

SKF @ptitude Analyst for SKF Microlog Analyzer

Documents features applicable to
SKF Microlog GX / AX Series and CMXA 51-IS

Part No. 32296800-EN
Revision C

User Manual

Read this manual before using this product. Failure to follow the instructions and safety precautions in this manual can result in serious injury. Keep this manual in a safe location for future reference.

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Technical Support Email: tsg-americas@skf.com North and South America

Technical Support Email: tsg-emea@skf.com



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US 6,437,692 • US 6,489,884 • US 6,513,386 • US 6,633,822 • US 6,789,025 • US 6,792,360 •
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CM-F0176 (Revision F, January 2011)

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Introduction to SKF @ptitude Analyst for SKF Microlog Analyzer

About This Manual

As you'll soon realize, SKF @ptitude Analyst for SKF Microlog Analyzer is easy to install and use. Chances are, after reading what you need to know in order to get going, you won't use this manual except as a quick reference aid.

Note - This manual guides the SKF Microlog user through the @ptitude Analyst software. For information on other aspects of @ptitude Analyst, such as SKF Microlog Inspector-specific applications, please reference the other provided user manual(s) for specific data acquisition devices.

This manual helps you create your @ptitude Analyst machinery hierarchy of measurement POINTs, download and upload measurements between @ptitude Analyst and your data collection device, and generate graphic plots and reports for analyzing the measured machinery's condition. This manual's chapters are organized according to the steps in this process (a chapter overview follows on page 2).

- In writing this manual we assume you are familiar with common Windows™ operations. Refer to your Windows guides for information in these areas.

As you use this manual, you'll discover certain conventions used:

Bold type is used to indicate text that appears in a SKF @ptitude Analyst menu, window, or dialog.

Italics are used to emphasize important information.

➤ - are used to indicate notes to the reader.

Step-by-step procedures are sequenced using bullets, •.

This manual contains information that applies to the GX and AX-Series Microlog units, as well as the CMXA51-IS, with any differences noted.

When referencing the GX and AX, the term "Microlog" is used.

If referencing a specific Microlog device, it will be noted accordingly.

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Note: Standard technical support will be provided at no cost on products or software covered under an SKF Product Support Plan (PSP), whenever applicable. Many SKF Machine Health products include limited technical support for the first 180 days after purchase. Support obtained after 180 days or without PSP coverage will be Support obtained after 180 days or without PSP coverage will be subject to a per-incident fee. Contact the technical support team for more information.

Chapter Overview

This SKF @ptitude Analyst for SKF Microlog Analyzer manual is divided into 5 chapters and 1 appendix:

Chapter 1, Introduction - Introduces manual conventions and overviews the @ptitude Analyst / Microlog System.

Chapter 2, Working With Your SKF @ptitude Analyst Hierarchy - Describes in detail how to organize your machinery measurement POINTs into @ptitude Analyst hierarchies, SETs, machines, and POINTs. Also details how to establish @ptitude Analyst's many alarm criteria. Describes database editing procedures using @ptitude Analyst's Templates, Modify by Attribute feature, and Filters.

Chapter 3, Data Collection ROUTEs and Other Data Transfer Operations - Describes how to create @ptitude Analyst measurement collection ROUTEs, how to download ROUTEs to the data collection devices, how to upload measurements from the data collection devices, and how to manually enter data into the @ptitude Analyst database.

Chapter 4, Displaying Graphic Plots - Describes methods for displaying collected machinery measurements in graphic plot format, and describes in detail @ptitude Analyst's menu options for manipulating graphic plots to obtain useful analysis data.

Chapter 5, Generating and Printing SKF @ptitude Analyst Reports - Describes in detail how to create report templates and how to generate and print @ptitude Analyst reports.

Appendix A, SKF @ptitude Analyst Toolbars - Offers an overview of @ptitude Analyst's toolbars and details the custom toolbar creation procedure.

What is the SKF @ptitude Analyst for SKF Microlog Analyzer?

An SKF @ptitude Analyst for SKF Microlog Analyzer system consists of two components:

1. A Microlog Data Collector / Analyzer, and
2. A host computer with @ptitude Analyst software.

The Microlog Data Collector / Analyzer

The Microlog series data collector / analyzer is a lightweight, hand-held, data acquisition device and portable maintenance instrument, designed to enable you to establish a comprehensive periodic condition monitoring program. The Microlog collects machinery vibration and temperature measurements and performs detailed analyses in harsh industrial environments.



Figure 1 - 1.
The **Microlog** Portable Data Collector.

The Microlog performs all the tasks required of a machinery predictive maintenance program. It collects both dynamic (vibration) and static (temperature, flow, pressure) measurements.

Vibration measurements are collected with a hand-held / magnetic-held probe or from an installed monitoring system. Temperature measurements are collected with a non-contact infrared sensor or with a contact probe.

Values read from machinery gauges and indicators are entered into the Microlog using the alphanumeric keys on the Microlog's keyboard. Observations can be recorded in plain language or as coded notes.

The Microlog automatically performs all filing, trending, and reporting of measurement data, with minimum effort and with minimum interaction.

In addition to its data collection features, the Microlog is a powerful analyzer. It is capable of displaying Fast Fourier Transform (FFT) frequency spectra and time domain waveforms on its liquid crystal display (LCD) screen.

- At times this manual refers to the Microlog Data Collector / Analyzer. Microlog operations are not discussed in this @ptitude Analyst User Manual. For information on the Microlog Data Collector / Analyzer, reference your Microlog User Manual.

The Host Computer

The host computer has Microsoft Windows 7, 8.1 or 10, an Intel 2.0 GHz, 32 or 64-bit, or better processor, 6 or more Gbytes of RAM, and a 30 Gbyte hard disk (minimum 10 Gbyte); and enough free disk space to store your @ptitude Inspector measurement hierarchy (whose size depends on the number of monitored measurement POINTs). Together, the host computer and @ptitude Inspector software perform database management, trending, display, and reporting functions for the Microlog Inspector / MARLIN System.

For further details, refer to the SKF @ptitude Analyst Installation Manual (P/N 32312400).

SKF @ptitude Analyst Software

The easy-to-use @ptitude Analyst software works with DADs (Data Acquisition Devices) to assist machinery maintenance personnel in managing and analyzing their collected data. @ptitude Analyst automatically uploads measurement data from DADs and performs the tedious clerical work required in sorting, storing, and pre-analyzing measurement data. Use @ptitude Analyst to easily configure measurement POINTs (a machinery location at which measurement data is collected), for downloading measurement POINT setups to DADs, for database manipulation of collected data, and to graphically display and generate reports on collected measurement data.

Exception Reports - @ptitude Analyst automatically compares current measurement values to past measurement values, and to pre-defined alarm values to detect changes from normal machinery conditions. Using hierarchy list alarm status indicators and detailed printed reports, @ptitude Analyst alerts maintenance personnel to alarm conditions (exceptions from normal conditions).

Analysis - @ptitude Analyst displays and prints various plots and reports for analyzing machinery condition.

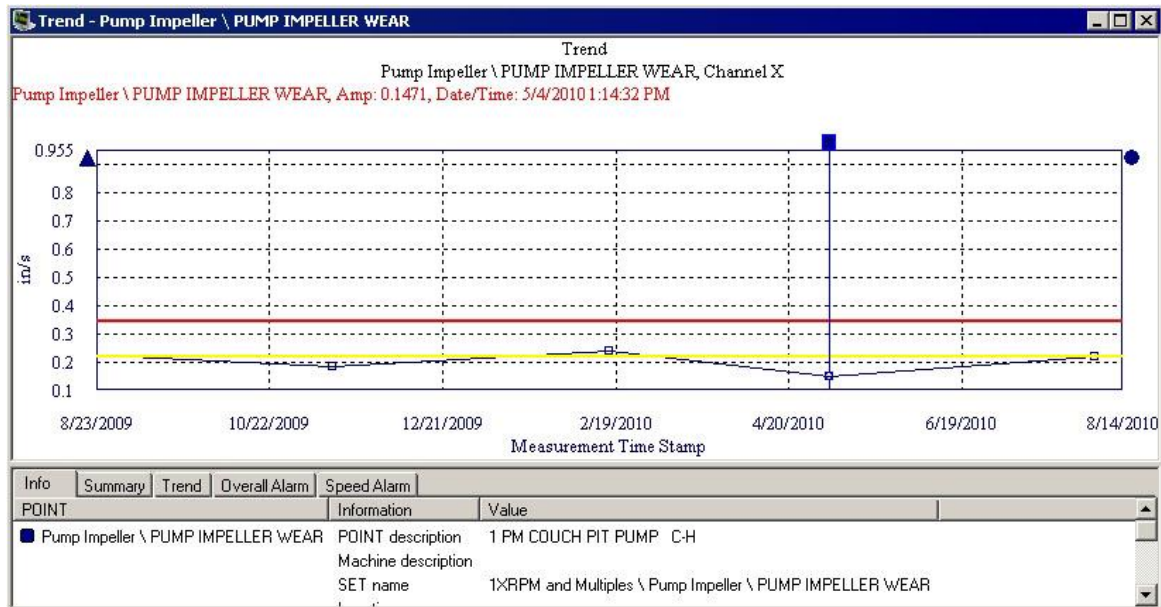


Figure 1 - 2.
Graphic Display of an @ptitude Analyst Measurement.

