Connecting SKF Flowline monitors to SKF @ptitude Analyst via SKF @ptitude Analyst OPC Client

By Risto Moilanen and Oscar van Dijk, SKF

Introduction

The SKF Flowline monitor is an oil flow rate monitoring unit used in circulating oil lubrication systems in heavy industry applications. One monitor includes flow meters and adjusting valves for 1 to 10 individual lubrication points. Two monitor models are available, FL-15 for 0 to 15 l/min and FL-50 for 10 to 50 l/min measuring range. The system uses a colored LED display for simple indication of lubrication flow and alarms. It is easy to read the actual flow rate of each individual lubrication point on the visual built-in display. A picture of the device is shown in **Figure 1**.

Figure 1. The SKF Flowline monitor.

The typical size of a lubrication monitoring system in a paper machine application is:

- more than 500 lubrication points
- more than 50 SKF Flowline monitors

The system has a digital interface for connection to the Windows based SKF Flowline software and to the customer's DCS system.

These options, however, are separate displays. This requires that the maintenance person needs to start the SKF Flowline software or they need to call the operators to check on the oil flow for the machine. However, when the SKF Flowline software is used, there is a chance that the alarm settings get changed without any notice to the operators.

The request, therefore, is to integrate display of the oil flow rate with condition monitoring data in SKF @ptitude Analyst software. The maintenance engineers then need only use a single application to view both. The display functionality should provide a "read-only" function.

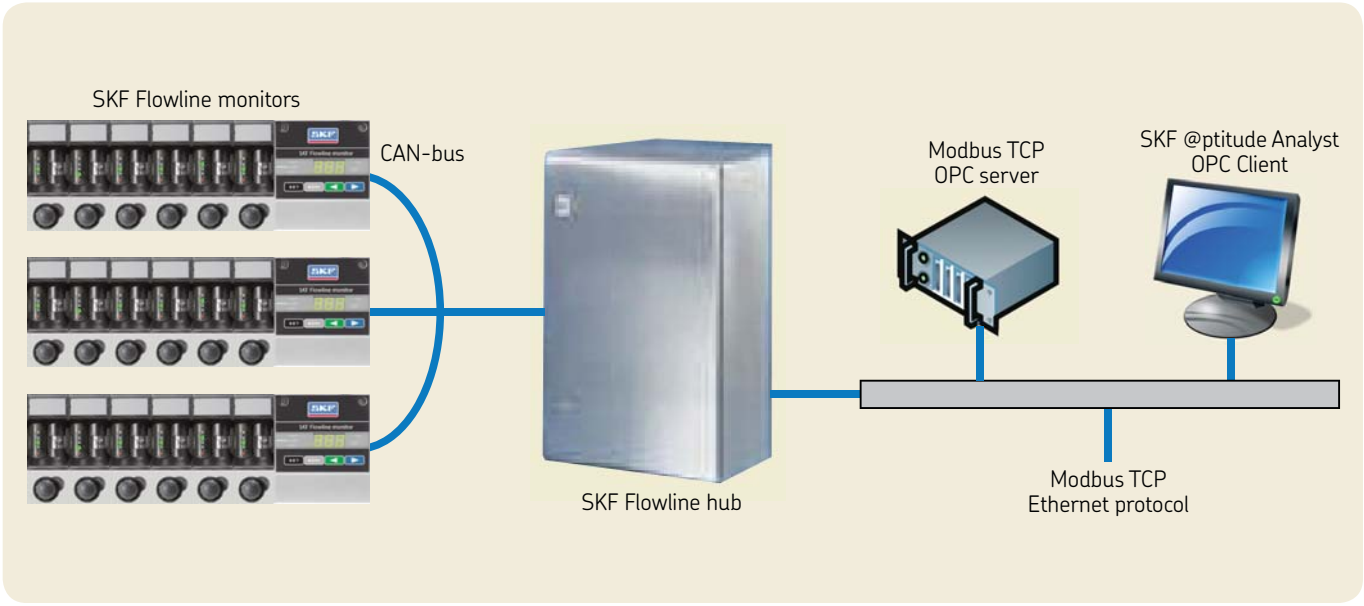


Figure 2.

