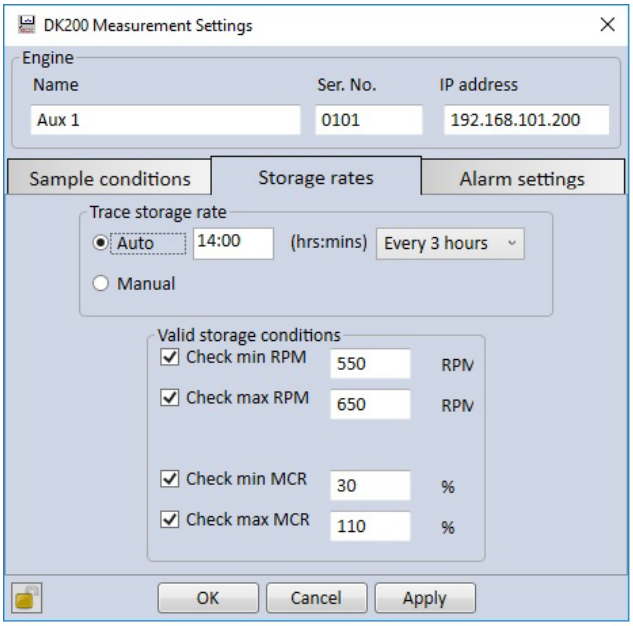
Click **Edit..Measurement settings** followed by the engine to define how measurements will be made by the DK-100/200. The screen below will appear.



There are three tabs for configuring measurement settings, namely *Sample conditions*, *Storage rates* and *Alarm settings*.

The first tab, *Sample conditions*, specifies whether the system has a single pickup (*TDC only*) or TDC and FLY pickups (*Dual*). Click on the appropriate radio button. Specify under *Averages* the number of averages (engine cycles) that should be taken at each measurement.

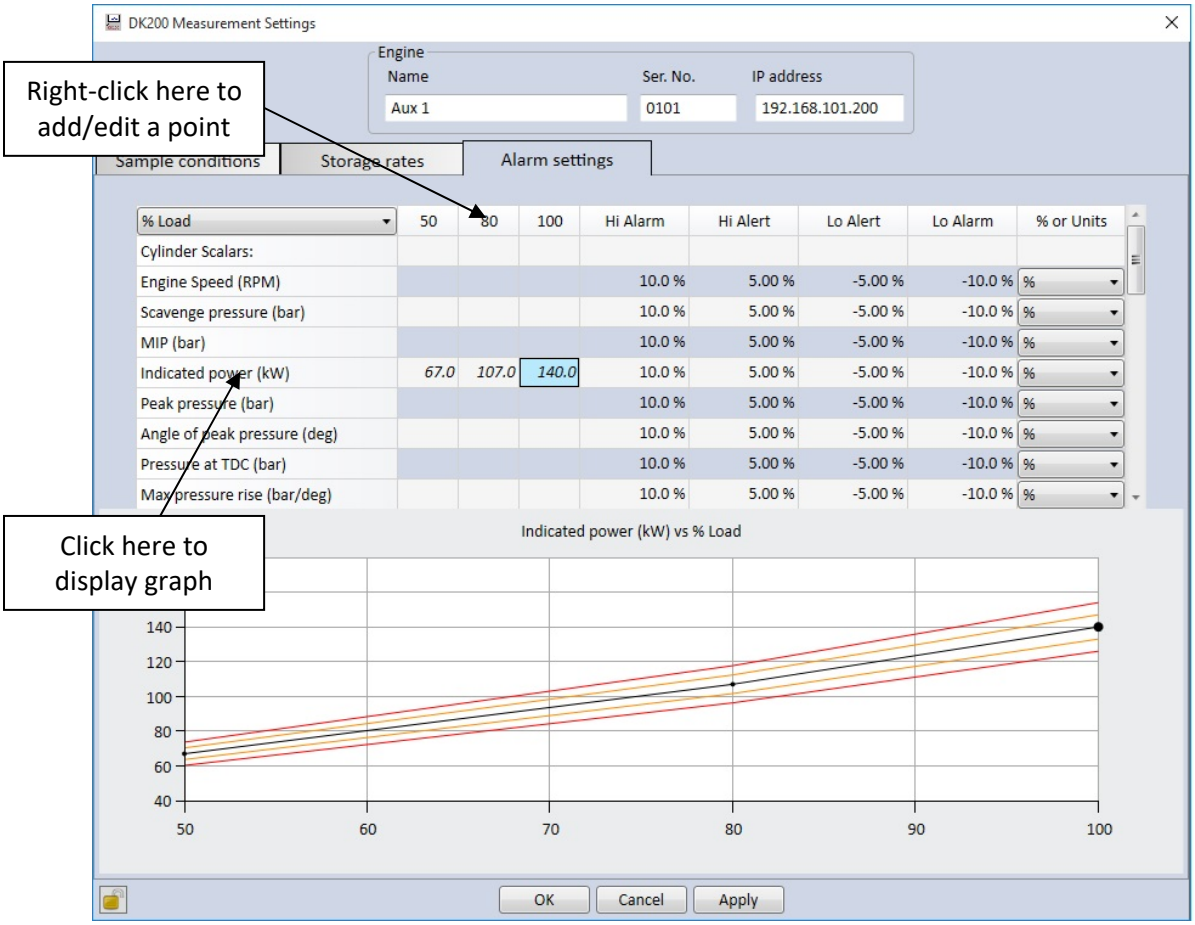
The second tab *Storage rates* defines how measurements are stored in the database as shown below. Note that the display in the *Viewer(s)* will update at every measurement. This tab specifies the frequency of storage of measurements.