Trend plots, FFT spectra (including waterfall and palogram plots), time waveforms, polar vector plots, and other plot types are easily displayed to help determine if machinery condition changes are occurring, and if so, to help with analyzing the cause of machinery condition changes.

For the easiest and most effective use of the Microlog System, you should:

Use @ptitude Analyst to:

- Organize your hierarchy into SETs and machines.
- Add measurement POINTs to these hierarchy machines, configuring each POINT's measurement and alarm settings as it is created.
- Create a collection ROUTE of measurement POINTs.
- Download the collection ROUTE to the Microlog

Use the Microlog to:

- Walk the ROUTE, collecting data for each pre-determined measurement POINT.

Use @ptitude Analyst to:

- Upload the collected data to @ptitude Analyst.
- Use @ptitude Analyst's alarm detection features to quickly scan for abnormal machine conditions.
- Use @ptitude Analyst plots and reports to analyze, trend, report, and store measurement data.

Working With Your SKF @ptitude Analyst Hierarchy

Selecting which of your machinery requires monitoring, what measurements to perform on the selected machinery, and how often to perform these measurements requires a careful study of the needs of the plant.

Creating a Paper Copy Hierarchy

It is advisable to create a paper copy hierarchy before creating your @ptitude Analyst hierarchy. This paper copy hierarchy of your machinery measurement POINTs should be organized in hierarchical format by machines and POINTs for each machine.

For each hierarchy, use an outline format to create your hierarchy's organizational hierarchy, with measurement POINTs branching from machines, which branch from SETs.

```

POWER GENERATION
  GAS TURBINE
    GT INLT 1HV
    GT INLT 1VV
    GT INLT 1XV
    GT INLT 2HV
    GT INLT 2VV
    GT INLT 2XV
  MAIN PUMP
  WATER TREATMENT
  
```

Take time to organize your paper copy hierarchy thoroughly. A complete and organized paper copy hierarchy makes building your @ptitude Analyst hierarchy much easier. When naming POINTs, it is helpful to keep machine names and POINT identifiers in columns (as exemplified above).

- If you have several machines with the same title (for example, GAS TURBINE), use an alpha or numeric prefix or suffix to uniquely identify one machine only (for example, GAS TURBINE INLT).

About POINT Names

In the Microlog / @ptitude Analyst system, each measurement must be identified by a descriptive name. This can be accomplished by adding a suffix to each equipment name to denote the specific location, measurement orientation, and type of measurement.

Suffixes such as AHV, 1VD, and so on, can be used to identify specific MCD Probe vibration measurements, with letters denoting which end of the machine (A, B, 1, 2, etc.), direction (H - horizontal, V - vertical, or A - axial), and type of measurement (V - velocity, D - displacement, etc.).

- In a hierarchy list, POINTs branching from the same machine must have unique names. However, POINTs branching from different machines may share the same name. Also, each machine must have a unique name. If you try to create a machine with the same name as another in the hierarchy list, SKF @ptitude Analyst automatically adds a numeric suffix to the machine's name. The same holds true for POINTs branching from the same machine. For example, if you have a machine named **Pump** and try to name another machine with the same name, @ptitude Analyst adds a suffix, and the new machine is named **Pump.1**.

Overview

In @ptitude Analyst, you create a database that organizes your monitored machinery measurements into a hierarchy structure consisting of Groups (which consist of organizational SETs, machines, or custom groups) and measurement POINTs.

Each @ptitude Analyst hierarchy displays in the Hierarchy window in which its hierarchy items list. Multiple databases display in the same Hierarchy window, and only one Hierarchy window may be open at a time.

When building your hierarchy, you insert hierarchy Groups which you identify as either a Machine hierarchy item or an organizational SET hierarchy item, or a custom Group Type you create.

IMPORTANT

All hierarchy lists must contain Machine hierarchy items from which measurement POINTs branch. Measurement POINTs cannot branch from a SET hierarchy item or the root node. They must branch from a "Machine" hierarchy item.

After creating your paper copy hierarchy, your next task is to use your paper copy hierarchy to input your organizational hierarchy into @ptitude Analyst to build your @ptitude Analyst hierarchy. This chapter walks you through the usual @ptitude Analyst steps for creating a new hierarchy. These steps are:

- Create one or more new hierarchies.
- Create each hierarchy's organizational SETs (optional) and Machines.
- Add measurement **POINTs** to their appropriate machine, configuring each POINT as it is created.

The general steps required to create a new hierarchical structure are listed below. Refer to the indicated dialogs and topics for more information on specific steps.

- Use the **File** menu's **New** option to create a new hierarchy. A hierarchy window displays with a **Hierarchy** root node.
- With the Hierarchy window active, use the **Insert** menu to insert new **Groups** in the hierarchy window. Specify the new Group's **Type** as either **Machine** group, a **SET** group, or one of your custom groups (if available).

- Refer to **Group Properties** for more information.

- After inserting your Machine hierarchy items, click to highlight a specific Machine and insert **New POINTs** for the Machine. Specify the new POINT's **DAD** and **POINT Properties**.
 - Refer to **POINT Properties** for more information.

IMPORTANT:

- * *Machines must have unique names.*
- * *POINTs must branch from a machine.*
- * *POINTs branching from the same machine must have unique names.*

Displaying Existing SKF @ptitude Analyst Hierarchies in the Hierarchy Window

To display hierarchies in the Hierarchy window:

- Use the **File** menu's **Open/Close** command to display the **Open/Close** dialog. All available hierarchies display in the **Open/Close** dialog.
 - Only the hierarchies to which the user has access display. For details on setting Hierarchy access, refer to the Customizing Your @ptitude Analyst Software section in Section 1, Chapter 2 – Getting Around in SKF @ptitude Analyst.
- In the **Open/Close** dialog, enable the checkbox next to the hierarchy name(s) you wish to display in the Hierarchy window and click **OK**.

The selected hierarchies' display in the Hierarchy window.

To remove a hierarchy from the Hierarchy window:

- Use the **File** menu's **Open/Close** command to display the **Open/Close** dialog.
- In the **Open/Close** dialog, disable the checkbox next to the hierarchy name(s) you wish to no longer display in the hierarchy and click **OK**. The disabled hierarchies no longer display in the Hierarchy window.

Creating a New SKF @ptitude Analyst Hierarchy

@ptitude Analyst's installation program installs a "demo" hierarchy (unless you selected to install an empty database only). You should create a new hierarchy to store your machinery vibration measurements.

To create a new @ptitude Analyst hierarchy:

- Select the **File** menu's **New** command. The **New** dialog opens.
- Enter a unique name for the new hierarchy and click **OK**.

A blank hierarchy window displays. The hierarchy name appears in the window's title bar.

- Access to the new hierarchy is assigned only to its creator. To give other users access to the new hierarchy, refer to the **Customizing Your @ptitude Analyst Software** section in **Section 1, Chapter 2 – Getting Around in SKF @ptitude Analyst**.

Setting Your Primary Hierarchy

@ptitude Analyst's Hierarchy window displays multiple hierarchies at one time in the same window. One hierarchy must be designated as the primary hierarchy.

The primary hierarchy is the default hierarchy and owns any newly created ROUTEs and Workspaces. When working in areas of the application that require hierarchy selection (e.g., Reports, Filters, Workspaces, etc.), this hierarchy will be offered by default. When in areas of the application where hierarchy selection is not offered (for example, Transfer), the primary hierarchy will automatically be used.

To set the primary hierarchy:

- In the **File** menu's **Open/Close** dialog, you may click the **Set Primary** button to set the highlighted hierarchy as the primary hierarchy. The primary hierarchy name appears in bold with the **[primary]** displayed next to the hierarchy name.

OR

- In the **Hierarchy** window, right click the hierarchy's root node, and select the **Set Primary** option. The primary hierarchy name displays in bold.

Inserting @ptitude Analyst Groups

When building your database, you insert hierarchy Groups which you identify as either a Machine hierarchy item, an organizational SET hierarchy item, or a custom Group Type previously created.