System layout

A typical system layout for connection of the SKF Flowline monitor system is pictured in **Figure 2**.

SKF Flowline monitors are connected via CAN-bus to the SKF Flowline hub. This hub has several communication interfaces. In this example, we use an ethernet interface for the connection. This ethernet interface is connected to the plant's network. The SKF Flowline hub provides data from the SKF Flowline monitors in a Modbus TCP format.

To convert this Modbus TCP data into OPC format, an OPC server is used. The OPC format is readable by a multitude of process interfaces and by SKF @ptitude Analyst. The OPC format is becoming more and more the standard for communication between measuring devices, process control and data historian systems.

When data from the SKF Flowline monitors is provided in the OPC format, any OPC client can read the data. One of these clients is the SKF @ptitude Analyst OPC Client. The SKF @ptitude Analyst OPC Client reads the data and stores it in the SKF @ptitude Analyst database.

To set up communication, several steps are required. First, the OPC server needs to be created, then the measurement POINTs in SKF @ptitude Analyst need to be created. When both are complete, we can link the points from the OPC server to the SKF @ptitude Analyst database.

After the setup is completed, data is stored at regular intervals in the database and can be used by SKF @ptitude Analyst for trending and alarming. Data can also be utilized by SKF @ptitude Analyst Human Machine Interface (HMI) for a graphical user interface, and by SKF @ptitude Decision Support for asset fault diagnosis.

System setup

A typical setup for the Flowline oil flow rate monitoring system is shown in **Figure 3**. This system monitors the PM2 Drying Section, driver side. Only a part of the system is shown.

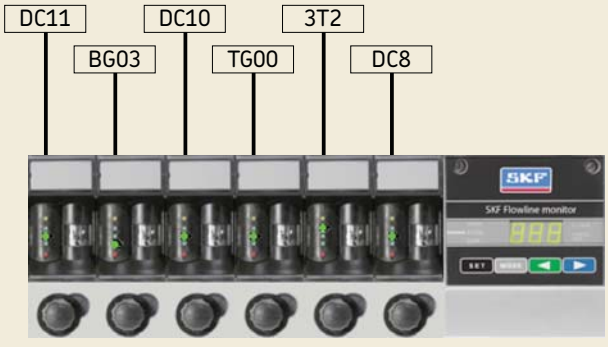


Figure 3.

In the OPC server, tags are created and linked to the Modbus TCP registers. The exact linking of the registers depends on the number of SKF Flowline monitors and the configuration of these monitors. **Figure 4** shows the linking for the above points.