If the *Auto* radio button is selected, the system will store measurements automatically. The storage reference time is specified in the *(hrs:mins)* field and then the rate at which data is stored set from the drop-down list. In the example above, measurements will be stored every three hours based on a *Viewer* reference start time of 14:00hrs. So, measurements will be stored at 14:000 hrs, 17:00hrs, 20:00hrs etc (or the nearest measurement immediately after those times).

Valid storage conditions specify when a measurement should be stored, The purpose of this is to prevent erroneous measurements being stored when an engine is coasting up to speed or is under very light load, in which case the measurement is not really valid. The screen above shows some example settings.

The *Alarm settings* tab sets the limits where the traffic light colours on the screen change from green to yellow and red. The screen is shown below.



To set up your alarm limits, it is recommended that you follow the steps below:

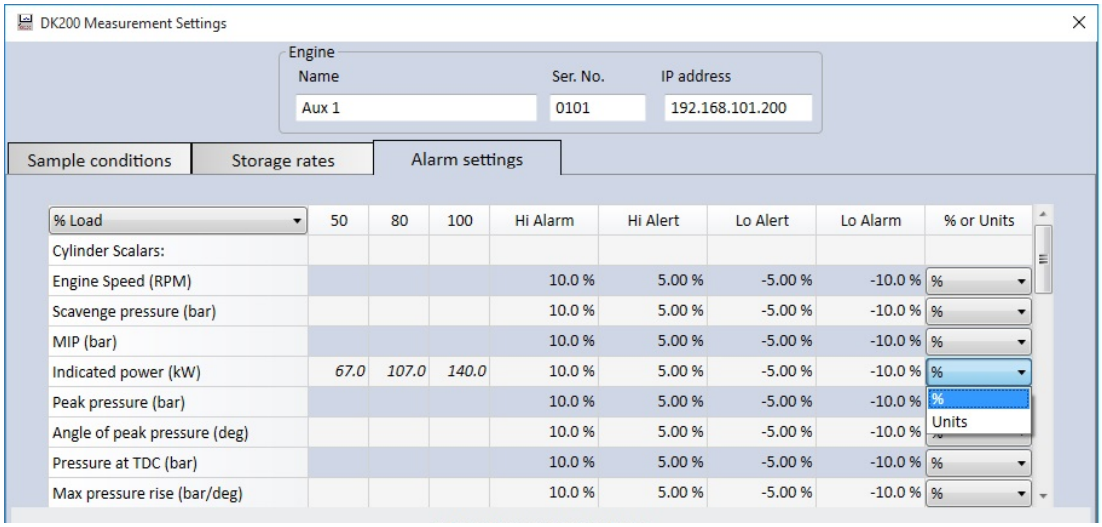
1. Alarm limits are load or RPM dependent. To set which you wish to use, click on the drop-down list in the top left corner of the table and select *% Load* or *RPM*. (In our example, we have chosen *% Load*).

2. Now decide on how many load points you wish to set. The default is two points at 50% load and 80% load. To add another load point or edit/delete an existing point, right-click on one of the load points in the top row (as indicated above) and you will see the options to edit, add or remove a load point. For example, select *Add % Load point* and enter a value of 100. You will now have three load points at 50%, 80% and 100% load as in the screen above.

3. Now specify the value for each scalar at each load point by clicking on the appropriate cell in the table. In our example, we have chosen a *Cylinder Indicated Power* of 67 kW bar at 50% load, 107kW at 80% load and 140kW at 100%. Remember that, in this example, these are *Cylinder* alarms so if the power in <u>any</u> cylinder goes outside the prescribed limits, it will go into yellow or red alarm. Note that, for verification, as you enter values, a graph of the scalar you are working

on appears below showing the alert and alarm value limits at each point for (click on the scalar name to select the graph).

4. Finally, define the alarm limits that you want to set. Default values are already inserted. Note that exceeding an alert limit causes a parameter to be highlighted in yellow and exceeding an alarm limit highlights in red. You can change the values as a percentage or, if you wish to use actual units rather than percentages, select this from the *% or Units* drop-down list on the right (see screenshot below). An explanation of how the limits work as a percentage or units is given below.