To insert a new Group:

- Select the **Insert** menu's **New Groups** option. The **Group Properties** screen displays.
 - The keyboard's **Insert** key may also be used to insert a new group when in a Hierarchy, ROUTE, or Workspace window.

Group Properties Screen

General Tab

Group Properties / General fields are organized into three areas; **Settings**, **Segment and asset tracking**, and **Miscellaneous**.

Settings fields include:

Name – Enter a unique name to identify the new group.

Description – (optional) Enter a description to further identify the new group.

Type – Select **Machine** or **SET** from the drop down list.

- Custom group types may also be available for selection. Creation of custom group types is discussed later in this chapter.
- Once a Group's **Type** is specified, it cannot be changed.

Enable data collection checkbox – Click the checkbox to enable POINT transfer to a DAD.

- By default, data collection is enabled. To temporarily disable data collection, clear the checkbox.

Segment and asset tracking fields include:

Segment name – Enter text that defines the Group's physical location. For example, enter "Level 2" or "Press Section."

Asset name – Enter text that defines the physical machinery currently occupying the **Segment** entered above. For example, enter a machine's serial or part number.

- **Segments** remain fixed while **Assets** may be moved from one location (segment) to another.
- **Segment name** and **Asset name** fields are unavailable when working with a template item's group properties.

Miscellaneous fields include:

Priority – Priority assignments may be used in filtering and reporting. A machine is typically given a Priority rating when a problem is found and you wish to prioritize the problems to be addressed. Specify a machine's priority from the drop down list.

- The **Priority** field is only available if you are working with a Machine-type Group.
- Assign a color for each machine priority to allow easy identification of all machines with priority assignments. Enable to display a machine priority color in the hierarchy for all machines with assigned priority levels on the **Customize / Preferences / General** tab. Default is disabled.

Available priority assignments are:

- <No Priority>
- 1 – Critical
- 2 – High
- 3 – Medium
- 4 – Low
- 5 – Lowest

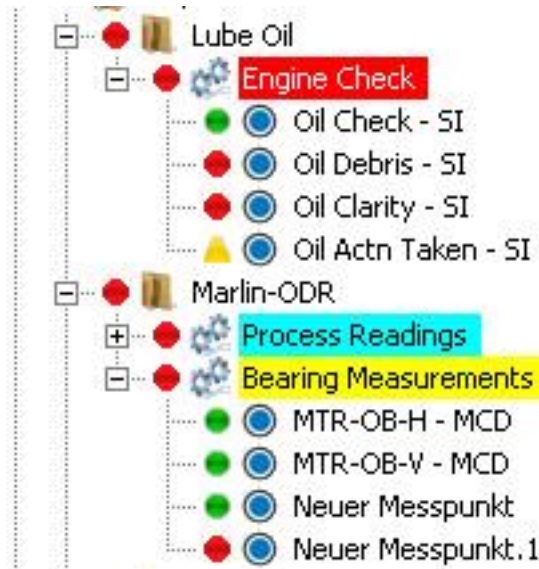


Figure 2 - 1.

Example of Machine Priority Color Displayed in Hierarchy.

Filter Keys Tab

@ptitude Analyst allows you to create **Filter Keys** which can be associated with POINTs and Machines for automated filtering purposes. For example, if you activated a “Pump” filter key for a Group and later filter a hierarchy list using the **Filter Key / Pump**, then all Groups with active Pump filter keys display in the filtered Workspace.

- Filter key creation is discussed later in this chapter.

Filter key searches list all POINTs or Machines sharing a specified filter key (or multiple filter keys). The **Filter Key** tab lists all created filter keys and indicates whether or not they are currently assigned.

- Click a specific filter key’s checkbox to associate it to the current POINT.
 - The checkbox appears gray if the filter key is enabled for a parent hierarchy item.
- Click the **Filter Key** dialog’s **OK** button to save your filter key assignments.

Messages Tab

The **Messages** tab allows you to apply previously defined “shared” messages, and to create new, private messages to assign to the selected group.

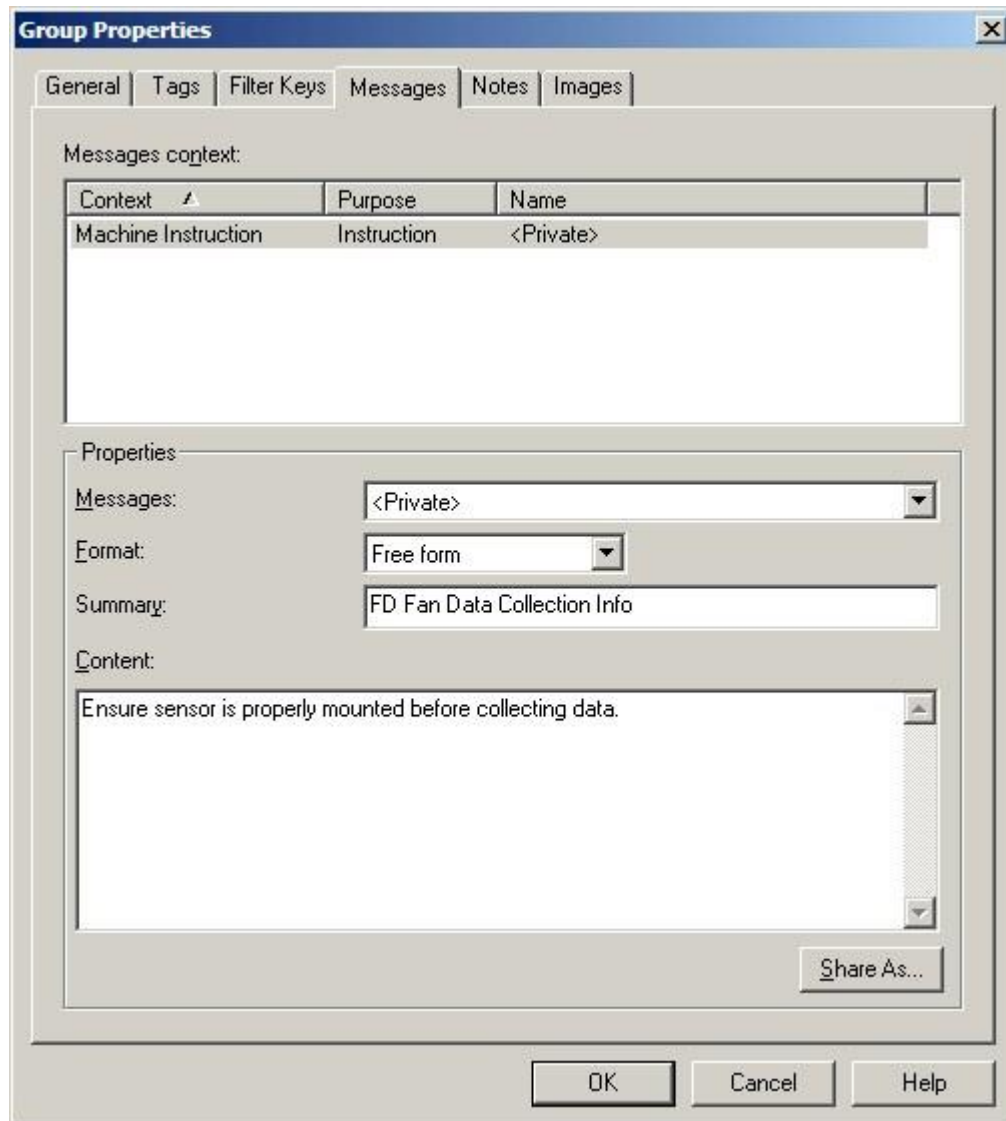


Figure 2 - 2.
The **Group Properties** Screen's **Messages** Tab.

@ptitude Analyst's **Group Properties / Messages** feature allows you to create and assign one message for general machine instruction purposes. The **Messages context** area displays the type of message available for assignment and any existing messages already applied. You can assign a previously created public message to the current group, or create and apply a new private message.

The **Name** drop down list displays all previously created messages and a **<Private>** option. Use this drop down list to specify whether you wish to set up a unique **<Private>** message for the current group only, or specify a previously defined “shared” message (selected by name). If you specify a shared message, its format, summary,

and content automatically display in subsequent fields. If you specify a Private message, proceed to configure the message settings as described below.

- For more information on creating and managing public messages, refer to the **Customize / Hierarchy Operations** section later in this chapter.

Format – This drop down list allows you to specify your message's format.

Free form – Allows you to manually type in the summary and content for your message.

Summary – Type in text summarizing your message for easy recognition. For example, if you have a message that details specifics about a group of machinery, your summary may read, "FD Fan Data Collection Information."