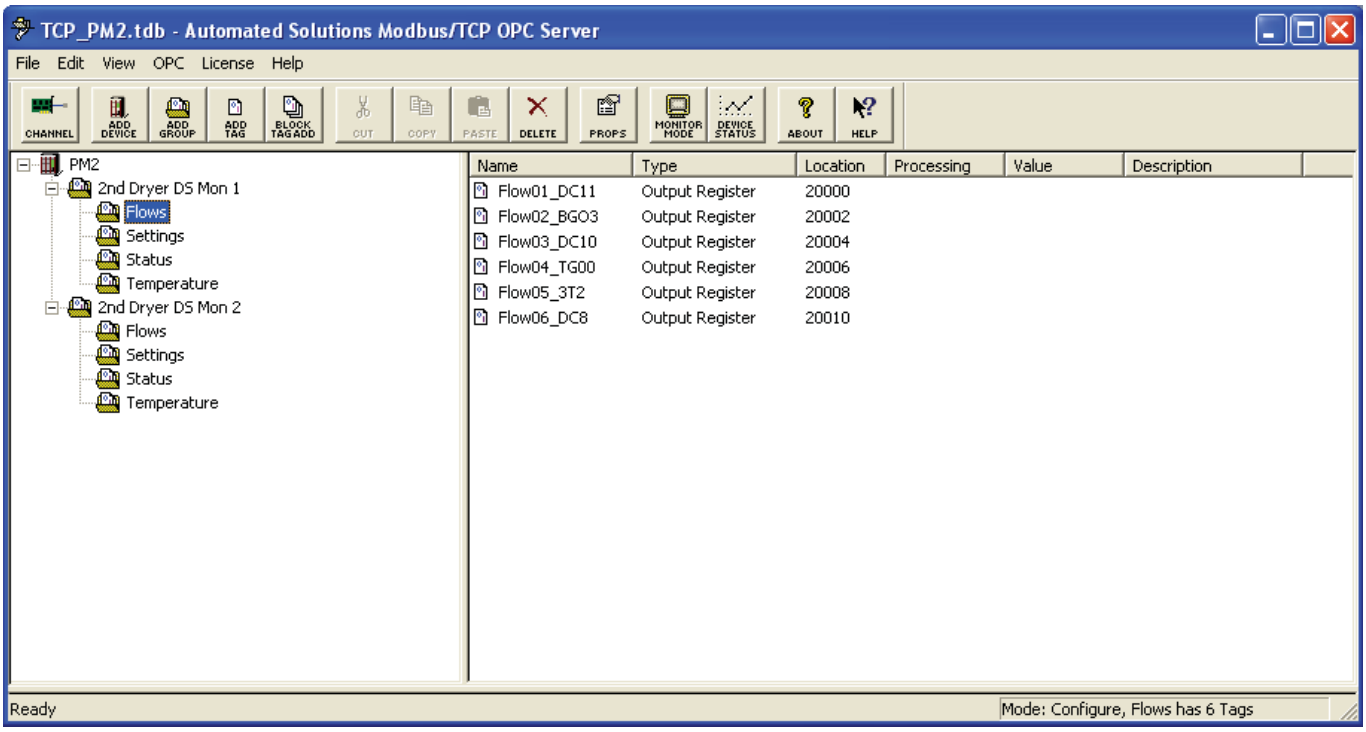


Figure 4.

The tag for the oil temperature is available in the Temperature group.

Corresponding points for tags requiring transfer to SKF @ptitude Analyst database need to be configured first.

SKF @ptitude Analyst POINT Setup

OPC data is stored in the database by the SKF @ptitude Analyst OPC Client. Before this can happen, POINTs need to be created in the SKF @ptitude Analyst software. For OPC data, a Manual type POINT is created, **Figure 5**.

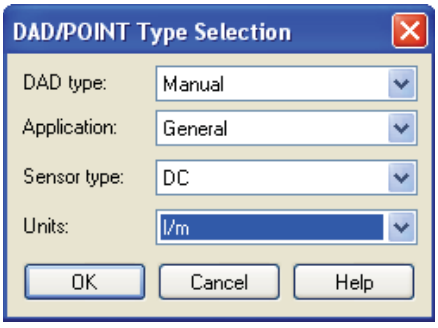


Figure 5.

Units are set to the corresponding type measured by the SKF Flowline system. When the POINT type is accepted, the POINT name can be defined, **Figure 6**.

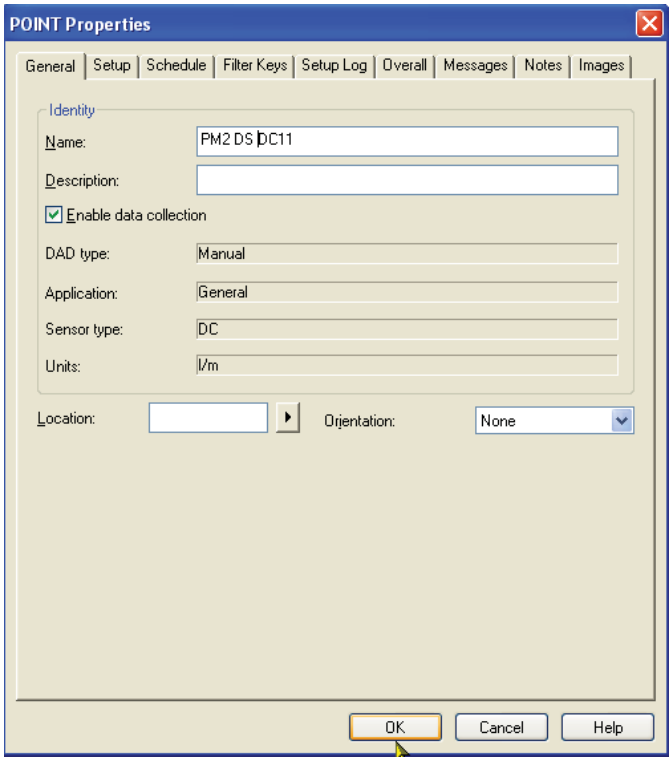


Figure 6.