Percentage/Units Selection

The *%* selection in the drop-down will set the alert/alarm points as a percentage (+/-) of the values that you entered into the cells for that scalar. For example, if you entered 100 bar as peak pressure at 50% load and alarm limits of +10% and -10%, then this will alarm if the peak pressure at 50% load goes outside the range 90 to 110 bar. If you enter 120 bar as peak pressure at 80% load, the range is 108 to 132 bar at this load before it alarms (ie. +/-10% of 120). The alarm limits automatically interpolate for load settings between load set points.

The *Units* selection will set the alert/alarm limits as values of units, + or - relative to the values that you entered into the cells for that scalar. For example, if you entered 100 bar as peak pressure at 50% load and alarm limits of +10 bar and -10 bar, then this will alarm if the peak pressure at 50% load goes outside the range 90 to 110 bar. If you enter 120 as peak pressure at 80% load, the range is 110 to 130 bar at this load before it alarms (ie. +/-10 bar from 120). The alarm limits automatically interpolate for load settings between load set points. Note that, when specifying alarms for angular units, the *Units* selection should always be used as a percentage of an angle is meaningless (especially if the angle is zero).

Note that the same steps and settings apply as above for limits set relative to RPM.

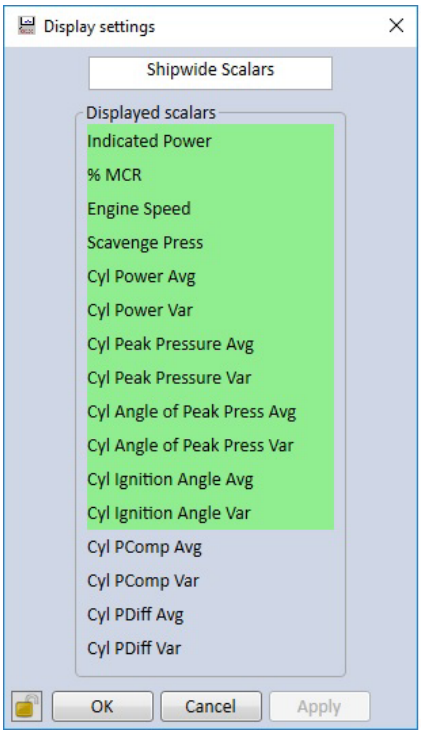
3.6 Display Settings

To specify which parameters or "scalars" will appear on the *Viewer* screens, click **Edit..Display settings** followed by **All Engines** or an individual engine (**Aux 1** in our example).

It is important to understand which scalars will be displayed on which screen in the *Viewer*:

- Scalars defined under *All Engines* will appear in the top overall screen in the *Viewer* (where a summary of all engines is available).
- Scalars defined under an engine name will be displayed when that specific engine is selected in a subsequent screen in the *Viewer* (for example, the *Table* view).

First select **Edit..Display settings..All Engines**. The following screen will appear.



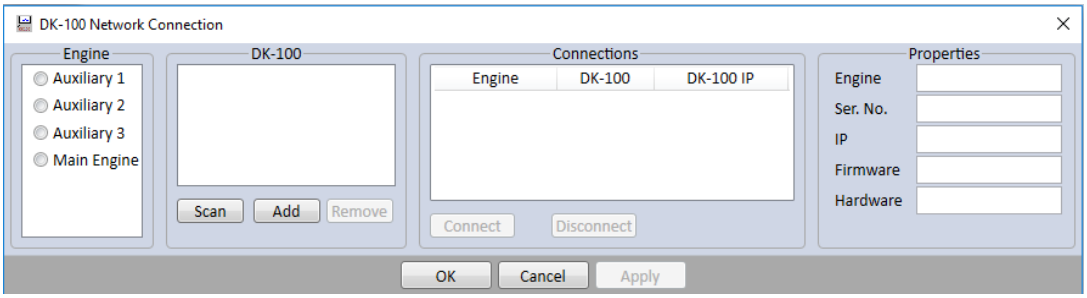
Twelve scalars can be displayed and these are highlighted in green. The order in which the scalars appear can be changed by dragging a scalar up and down the table. To add a scalar to the list, drag it into the green area and place it in the position that you would like it to appear in the *Viewer*. The scalar at the bottom of the list will drop out. Click **OK** when complete.

The same applies for engine scalars except that the total number that can be displayed is 10. The screen below shows an example selection for *Aux 1*.

3.7 Setting Up The Network

In order for the *Doctor On-line Server (DOS)* to transfer information to and from the correct engine, it is necessary to specify which DK-100/200 is fitted to which engine. This is done by clicking on **Edit.. Network Settings**.