Content – Enter your complete message in the content text area. Using the above example, your alarm message content would include detailed data collection information, specific to the current group. For example, your message may read "Ensure sensor is properly mounted before collecting data, etc."

To assign a shared message to the current group:

- Select the shared message from the drop down list and click the **OK** button. Shared messages may be applied to an unlimited number of groups.

Shared Message

Alarm messages initially created as private messages may be converted into shared (public) messages. To share a newly created Private message, select the new Private message and click the tab's **Share As** button.

The **Enter Name** dialog specifies the message as a shared (public) message. When the **Enter Name** dialog displays, you will be prompted to give the shared message a unique name for easy identification.

- Enter a name for the shared message and click the **OK** button.
- The new shared message **now** appears as an available selection in the tab's drop down list. Shared messages are easily assigned to other groups to simplify setup and maintenance.

Notes Tab

The **Group Properties / Notes** tab allows you to attach a text note to the Group along with a date / time stamp. This feature conveniently stores and records relevant Group information such as maintenance history.

- Coded notes uploaded from the Microlog for the current Machine display in the **Notes** tab.
- Click the **Notes** tab's **Add** button to add a new note and date / time stamp.
- Click the **Save** button to save edits made to a note.
- Click the **Undo** button to cancel edits made to a note.
- Click the **Remove** button to remove the selected note from the display.

Group Properties / Notes fields include:

Date – Select the current date from the drop down list.

Time – Select the current time.

The selected date and time appear in the tab's left **Notes** field.

Text – Type in desired note text in the text field.

- Click the tab's **OK** button to save all entries.

Images Tab

Scanned photographs or digital images can be added to a particular Group, stored in the hierarchy, and viewed from the **Images** tab. Images help identify SETs / machines, organize similar equipment, and document known defects.

Group Properties / Images fields include:

Image – All attached images display in the drop down list.

Description – Enter text to identify the image. Click the **Save** button to save your description entry. If saved, the new description replaces the filename in the **Images** list.

- Click **OK** to save your new description entry.

To add a new image:

- Click the **Add** button to add a new image. The Windows' **Open** dialog displays. Select desired image and click **Open** to add or **Cancel** to undo.
 - Added images use the filename as the default description.

To replace / update the current image:

- Click the **Browse** button.
- Select a replacement image. The new image displays on the tab.
- Click **Save** to confirm the image replacement.
- Click **Cancel** to undo the image replacement.
 - The image name and description of the old image are retained for the replacement image.

To export an image to a specific location:

- Select the image to export.
- Click the **Export** button.
- When prompted, enter the desired export location and click **OK**.

The image is copied and saved to the specified location, but still remains attached to the assigned Group.

Details Tab

The screenshot shows a window titled "Group Properties" with a close button (X) in the top right corner. Below the title bar is a tabbed interface with six tabs: "General", "Tags", "Filter Keys", "Messages", "Notes", and "Images". The "Details" tab is currently selected and highlighted. The main area of the "Details" tab contains five numbered text input fields, each with a label to its left: "1: Manufacturer", "2: Type", "3: Cover Type", "4: Diameter", and "5:". Each field is empty. At the bottom of the dialog box are three buttons: "OK", "Cancel", and "Help".

Figure 2 - 3.
The **Group Properties** Screen's **Details** Tab.

- The **Details** tab is available only for custom Group Types.

Additional Group information can be entered in the **Details** tab and stored in the hierarchy. The five fields that appear in the **Details** tab are defined in the **Customize / Hierarchy / Group Types** screen when you define a custom Group Type.

Enter appropriate information in the text box following the customized fields. Helpful **Details** information may include serial number, RPM, address, etc. These fields may be customized to support any type of information applicable to your specific application.

The **Details** tab is unavailable if detail options have not been previously defined in the **Hierarchy / Group Type** screen.

Inserting New POINTs

Use the **Insert** menu to insert new measurement POINTs to your hierarchy machines.

To insert new POINTs:

- In the Hierarchy window, select the machine from you wish the new POINT to branch.
- Select the **Insert** menu's **New POINT** option. The **DAD / POINT Type Selection** screen displays.
 - The keyboard's **Insert** key may also be used to insert a new POINT.

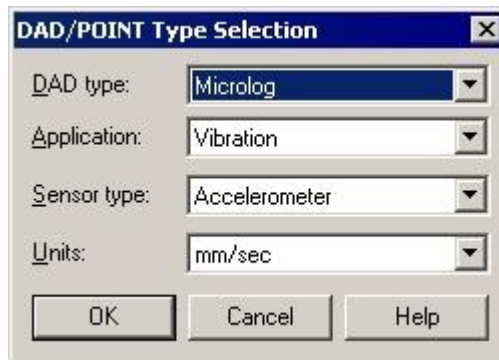


Figure 2 - 4.
The **DAD / POINT Type Selection** Screen.

From the **DAD / POINT Type Selection** screen, your **DAD Type**, **Application**, **Sensor**, and **Units** selections determine the POINT type. For example, **Vibration / Accelerometer / mm / sec** settings denote an acceleration to velocity type measurement, whereas **Vibration / Accelerometer / gE** settings denote an enveloped acceleration measurement.

Fields in this screen include:

DAD Type – Select the appropriate data acquisition device type from the drop down list of available DADs.

- **Application** – Only applications consistent with your DAD type selection display in the **Application** drop down list. Select the appropriate application.

Sensor – Only sensors consistent with your selected application display in the **Sensor** drop down list. Select the appropriate sensor.

Units – Only units consistent with your selected sensor type display in the **Units** drop down list. Select the appropriate units.

- Click **OK** to save your settings.
- Click **Cancel** to terminate POINT insertion.
 - Once the POINT is saved with **DAD / POINT Type** information, this information cannot be modified.

After **DAD / POINT Type Selection** settings are saved, the **POINT Properties** screen automatically displays.

POINT Properties

The **POINT Properties** screen allows you to enter all POINT information and settings. On each tab:

- Click **OK** to save settings
- Click **Cancel** to undo settings.

General Tab

The **POINT Properties** screen's **General** tab allows you to enter the POINT name and description and displays the DAD / POINT Type information you previously entered.

The screenshot shows the 'POINT Properties' dialog box with the 'General' tab selected. The dialog has a title bar with a close button (X). Below the title bar is a tabbed interface with the following tabs: Speed Alarm, Messages, Notes, Frequencies, Images, Band, Envelope, General (selected), Setup, Compliance, Filter Keys, Setup Log, and Overall. The 'General' tab contains the following fields and controls:

- Identity** section:
 - Name:** A text field containing 'New POINT'.
 - Description:** An empty text field.
 - ☒ **Enable data collection**
- DAD type:** A dropdown menu showing 'Microlog Analyzer'.
- Application:** A dropdown menu showing 'Vibration'.
- Sensor type:** A dropdown menu showing 'Accelerometer'.
- Units:** A dropdown menu showing 'mm/s'.
- Location:** A text field with a right-pointing arrow button next to it.
- Orientation:** A dropdown menu showing 'None'.
- Two checkboxes at the bottom:
 - ☐ **Exclude from reports if last measurement is a Non-collection event.**
 - ☐ **Clear Alarms for Non-collection last measurements.**

At the bottom of the dialog are three buttons: **OK**, **Cancel**, and **Help**.

Figure 2 - 5.
The **POINT Properties** Screen's **General** Tab.

POINT Properties / General fields include:

Name – Enter a unique name to identify the POINT.

Description – Enter a description to further identify the POINT.

Enable data collection – When POINTs are downloaded to the collection instrument, the **Enable data collection** setting determines whether the POINT is downloaded or ignored. Click the checkbox to enable.

DAD Type – Displays the DAD type previously assigned when the POINT was created.

Application – Displays the application type assigned when the POINT was created.

Sensor – Displays the sensor type assigned when the POINT was created.

Units – Displays the appropriate measurement unit assigned when the POINT was created.

- The **DAD Type, Application, Sensor, and Units** fields of the **General** tab cannot be edited once they have been assigned.
- When a POINT is disabled from downloading, its existing alarm conditions do NOT affect the system.

Location – Enter the data collection POINT on the machine. Options include:

Normal – Alphabetic identifiers A-J.

Displacement – Numeric identifiers 1-10.

Other – Six specific identifiers:

Drive End
Non-Drive End
Outboard
Inboard
Coupled End
Non-Coupled End

Orientation – Select from drop down list options (**Axial, Horizontal, None, Radial, Triax, Vertical, X, Y**).

Exclude from reports if last measurement is a Non-collection event. – Select (check) to have any reports that would include this POINT exclude it if its last measurement was a non-collection event (for example, the machine was marked as non-operating or certain measurement conditions were not met).