On the next screen as shown in **Figure 7**, enter the required full scale. This full scale setting should be the same as used in the SKF Flowline monitoring system.

Figure 7.

Next, enter the data collection schedule. It is advised to enable data archiving. This allows for a high resolution of recent data, while older data is stored with a greater interval. In the example shown in **Figure 8**, we store data with five minute intervals for two weeks. After these two weeks, data with a daily storage interval is available for up to 24 months. After these 24 months, data is stored for up to 5 years with a weekly interval. Alarm data is kept for a full year.

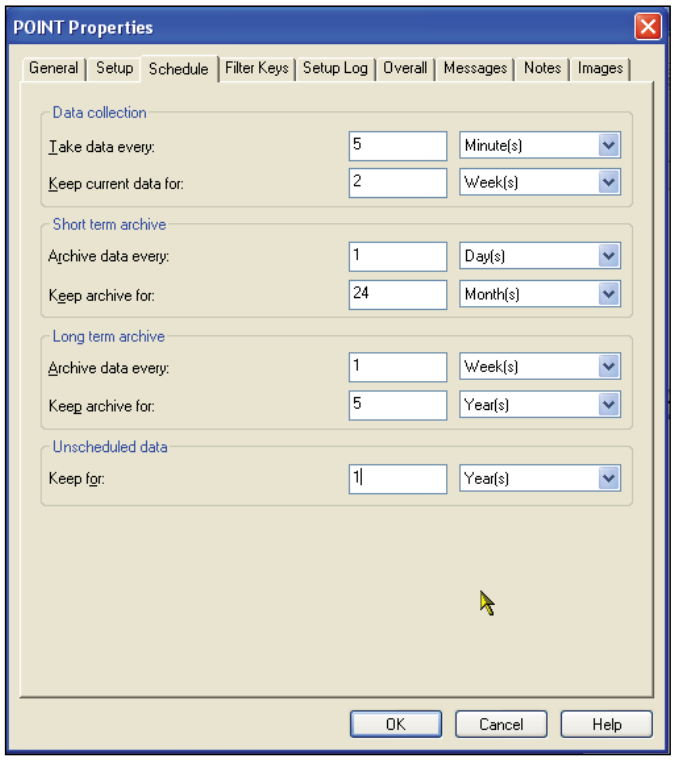


Figure 8.

When required, alarms can be set using the Overall tab, **Figure 9**. Private alarms can be set, as exampled here. When there are many points with the same interval, it is advised to use Shared alarms. Then, if alarm settings need to be changed, it can be accomplished from a single location.

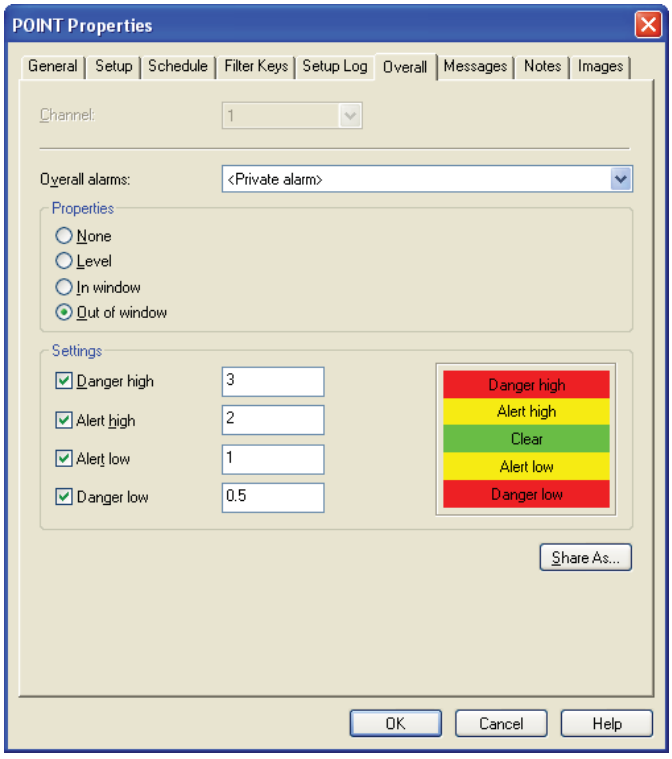


Figure 9.