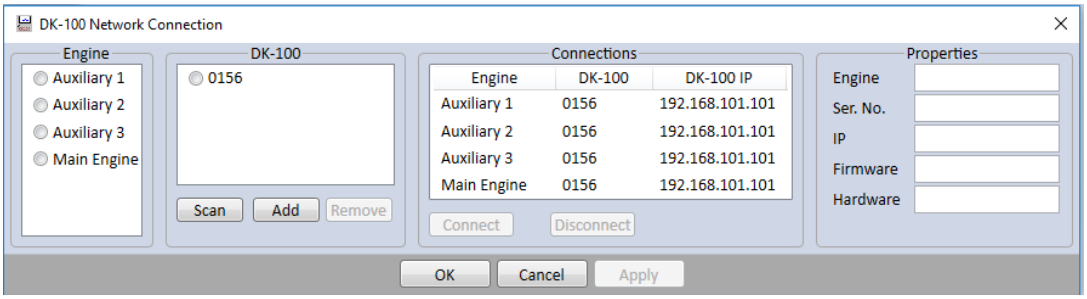
When a DK-100 is in use, a screen similar to the one below will appear. To populate the other panels, proceed as follows.



1. The left panel shows a list of the engines that you have entered into your database (details of how to do this are in sections 3.2 and 3.3).

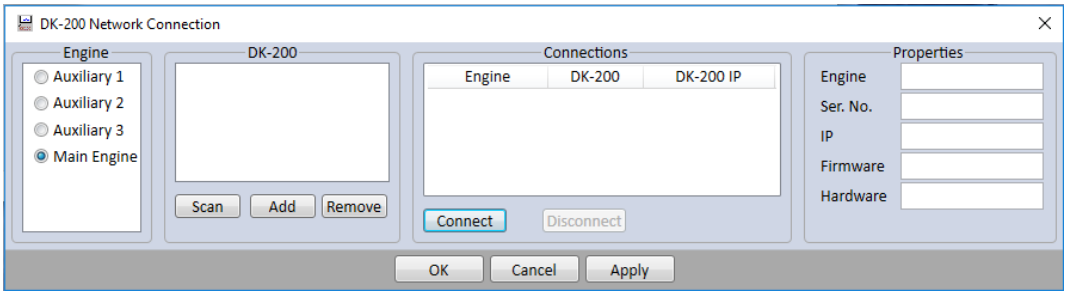
2. The second column from the left shows your DK-100 unit. To automatically identify it, click **Scan** and this will enter the DK-100 serial number into the panel. If the network is not available, you can enter the unit manually by clicking on the **Add** button and entering the DK-100 serial number (four digits with leading zero if necessary) and its IP address. Clicking **Remove** deletes the unit from the list.

3. Now you can make the connections from your DK-100 to the engines. Click on the appropriate radio button in the *Engine* list and on the DK-100 radio button, and then click **Connect**. The entry will appear in the *Connections* field as shown below. Note that, since the same DK-100 is used on all the engines, the serial number and IP address will be the same for all connections. You can remove a connection by clicking **Disconnect**. Clicking on a connection in the *Connections* field shows the properties of that connection in the *Properties* field. Once completed, the screen should look similar to that below.



4. **When using a DK-100, only one engine can be enabled at any one time. The engine to be monitored is selected in the *System Control* screen (see section 3.8).**

When DK-200's are in use, a screen similar to the one below will appear. To populate the other panels, proceed as follows.

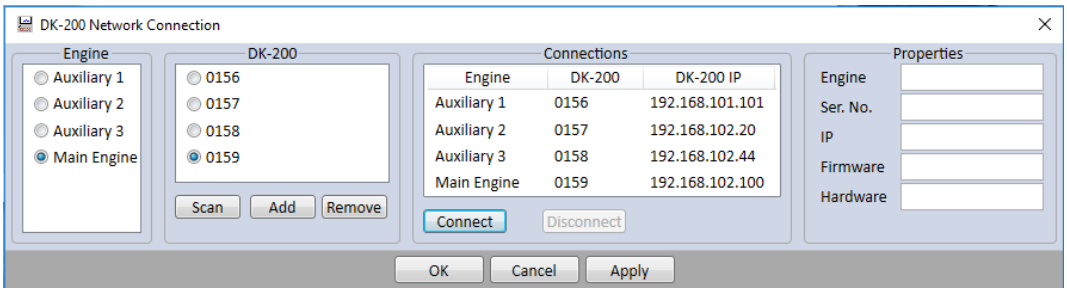


1. The left panel shows a list of the engines that you have entered into your database (details of how to do this are in sections 3.2 and 3.3).