Clear Alarms for Non-collection last measurements. – Select (check) to have the system clear any previous measurement alarms for this POINT if its last measurement was a non-collection event (for example, the machine was marked as non-operating or certain measurement conditions were not met).

Setup Tab (Microlog POINTs)

Enter Microlog POINT setup information in this tab.

- The **POINT Properties / Setup** tab displays differently, depending on the POINT type. The following **Setup** fields apply to POINTs defined with the Microlog DAD.
- Depending on the sensor type and units, different fields may display. All possible **Setup** fields are defined below.

The screenshot shows the 'POINT Properties' dialog box with the 'Setup' tab selected. The dialog has a title bar with a close button. Below the title bar are several tabs: Messages, Notes, Frequencies, Images, Band, Envelope, General, Setup (selected), Compliance, Filter Keys, Overall, and Speed Alarm. The 'Setup' tab contains various configuration fields for a Microlog POINT. These include: 'Full scale' (25 gE), 'Input mV/EU' (100), 'Detection' (Peak to peak), 'Enable ICP' (checked), 'Input filter range' (30K to 600K CPM), 'Freq. type' (Fixed span), 'Lines' (800), 'Save data' (FFT), 'Window' (Hanning), 'Start freq.' (0 kCPM), 'Autocapture' (Always), 'End freq.' (60 kCPM), 'Speed' (1800 RPM), 'Low freq. cutoff' (300 CPM), 'Averages' (2), 'Pulses/Rev' (1), 'Averaging' (Peak hold), 'Linear factor' (0), and 'Linear speed units' (empty). At the bottom, there is a 'Speed tag reference' section with 'POINT' (None) and 'Ratio' (1), and a 'Select...' button. At the very bottom are 'OK', 'Cancel', and 'Help' buttons.

Field	Value
Full scale	25 gE
Input mV/EU	100
Detection	Peak to peak
Enable ICP	<input checked="" type="checkbox"/>
Input filter range	30K to 600K CPM
Freq. type	Fixed span
Lines	800
Save data	FFT
Window	Hanning
Start freq.	0 kCPM
Autocapture	Always
End freq.	60 kCPM
Speed	1800 RPM
Low freq. cutoff	300 CPM
Averages	2
Pulses/Rev	1
Averaging	Peak hold
Linear factor	0
Linear speed units	
POINT (Speed tag reference)	None
Ratio (Speed tag reference)	1

Figure 2 - 6.
The **POINT Properties** Screen's Microlog **Setup** Tab.

ROUTE Mode vs. Analysis Mode

Vibration data is taken in two modes, either in ROUTE data collection mode for early fault detection purposes – or, after a problem is detected, in analysis / trouble shooting mode to determine the type of problem, how severe the problem is, and the root cause of the problem. *Measurement POINT setups are different for each mode.* In ROUTE mode, you typically collect vibration data for trending and alarming purposes, allowing you to get early detection of machinery problems. If a measurement's vibration level changes and a trend alarm occurs, then for that machine location you switch to analysis / troubleshooting mode, this is when spectral analysis of specific machinery frequencies comes into play.

Since you may be taking hundreds of ROUTE measurements daily, ROUTE measurements are set up to allow you to collect data quickly and yet still capture reliable, accurate trend data. After a problem is detected, analysis / troubleshooting measurements should not consider the speed of data collection. Since you typically have early detection of the problem, you typically don't have to hurry through your analysis. When you're wearing your Analyst hat, you typically take more measurements on and around the suspect machinery, and the measurements you take are higher resolution measurements to best determine the type, severity, and root cause of the problem. When making these types of analysis decisions, accuracy is much more important than data collection speed.

For example, when collecting ROUTE data, the lines of resolution setting is typically set at 400 lines. This provides enough resolution to detect vibration changes for common machinery faults. However, in analysis / troubleshooting mode, you typically increase to 800 or 1600 lines of resolution, causing measurements to take twice or four times as long to collect. These higher resolution settings allow you to better analyze discreet frequencies to help you make the correct diagnosis.

- **ROUTE POINT Setup Tip** - Throughout this section, POINT setup tips are provided for ROUTE mode, velocity and enveloped acceleration measurements on standard rotating machinery operating between 1500 and 3600 RPM.

POINT Properties / Setup tab fields include:

Full Scale – Enter a number to define the spectrum's maximum amplitude value.

- **ROUTE POINT Setup Tip** – For both the velocity and enveloped acceleration measurements, set **Full Scale** to 20% higher than the anticipated maximum amplitude value. If you do not know the measurement's anticipated maximum amplitudes, you should perform baseline off-ROUTE Microlog measurements using the Microlog's Autorange function to determine them.
- For *SEE* measurements, initially set the **Full Scale** value at 100 *SEEs*. You may change this value as you gain experience with measuring *SEEs*.

The **Units** selected on the **DAD/POINT Type Selection** screen display next to the **Full Scale** field. If **General** was selected in the **DAD/POINT Type Selection** screen's **Application** field, the units may be edited. Adjust the units if necessary.

Input mV / EU – If applicable, enter a value for the sensitivity of the pickup to be used in making the measurement.

- 100 mV / EU is used for most acceleration sensors, 200 mV / EU for most non-contact displacement sensors, and 1,000 mV / EU if the input is volts and the scale is to be read directly.

Detection – Click on the list box to view the choices (**Peak**, **Peak to Peak**, and **RMS**). Select the method of dynamic signal detection from the list.

- ROUTE POINT Setup Tip – @ptitude Analyst software defaults to the appropriate **Detection** type based upon the POINT's **DAD / POINT Type Selection** settings. Enveloped acceleration measurements should always use **Peak to Peak** Detection. For trending purposes, it is important to be consistent with **Detection** settings as, for example, **Peak to Peak** readings will be double the **Peak** readings.

Enable ICP – Click to enable the Microlog to provide power to the accelerometer or velocity sensor.

Input filter range – Specify the amplitude range scaling for envelope acceleration POINTs.

300 to 6K CPM	3K to 60K CPM
30K to 600K CPM	300K to 2.4M CPM

- ROUTE POINT Setup Tip – For “standard” machinery, ROUTE enveloped acceleration measurements are typically collected using the third filter, 30K to 600K CPM. If you do not observe a signal using the third filter, try collecting data using the second filter, and then the first filter. Using your best judgment, collect data using the filter that displays the most energy, (i.e., 1X bearing fault frequencies and harmonics).

Freq. Type – Click the list box to view the choices (**Fixed Span** or **Order Track**).

Fixed Span – Specifies frequency as the unit of measurement for the horizontal axis of the FFT spectrum.

Order Track – Specifies orders of running speed as the unit of measure for the horizontal axis of the FFT spectrum, requires a phase reference input to collect the measurement.

- ROUTE POINT Setup Tip – Except for special needs, ROUTE data of all types is collected in **Fixed Span**, as most machinery does not have a permanent method to input shaft speed data. **Order Track** requires a tachometer signal.

Save Data – Determines whether the DAD collects **FFT** data, **Time** Record data, or both. An additional **FFT and Phase** option is available for Order Tracking POINTs.

- ROUTE POINT Setup Tip – Enable **FFT** data storage. When you are back in the office analyzing the collected ROUTE data, you will be able to view FFT spectra for POINTs in alarm without having to return to the machine to collect the FFT. When collecting data on gear driven units, also save the **Time** waveform data.

Start / End Freq. –

Start Freq. triggers the Microlog's Automatic Zoom feature. To do so, **Start Freq.** must equal or exceed 50% of the **End Freq.** value. For example, if, **Start Freq.** = 500 Hz, **End Freq.** = 1 kHz, and **Lines** of resolution = 400; in order to provide the required 400-line resolution between Start Freq. and End Freq., the Microlog automatically selects 800 lines as the fzero to fmax resolution.

If **Start Freq.** = 750 Hz, **End Freq.** = 1000, and **Lines** = 400; the Microlog automatically selects 1600 Lines. Under these circumstances, the display cannot be changed to view spectral components outside the fstart to fmax display range.

Fixed Span / Frequency – If **Freq. Type** is **Fixed Span**, enter the lower and upper, full scale frequency range of the FFT between 0.00 kCPM and 4800 kCPM, or the equivalent in Hz. Unless you are making a very unusual measurement, the upper full scale frequency should always be greater than running speed.

Order Track / Orders – If **Freq. Type** is **Order Track**, enter the lower and upper, full scale order range of the FFT between 0 and 100.0 orders. For optimum results, use values from approximately 2 to 10 orders.