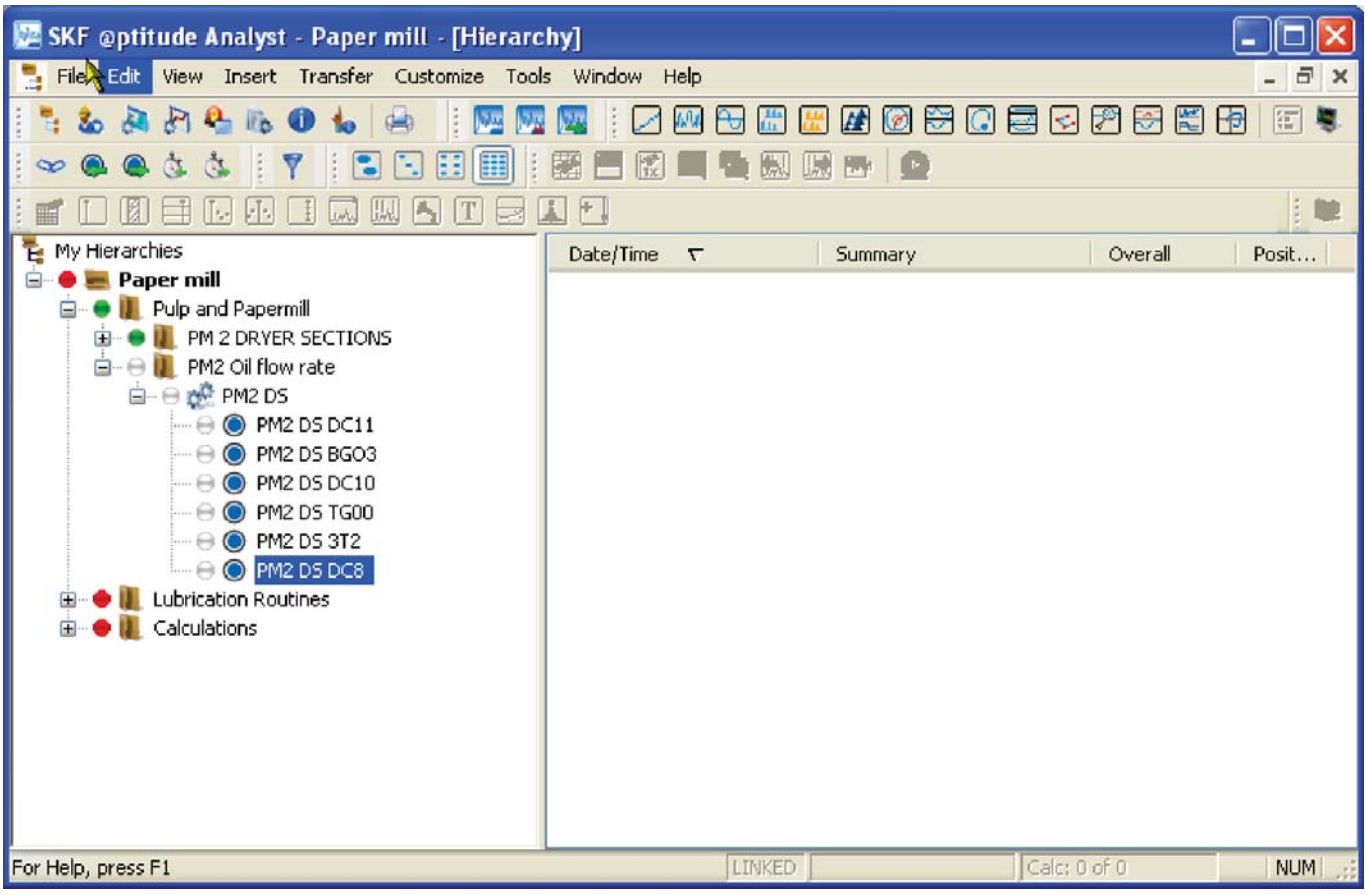


Figure 10.