2. The second column from the left shows a list of available DK-200 devices. To automatically identify DK-200 units on the network, click **Scan** and this will populate the list of units. If the network is not

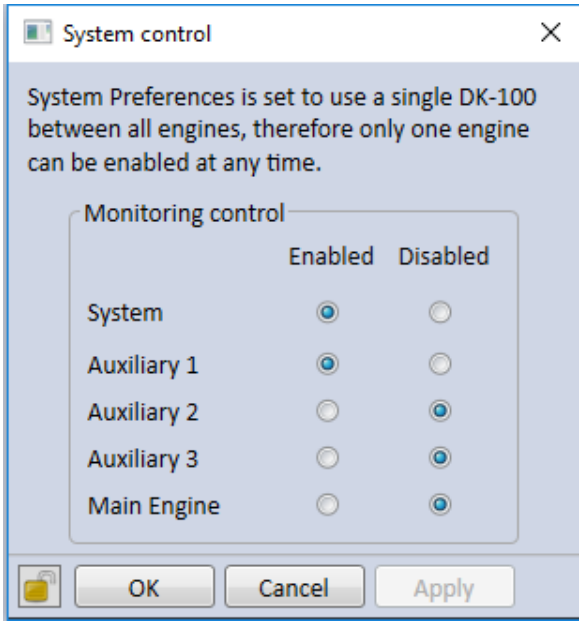
available, you can enter the units manually by clicking on the **Add** button and entering the DK-200 serial number (four digits with leading zero if necessary) and its IP address. Clicking **Remove** deletes units from the list.

3. Now you can specify which DK-200 is fitted to a particular engine ie. which engine the DK-200 is physically wired to. Click on the appropriate radio button in the *Engine* list and *DK-200* list, and then click **Connect**. The entry will appear in the *Connections* field as shown below, including the IP address of the DK-200 on the network. (Note that the IP addresses MUST be different). You can remove a connection by clicking **Disconnect**. Clicking on a connection in the *Connections* field shows the properties of that connection in the *Properties* field. Once completed, the screen should look similar to that below.



3.8 System Control

Overall control of the system is carried out by clicking **Edit..System control**. Here the complete system can be enabled and disabled, or the monitoring of individual engines can be enabled or disabled. Note that, if a DK-100 is in use, then only one engine can be enabled at one time. Multiple engines can be selected when using multiple DK-200's. Click on the appropriate radio buttons to make your selection.



3.9 Password Control

Configuration settings in the *DOM* and *Viewer* are password protected to prevent inadvertent changing of values, or changing without permission.

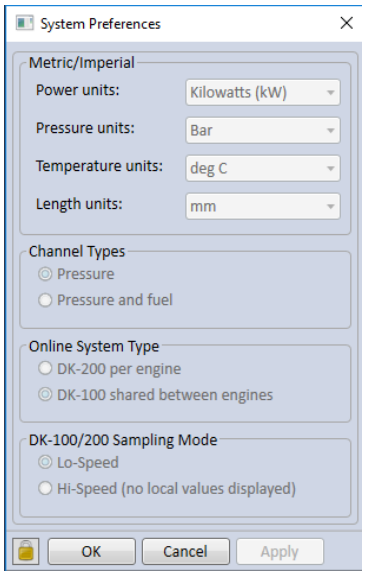
To unlock and lock the system, click **Edit..Change password**. The following screen appears.

On this screen, the system can be unlocked by typing in the password. Once accepted, configuration menus can be changed. In addition, the **Change password** button will be enabled allowing the password to be changed. The default password is '*doctor*'.

Each configuration screen also has a padlock in the bottom left corner which brings up the same screen as above. Remember to lock the system once you have finished any edits.

<u>Important note</u>: Password control is system-wide, and does not apply only to a user's own computer. If a user of the *DOM* or a *Viewer* changes the password, <u>then this is changed for all users</u>. Therefore, take care when changing the password that all users with password control authorisation are informed of a password change.

Note that, if the system is locked, settings can still be viewed but cannot be changed. For example, clicking **Edit..System preferences** shows the dialogue box below. Parameters can be viewed but are greyed out, indicating that they cannot be changed.