➤ ROUTE POINT Setup Tip

Start Frequency

Velocity and Env. Acc. – 0, the Start Freq setting facilitates the Microlog's automatic zoom feature, which is typically not applied for ROUTE data collection.

End Frequency

Velocity – Ten times shaft speed is a good place to start. This will capture shaft 1X and its harmonics, along with most bearing fundamental fault frequencies.

Env. Acc – Four times the bearing's BPFO, rounded up to the next even number to capture the BPFO and its harmonics. If you don't know the bearing's BPFO, then start with 20 times shaft speed (this assumes the BPFO is around 5X shaft speed).

- The highest upper scale frequency range available for the Microlog GX Series (CMXA 70/75) allows up to 2400 kCPM. The Microlog AX allows up to 4800 kCPM.

Low Freq. Cutoff – Enter a low frequency cutoff filter value to exclude any unwanted lower frequency components (i.e., noise). Although values are allowed from 0.0 CPM to 1200 kCPM, the range for normal measurements is from approximately 200 CPM to 600 CPM, or the equivalent in Hz.

- ROUTE POINT Setup Tip – For velocity measurements, set the **Low Frequency Cutoff** to 600 CPM to cut out the ski slope that appears due to integration of the signal. For enveloped acceleration measurements, set to 0, as there is no integration of the signal.

Pulses / Rev - Used to determine machine running speed. If a tachometer is connected, enter the number of tach. pulses that occur for each shaft revolution.

Lines – The spectrum's FFT resolution. Click the list box to view choices.

100	200	400	800	1600
3200	6400	12800	25600	

- ROUTE POINT Setup Tip - The higher the resolution, the slower the data collection. For both velocity and enveloped acceleration measurements, **400** lines of resolution is adequate.

Window – Select the type of window used in the FFT processing. Click the list box to view the choices (**Uniform**, **Hanning**, or **Flat Top**). A window function must be applied to any periodic time record prior to performing an FFT. The **Hanning** and **Flat Top** window functions attenuate to zero both the leading and trailing edges of the sample in order to prevent leakage error caused by discontinuities in the time record.

Uniform – A dynamic signal analyzer window function with uniform weighting across time. Useful for measuring transients or mechanical response measurements.

Hanning – A dynamic signal analyzer window function that provides better frequency resolution than Flat Top, but with reduced amplitude accuracy. Useful for machine vibration measurements, general purpose measurement, and measurements containing random noise.

Flat Top – A dynamic signal analyzer window function which provides the best amplitude accuracy for measuring discrete frequency components. Useful for calibration of machine vibration measurements using displacement probes in fluid-film bearings.

- ROUTE POINT Setup Tip – For both velocity and enveloped acceleration measurements, select **Hanning**.

Autocapture – Click the list box to view the choices (**Off**, **On Overall Alarm**, **Always**). Determines when the DAD transfers a recorded FFT spectrum to @ptitude Analyst.

Off – The FFT Spectrum is never transferred.

On Overall Alarm – The FFT spectrum is only transferred when either overall alarm value is exceeded (alert or danger).

Always – The FFT spectrum is always transferred.

- ROUTE POINT Setup Tip - **Always** enable Autocapture. Computer memory size is typically not an issue, and it's advantageous to have the spectrum available if you need it.
- You must also have the Microlog device configured to capture the FFT spectrum. Refer to your Microlog user manual for instructions.

Speed – Enter the nominal shaft speed in CPM or Hz.

Averages – Enter the number of FFT averages to be collected (from 1 to 99). The higher the number of averages, the slower the data collection.

- **ROUTE POINT Setup Tip** – For enveloped acceleration, set to one average. For velocity measurements, four averages are typically adequate, however, if the machine has large variations in vibration amplitudes, six or eight averages may be needed.

Averaging – (Average, Off, Peak Hold, or Synchronous Time) If averaging has been selected for the POINT, determines the type of averaging performed, (either normal averaging, no averaging, peak hold averaging, or synchronous time averaging). Synchronous Time requires a tachometer assignment.

- **ROUTE POINT Setup Tip** – Select **Average** (normal averaging) for both velocity and enveloped acceleration measurements.

Linear Factor – Type in the numeric linear factor.

Linear Speed Units – Type in the linear speed unit.

Speed tag reference – To assign a POINT for speed tag reference, click the **Select POINT** button to browse POINTs. Once selected, the parent / POINT name appears in the **POINT** field. Enter a numerical value for the desired multiple in the **Ratio** field.

Setup Tab (2-Channel Microlog POINTs)

Enter Microlog POINT setup information in this tab.

- The **POINT Properties / Setup** tab displays differently, depending on the POINT type. The following **Setup** fields apply to POINTs defined with the Microlog DAD for **Vibration (2-Channel)** application types.
- The Microlog allows you to set up measurements on-the-fly that may be transferred to @ptitude Analyst as non-ROUTE POINTs. If you collect a four channel, non-ROUTE POINT on the Microlog AX, two 2-channel POINTs are created in @ptitude Analyst. These are identified by the last three characters of the POINT name: [POINT NAME].1_2 and [POINT NAME].3_4. Data from the four channel POINT is distributed as follows:

Channel 1 = POINT.1_2 Channel 1

Channel 2 = POINT.1_2 Channel 2

Channel 3 = POINT.3_4 Channel 1

Channel 4 = POINT.3_4 Channel 2

POINT Properties

Speed Alarm | Messages | Notes | Frequencies | Images | Band | Envelope
General | **Setup** | 2-Channel | Compliance | Filter Keys | Overall

Full scale: 25 gE Detection: Peak to peak
☒ Enable ICP
 Input filter range: 30K to 600K CPM

Freq. type: Fixed span Lines: 800
 Save data: FFT Window: Hanning
 Start freq.: 0 kCPM Autocapture: Always
 End freq.: 60 kCPM Speed: 1800 RPM
 Low freq. cutoff: 300 CPM Averages: 2
 Pulses/Rev: 1 Averaging: Peak hold

Linear factor: 0 Linear speed units:
 Speed tag reference
 POINT: None Select...
 Ratio: 1

OK Cancel Help

Figure 2 - 7.
The **POINT Properties** Screen's Microlog **Setup** Tab.

Setup fields include:

Full Scale – Enter a number to define the spectrum's maximum amplitude value.

- For *SEE* measurements, initially set the **Full Scale** value at 100 *SEEs*. You may change this value as you gain experience with measuring *SEEs*.

Detection – Click on the list box to view the choices (**Peak**, **Peak to Peak**, and **RMS**). Select the method of dynamic signal detection from the list.

Enable ICP – Click to enable the Microlog to provide power to the accelerometer or velocity sensor.

Input filter range - Specify the amplitude range scaling for envelope acceleration POINTs.

300 to 6K CPM	3K to 60K CPM
30K to 600K CPM	300K to 2.4M CPM

Freq. Type – Click the list box to view the choices (**Fixed Span** or **Order Track**).

Fixed Span – Specifies frequency as the unit of measurement for the horizontal axis of the FFT spectrum.

Order Track – Specifies orders of running speed as the unit of measure for the horizontal axis of the FFT spectrum, requires a phase reference input to collect the measurement.

Save Data – Determines whether the DAD collects **FFT** data, **Time** Record data, or both. An additional **FFT and cross-phase** option is available for Order Tracking POINTs. Cross-phase is the difference in phase between the two channels.

Start / End Freq. –

Order Track / Orders – If **Freq. Type** is **Order Track**, enter the lower and upper, full scale order range of the FFT between 0 and 100.0 orders. For optimum results, use values from approximately 2 to 10 orders.

Fixed Span / Frequency – If **Freq. Type** is **Fixed Span**, enter the lower and upper, full scale frequency range of the FFT between 0.00 kCPM and 4800 kCPM, or the equivalent in Hz. Unless you are making a very unusual measurement, the upper full scale frequency should always be greater than running speed.

- The highest upper scale frequency range available for the Microlog GX Series (CMXA70) allows up to 2400 kCPM. The Microlog AX allows up to 4800 kCPM.

Low Freq. Cutoff – Enter a low frequency cutoff filter value for dynamic (AC) measurements. Although values are allowed from 0.0 CPM to 1200 kCPM, the range for normal measurements is from approximately 200 CPM to 600 CPM, or the equivalent in Hz.

Pulses / Rev - Used to determine machine running speed. If a tachometer is connected, enter the number of tach. pulses that occur for each shaft revolution.

Lines – The spectrum's FFT resolution. Click the list box to view choices.

- The higher the resolution, the slower the data collection.