POINT setup information on the other tabs is not required at this time. This information can be entered afterwards, or with a global change using the Modify By Attribute feature.

When all the POINTs are entered, a typical hierarchy for the machine might look like the one exampled in **Figure 10**.

When complete, the POINTs in SKF @ptitude Analyst can be linked with the tags in the OPC Server using the SKF @ptitude Analyst OPC Manager.

SKF @ptitude Analyst OPC Client

SKF's @ptitude Analyst OPC Client application consists of two modules. The foreground module; SKF @ptitude Analyst OPC Manager, and the background module; the SKF OPC to SKF @ptitude Analyst Service. The Manager module is used to configure the connections and link the OPC tags to the SKF @ptitude Analyst POINTs. The actual data transfer is set up via the OPC to SKF @ptitude Analyst Service.

When SKF @ptitude Analyst OPC Manager is started, the SKF @ptitude Analyst hierarchy displays, **Figure 11**.

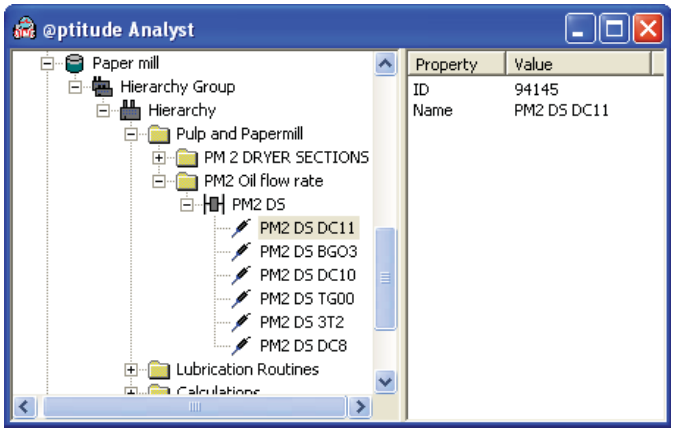


Figure 11.

To connect the POINTs to the OPC tags, a connection to the OPC server needs to be created. When this is done via the menu selection Action/OPC Server/Connect, the following window opens, **Figure 12**.

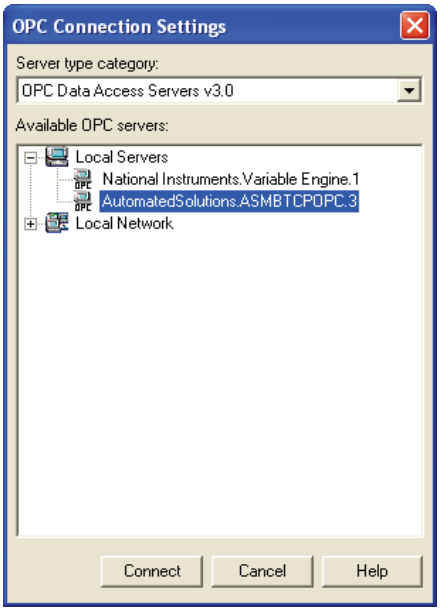


Figure 12.

Select the OPC server to use and click on the Connect button. When the connection is made, the OPC server window can be opened, **Figure 13**.

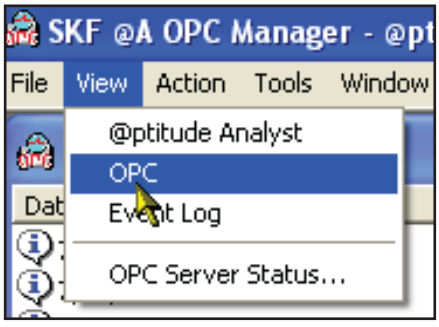


Figure 13.

When the OPC window is opened, the tags, as created in the OPC server, are shown, **Figure 14**.

Connecting the SKF @ptitude Analyst POINTs to the OPC tags is done via a simple drag and drop operation.

Tip: This is more easily accomplished when the OPC server window and the SKF @ptitude Analyst window are aligned next to each other.