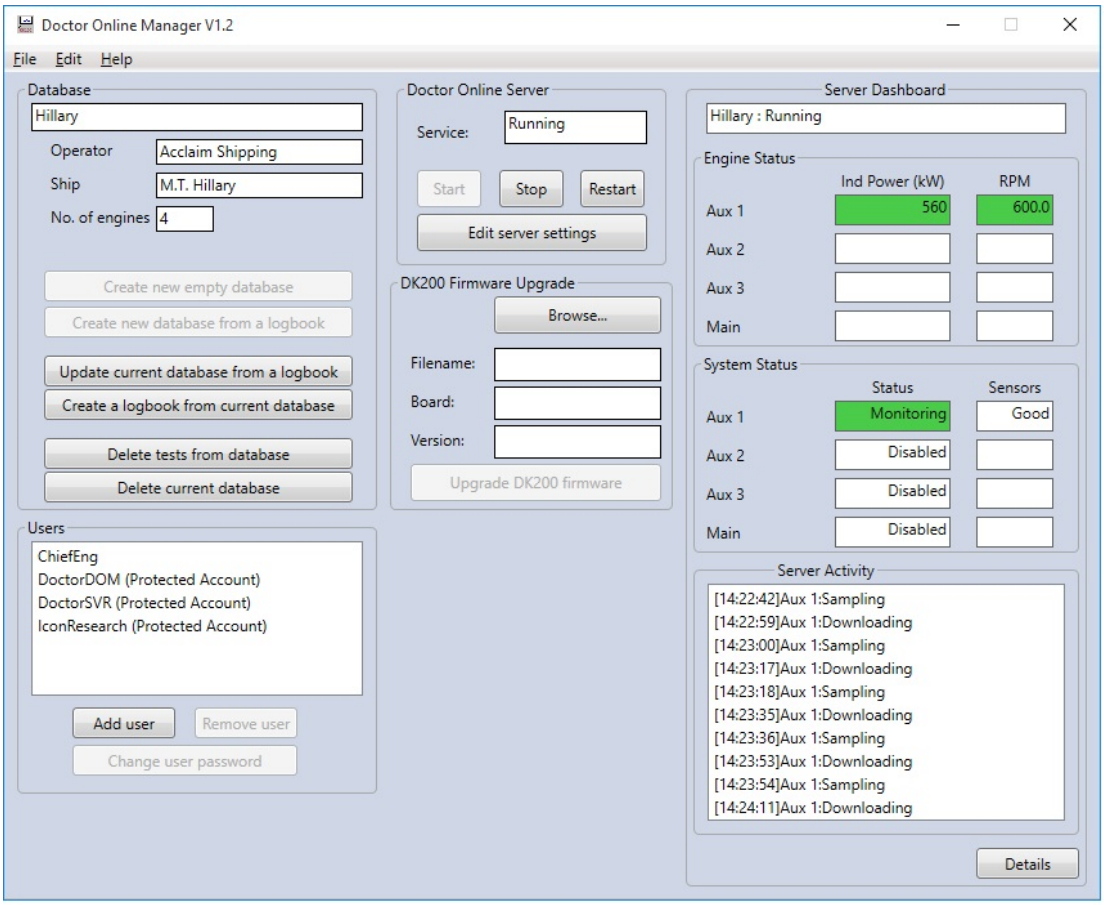
3.10 Running the Doctor On-Line Server (DOS)

Once all the necessary parameters have been entered, you are ready to run the *Doctor On-line Server* which will start the acquisition of measurement data. The *DOS* will run without the need for the *DOM* or any *Viewers* to be connected.

It is assumed here that a single DK-100/200 has been fitted and checked in Diagnostic mode that all sensors and pickups are working correctly. Remember not to leave the DK-100/200 in Diagnostic mode – a warning will appear in the *DOM* and *Viewer* if this is the case.

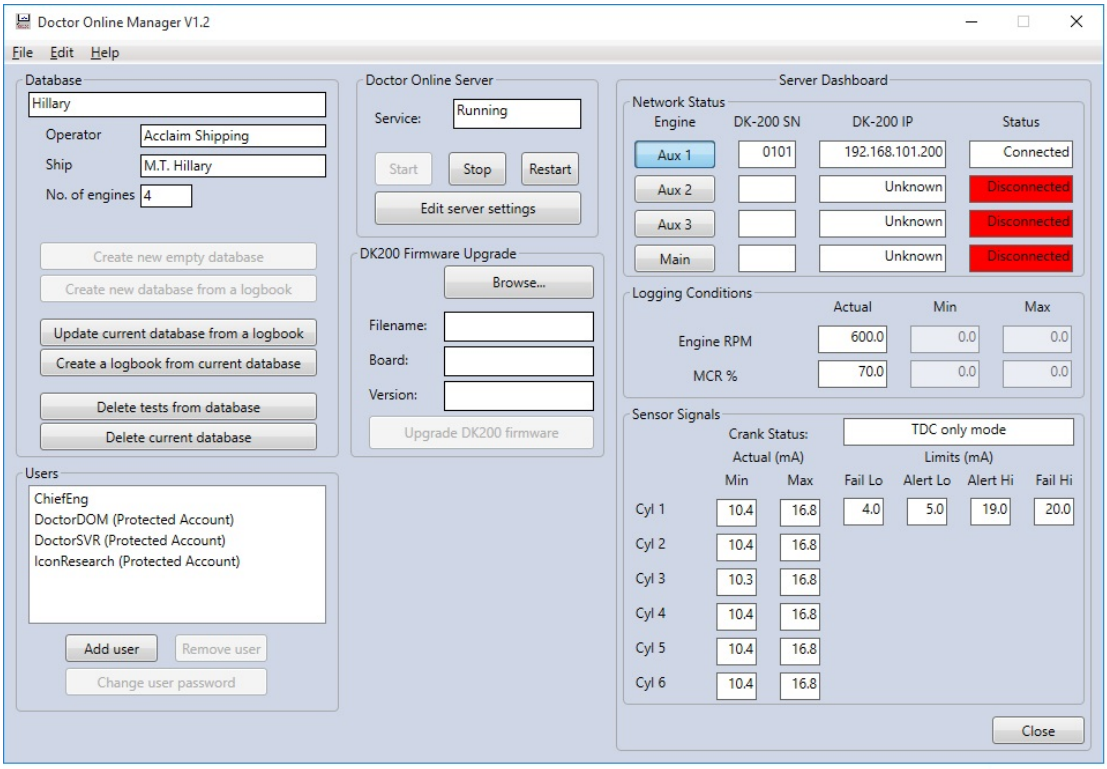
In the Server Service panel, click **Start**. The status message *Running* will appear in the *Service* field. After a short while data will start to arrive.