100	200	400	800
1600	3200	6400	12800

Window – Select the type of window used in the FFT processing. Click the list box to view the choices (**Uniform**, **Hanning**, or **Flat Top**). A window function must be applied to any periodic time record prior to performing an FFT. The **Hanning** and **Flat Top** window functions attenuate to zero both the leading and trailing edges of the sample in order to prevent leakage error caused by discontinuities in the time record.

Uniform – A dynamic signal analyzer window function with uniform weighting across time. Useful for measuring transients or mechanical response measurements.

Hanning – A dynamic signal analyzer window function that provides better frequency resolution than Flat Top, but with reduced amplitude accuracy. Useful for machine vibration measurements, general purpose measurement, and measurements containing random noise.

Flat Top – A dynamic signal analyzer window function which provides the best amplitude accuracy for measuring discrete frequency components. Useful for calibration of machine vibration measurements using displacement probes in fluid-film bearings.

Autocapture – Click the list box to view the choices (**Off**, **On Overall Alarm**, **Always**). Determines when the DAD transfers a recorded FFT spectrum to @ptitude Analyst.

Off – The FFT Spectrum is never transferred.

On Overall Alarm – The FFT spectrum is only transferred when either overall alarm value is exceeded (alert or danger).

Always – The FFT spectrum is always transferred.

- You must also have the Microlog device configured to capture the FFT spectrum. Refer to your Microlog user manual for instructions.

Speed – Enter the nominal shaft speed in CPM or Hz.

Averages – Enter the number of FFT averages to be collected (from 1 to 99). Four to six averages are adequate and are normally used for machine monitoring. The higher the number of averages, the slower the data collection.

Averaging – (**Average**, **Off**, **Peak Hold**, or **Synchronous Time**) If averaging has been selected for the POINT, determines the type of averaging performed, (either normal averaging, no averaging, peak hold averaging, or synchronous time averaging). Synchronous Time requires a tachometer assignment.

Linear Factor – Type in the numeric linear factor.

Linear Speed Units – Type in the linear speed unit.

Speed tag reference – To assign a POINT for speed tag reference, click the **Select POINT** button to browse POINTs. Once selected, the parent / POINT name appears in the **POINT** field. Enter a numerical value for the desired multiple in the **Ratio** field.

2-Channel Tab

- The **POINT Properties / 2-Channel** tab displays when the **Vibration(2-Channel)** application type is selected. Use this tab to define 2-channel settings for each channel.

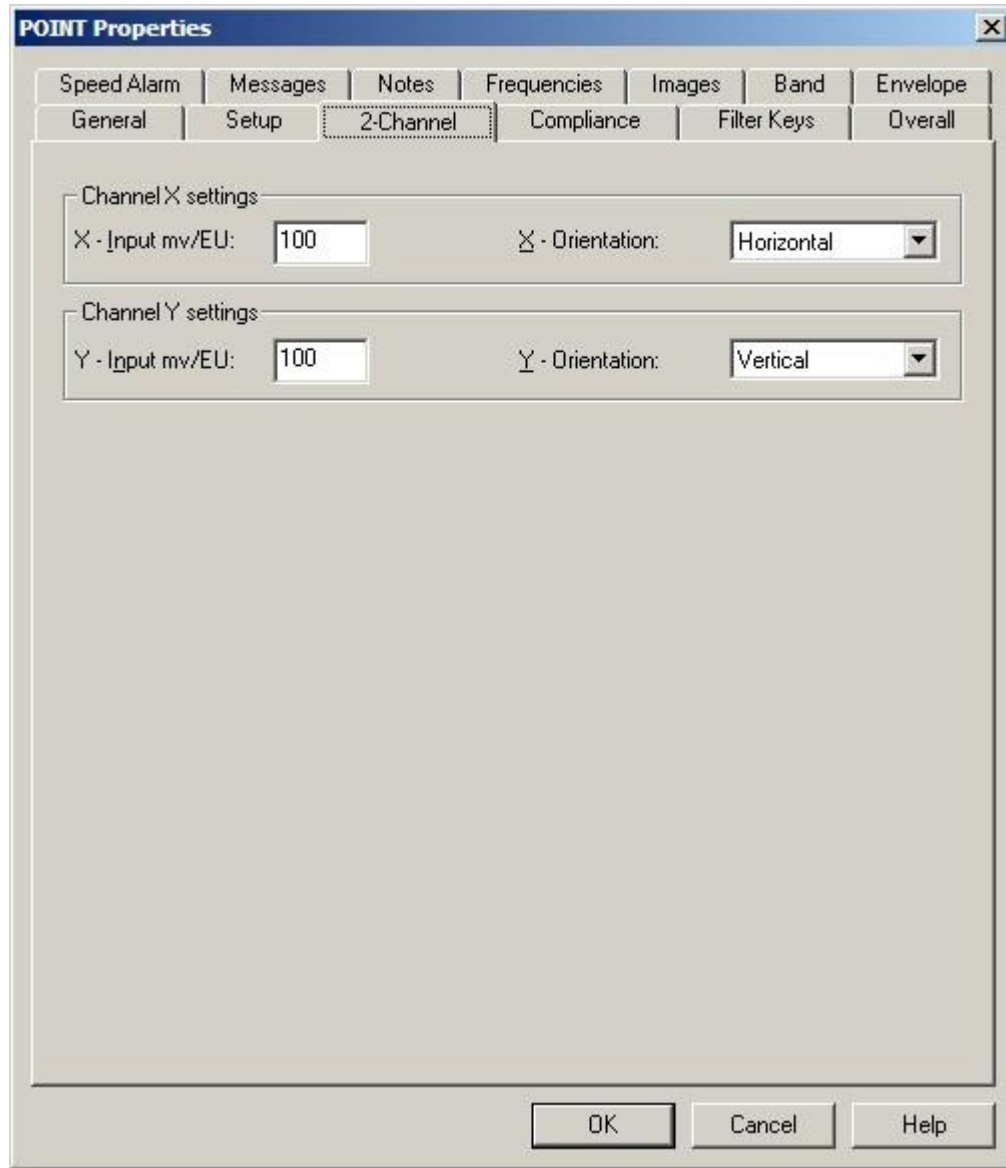


Figure 2 - 8.
The **POINT Properties** Screen's Microlog **2-Channel** Tab.

POINT Properties / 2-Channel fields may include:

Channel X and Y settings

Input mv/EU – Enter a number to define the sensitivity of the pickup to be used in taking measurements for each channel.

Orientation – Choose the sensor orientation for each channel (**Axial**, **Horizontal**, **Radial**, **Tangential**, or **Vertical**)

Setup Tab (3-Channel Microlog POINTs)

Enter Microlog POINT setup information in this tab.

- The **POINT Properties / Setup** tab displays differently, depending on the POINT type. The following **Setup** fields apply to POINTs defined with the Microlog DAD for **Vibration (3-Channel)** application types.

The screenshot shows the 'POINT Properties' dialog box with the 'Setup' tab selected. The dialog has a title bar with a close button. Below the title bar are several tabs: Messages, Notes, Frequencies, Images, Band, Envelope, General, Setup (selected), Triax, Compliance, Filter Keys, Overall, and Speed Alarm. The 'Setup' tab contains various configuration fields for a 3-channel microlog point. These include: 'Full scale' (25 gE), 'Detection' (Peak to peak), 'Enable ICP' (checked), 'Input filter range' (30K to 600K CPM), 'Freq. type' (Fixed span), 'Lines' (800), 'Save data' (FFT), 'Window' (Hanning), 'Start freq.' (0 kCPM), 'Autocapture' (Always), 'End freq.' (60 kCPM), 'Speed' (1800 RPM), 'Low freq. cutoff' (300 CPM), 'Averages' (2), 'Pulses/Rev' (1), 'Averaging' (Peak hold), 'Linear factor' (0), and 'Linear speed units' (empty). At the bottom, there is a 'Speed tag reference' section with 'POINT' (None) and 'Ratio' (1), a 'Select...' button, and 'OK', 'Cancel', and 'Help' buttons.

Field	Value
Full scale	25 gE
Detection	Peak to peak
Enable ICP	<input checked="" type="checkbox"/>
Input filter range	30K to 600K CPM
Freq. type	Fixed span
Lines	800
Save data	FFT
Window	Hanning
Start freq.	0 kCPM
Autocapture	Always
End freq.	60 kCPM
Speed	1800 RPM
Low freq. cutoff	300 CPM
Averages	2
Pulses/Rev	1
Averaging	Peak hold
Linear factor	0
Linear speed units	
POINT (Speed tag reference)	None
Ratio (Speed tag reference)	1

Figure 2 - 9.

The **POINT Properties** Screen's Microlog **Setup** Tab.

Setup fields include:

Full Scale – Enter a number to define the spectrum's maximum amplitude value.