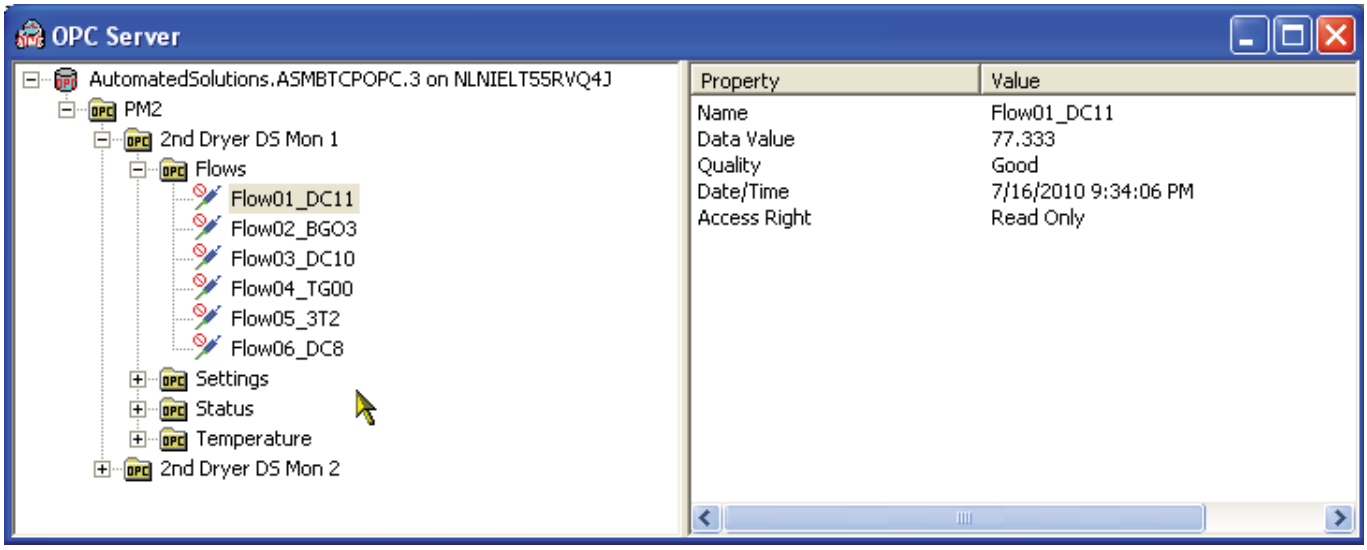


Figure 14.

Important!: The direction of the drag and drop operation defines the direction of the data transfer. For example, if data needs to be transferred from the OPC server to the SKF @ptitude Analyst database, drag the tag from the OPC server window to the SKF @ptitude Analyst window.

When the OPC tag and SKF @ptitude Analyst POINT are connected, the status of the connection is also displayed in the Properties window, **Figure 15**.

The data transfer interval is controlled by the setting in the SKF @ptitude Analyst OPC Manager Preferences. A typical setting for the oil flow might be every five minutes.

When the value from the SKF Flowline monitor has changed, the value will be stored in the SKF @ptitude Analyst database. To save bandwidth, values will not be stored if they have not changed.

Icons in both the OPC Server hierarchy and the SKF @ptitude Analyst hierarchy show the connection. In the OPC hierarchy, the icon also indicates "read only". Data in the OPC server is supplied by the SKF Flowline monitors. The SKF @ptitude Analyst OPC Client only reads this data. SKF @ptitude Analyst can not write to the SKF Flowline monitors, as there is no reason to do so.

Summary

Integration of SKF Flowline monitors flow rate data into SKF @ptitude Analyst is accomplished using the SKF @ptitude Analyst OPC Client. Flow rate information, once in SKF @ptitude Analyst database, may be stored and trended and used to complement vibration analysis, and may also be displayed on Live screens, as with the SKF @ptitude Analyst Human Machine Interface (HMI) application. Oil flow and oil temperature data can be compared to vibration data and to vibration envelope data to monitor bearing wear.