The *Server Dashboard* shows overall *Engine Status* and *System Status*, together with *Server Activity* which updates as new information arrives. The screen below is typical of a system when it is running (with a single DK-100/200 installed).



If an alert or alarm is indicated, clicking on **Details** brings up the screen below which provides further information. The *Server Dashboard* indicates the

status of the network under *Network Status*, and the status of the sensors under *Sensor Signals*.

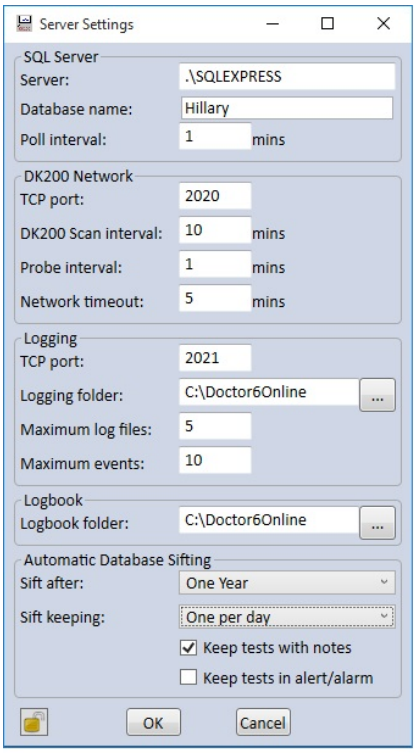


3.11 Adding a User

Additional users who can use the *Viewer* application can be added under the *Users* panel. This is explained in the section *Setting Up The Viewer* in the previous chapter. Note that each *Viewer* requires a *User* to be added to the system.

3.12 Editing *SQL Server/Database* Settings / Sifting

It is possible to alter various time intervals and file locations for the *SQL Server/Database* by clicking **Edit server settings** in the *Server Service* panel. It is recommended that these settings are only adjusted in consultation with personnel responsible for IT within your organisation.

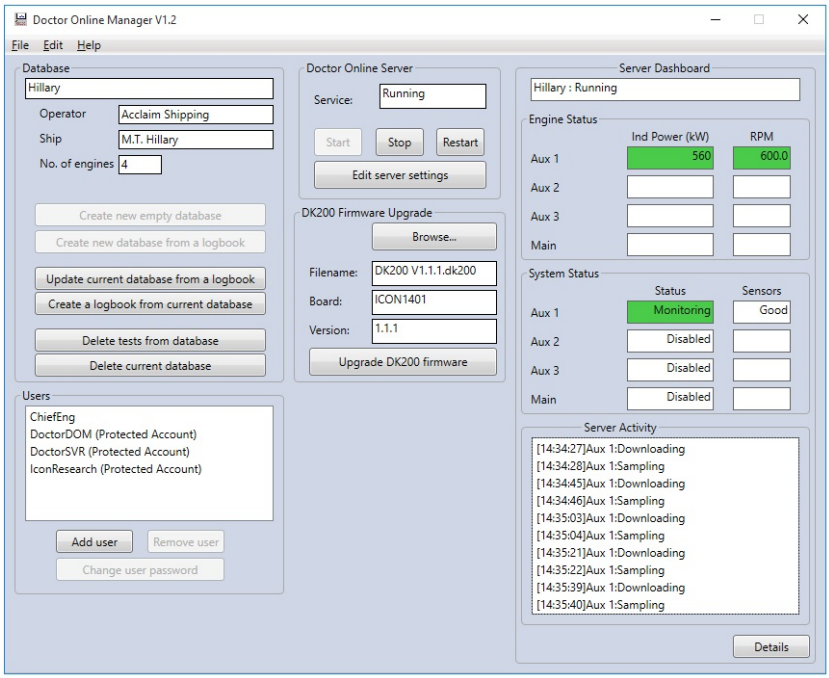


The panel at the bottom labelled *Automatic Database Sifting* enables data to be condensed over time. The *Sift after* drop-down specifies the period during which all data is maintained and sifted thereafter. The *Sift keeping* drop-down specifies how much data is kept after a sift (eg. one set of measurements per day, or per week etc). Additional measurements can be retained after a sift by clicking on the options *Keep tests with notes* and *Keep tests in alert/alarm*.

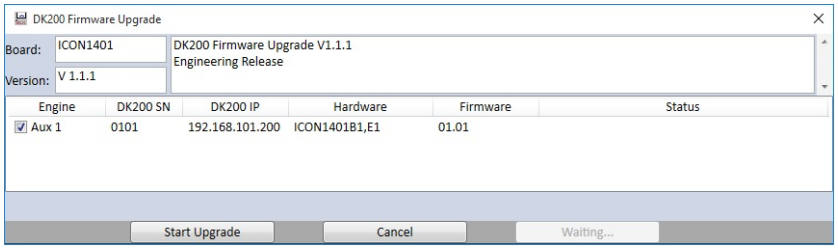
3.13 DK-100/200 Firmware Upgrade

The firmware fitted to DK-100/200 units on the network can be upgraded from the *DOM* using the *DK200 Firmware Upgrade* panel.

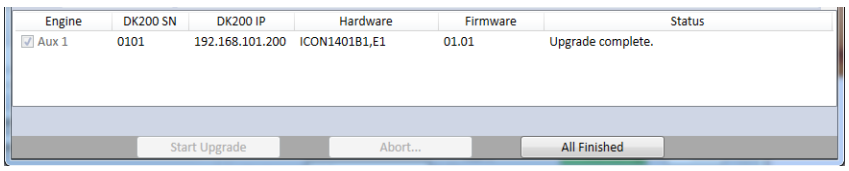
First, click **Browse** and select the firmware upgrade file from where you have stored it (this will be a **.dk200 file*). Click **Open**. The filename, board revision of the DK-100/200 and the firmware revision are populated as shown below.



Now click **Upgrade DK200 Firmware**. The following screen appears.



You can now select which DK-100/200 units you wish to upgrade by ticking the appropriate boxes. The example above shows a single DK-100/200 on our system which we have chosen to upgrade by ticking *Aux 1*. Click **Start Upgrade** to start the process. Messages will appear in the *Status* column indicating progress. When the upgrading is complete, messages appear as in the screen below – you can now close the dialogue box.



3.14 Setting Up SQL Database Access on a Remote Computer

The default installation for the Doctor Online system is for the DOM to be run on the same computer as SQL Server and this allows for the link to the database held on SQL Server to be performed automatically. If this is not the case it is possible to instruct the software to prompt the user for details of where the database is held each time the DOM is started.

To select this option, you need to do the following:

STEP 1

Edit the file *IconResearch.Doctor.Online.DOM.exe.config* which will be found in the folder that the software was originally installed into, which by default is *C:\Program Files (x86)\Doctor6Online\Server*.

In this file you will find a section as below:

<setting name="AllowSQLLogins" serializeAs="String">

<value>False</value>

</setting>

Change the line *<value>False</value>* to *<value>True</value>* and save this changed file.

Note that as this file is in a protected windows location you will have to run your text editor as administrator to allow the file to be saved.

STEP 2

Once the above change has been made you will now get an additional window popup when you start the DOM and you will have to enter your SQL server login details as follow:

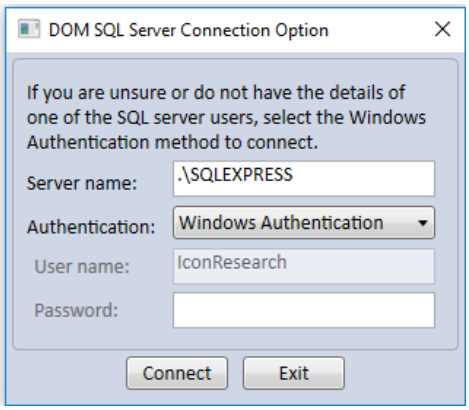
Server name
The name of the computer running SQL server

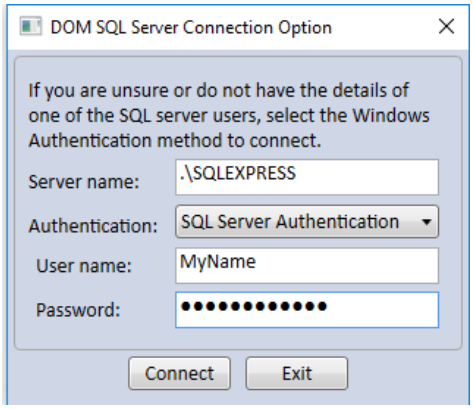
Authentication
Select either *Windows Authentication* to login using your windows account or *SQL Server Authentication* to login using a SQL server account

User name
The SQL server account user name

Password
The SQL server account password

One of the screens below will appear depending on the *Authentication* you have selected





In either case you must make sure that the windows account or SQL server account has been correctly setup within SQL server to use the Doctor Online database.