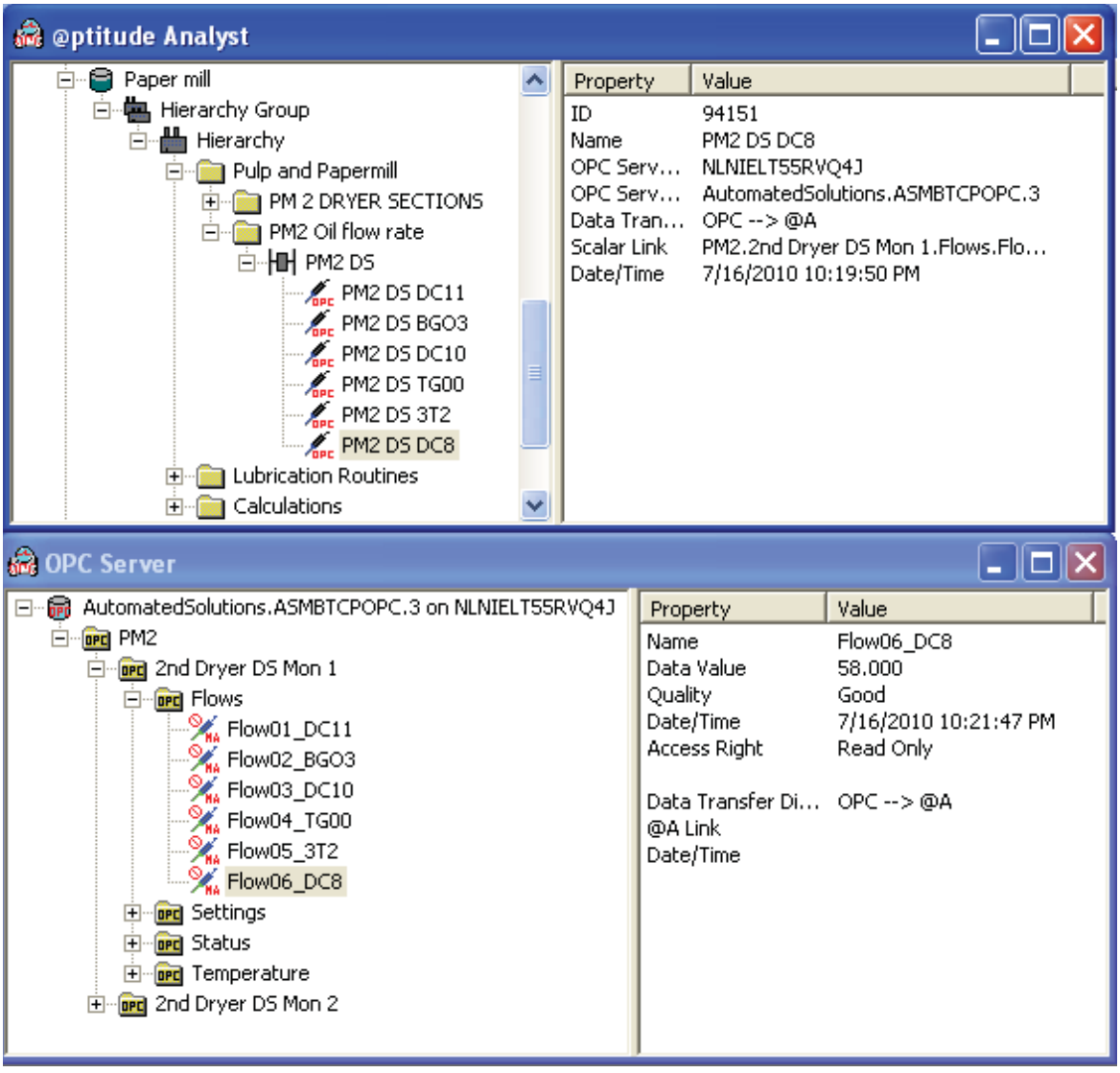
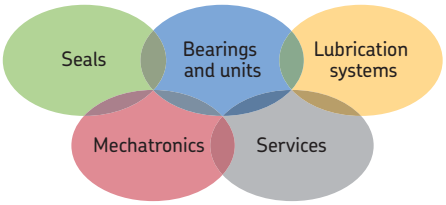


Figure 15.



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Please contact:

SKF USA Inc.
Condition Monitoring Center – San Diego
5271 Viewridge Court · San Diego, California 92123 USA
Tel: +1 858-496-3400 · Fax: +1 858 496-3531

Web: www.skf.com/cm

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