- For *SEE* measurements, initially set the **Full Scale** value at 100 *SEEs*. You may change this value as you gain experience with measuring *SEEs*.

Detection – Click on the list box to view the choices (**Peak**, **Peak to Peak**, and **RMS**). Select the method of dynamic signal detection from the list.

Enable ICP – Click to enable the Microlog to provide power to the accelerometer or velocity sensor.

Input filter range – Specify the amplitude range scaling for envelope acceleration POINTs.

300 to 6K CPM	3K to 60K CPM
30K to 600K CPM	300K to 2.4M CPM

Freq. Type – Click the list box to view the choices (**Fixed Span** or **Order Track**).

Fixed Span – Specifies frequency as the unit of measurement for the horizontal axis of the FFT spectrum.

Order Track – Specifies orders of running speed as the unit of measure for the horizontal axis of the FFT spectrum, requires a phase reference input to collect the measurement.

Save Data – Determines whether the DAD collects **FFT** data, **Time** Record data, or both. An additional **FFT and Phase** option is available for Order Tracking POINTs.

Start / End Freq. –

Order Track / Orders – If **Freq. Type** is **Order Track**, enter the lower and upper, full scale order range of the FFT between 0 and 100.0 orders. For optimum results, use values from approximately 2 to 10 orders.

Fixed Span / Frequency – If **Freq. Type** is **Fixed Span**, enter the lower and upper, full scale frequency range of the FFT between 0.000.06 kCPM and 4800 kCPM, or the equivalent in Hz. Unless you are making a very unusual measurement, the upper full scale frequency should always be greater than running speed.

- The highest upper scale frequency range available for the Microlog GX Series (CMXA70) allows up to 2400 kCPM. The Microlog AX allows up to 4800 kCPM.

Low Freq. Cutoff – Enter a low frequency cutoff filter value for dynamic (AC) measurements. Although values are allowed from 0.0 CPM to 1200 kCPM, the range for normal measurements is from approximately 200 CPM to 600 CPM, or the equivalent in Hz.

Pulses / Rev – Used to determine machine running speed. If a tachometer is connected, enter the number of tach. pulses that occur for each shaft revolution.

Lines – The spectrum's FFT resolution. Click the list box to view choices.

- The higher the resolution, the slower the data collection.

100	200	400	800
1600	3200	6400	

Window – Select the type of window used in the FFT processing. Click the list box to view the choices (**Uniform**, **Hanning**, or **Flat Top**). A window function must be applied to any periodic time record prior to performing an FFT. The **Hanning** and **Flat Top** window functions attenuate to zero both the leading and trailing edges of the sample in order to prevent leakage error caused by discontinuities in the time record.

Uniform – A dynamic signal analyzer window function with uniform weighting across time. Useful for measuring transients or mechanical response measurements.

Hanning – A dynamic signal analyzer window function that provides better frequency resolution than Flat Top, but with reduced amplitude accuracy. Useful for machine vibration measurements, general purpose measurement, and measurements containing random noise.

Flat Top – A dynamic signal analyzer window function which provides the best amplitude accuracy for measuring discrete frequency components. Useful for calibration of machine vibration measurements using displacement probes in fluid-film bearings.

Autocapture – Click the list box to view the choices (**Off**, **On Overall Alarm**, **Always**). Determines when the DAD transfers a recorded FFT spectrum to @ptitude Analyst.

Off – The FFT Spectrum is never transferred.

On Overall Alarm – The FFT spectrum is only transferred when either overall alarm value is exceeded (alert or danger).

Always – The FFT spectrum is always transferred.

- You must also have the Microlog device configured to capture the FFT spectrum. Refer to your Microlog user manual for instructions.

Speed – Enter the nominal shaft speed in CPM or Hz.

Averages – Enter the number of FFT averages to be collected (from 1 to 99). Four to six averages are adequate and are normally used for machine monitoring. The higher the number of averages, the slower the data collection.

Averaging – (**Average**, **Off**, **Peak Hold**, or **Synchronous Time**) If averaging has been selected for the POINT, determines the type of averaging performed, (either normal averaging, no averaging, peak hold averaging, or synchronous time averaging). Synchronous Time requires a tachometer assignment.

Linear Factor – Type in the numeric linear factor.

Linear Speed Units – Type in the linear speed unit.

Speed tag reference – To assign a POINT for speed tag reference, click the **Select POINT** button to browse POINTs. Once selected, the parent / POINT name appears in the **POINT** field. Enter a numerical value for the desired multiple in the **Ratio** field.

Triax Tab

The **POINT Properties / Triax** tab displays when the **Vibration(3-Channel)** application type is selected. Use this tab to define Triax sensor settings for each channel.

The Triax Accelerometer Sensor automatically sequences through three measurements for the sensor location (one for each axis monitored by the triax sensor)

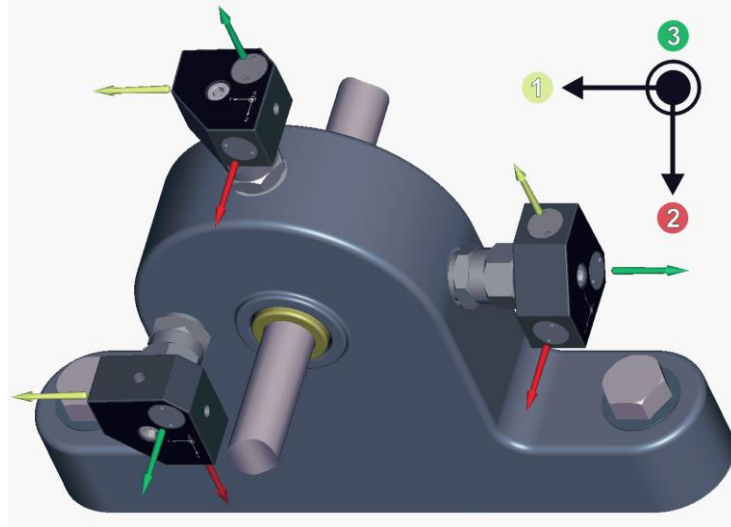


Figure 2 - 10.
Triax Accelerometer Sensors.

- The triax sensor's axes are labeled Axis 1, Axis 2, and Axis 3. On the **POINT Properties / Triax** tab, match the labeled axis to a measurement orientation (i.e., horizontal, vertical, axial).

To collect valid measurements, the triax accelerometer sensor must always be oriented in the same direction for all measurements at the same location.

For example, if the machine is mounted horizontally, mount the triax sensor in the vertical direction to the shaft to orient Axis 2 in the axial direction, Axis 1 in the horizontal direction, and Axis 3 in the vertical direction. If a vertical mounting is not possible, mount the triax accelerometer sensor in the horizontal direction to the shaft. Please note that in this case the horizontal and vertical axes are reversed for this measurement POINT.

Triax Tab Options

POINT Properties

Messages | Notes | Frequencies | Images | Band | Envelope
General | Setup | **Triax** | Compliance | Filter Keys | Overall | Speed Alarm

Channel X settings
X - Input mv/EU: 100 X - Orientation: Horizontal
X - Sensor axis: Axis 1

Channel Y settings
Y - Input mv/EU: 100 Y - Orientation: Vertical
Y - Sensor axis: Axis 2

Channel Z settings
Z - Input mv/EU: 100 Z - Orientation: Axial
Z - Sensor axis: Axis 3

OK Cancel Help

Figure 2 - 11.
The **POINT Properties** Screen's **Triax Tab**.

POINT Properties / Triax fields may include:

Channel X, Y, and Z settings

Input mv/EU – Enter a number to define the sensitivity of the pickup to be used in taking measurements for each channel.

Orientation – Choose the triax sensor's orientation for each channel (**Horizontal**, **Vertical**, or **Axial**)

Sensor axis – Match the axis label to the sensor orientation for each channel (**1**, **2**, or **3**)

Setup Tab (Orbit/SCL POINTs)

Orbit and shaft centerline data supports the collection of two-channel data which can be displayed on an orbit plot.

Prior to setting **Orbit/SCL** tab options, use the **DAD / POINT Type Selection** screen's setup fields to specify a Orbit/SCL POINT type.

To specify a Orbit/SCL POINT type:

- Select the **Insert** menu's **New POINT** option. The **DAD / POINT Type Selection** screen displays.
- Select the **DAD type** field's **Microlog** option.
- Select the **Application** field's **Orbit/SCL** option.
- Select the appropriate **Sensor type** and **Units**.

Enter Microlog POINT setup information in this tab.

- The **POINT Properties / Setup** tab displays differently, depending on the POINT type. The following **Setup** fields apply to POINTs defined with the Microlog DAD for **Orbit/SCL** application types.

The screenshot shows the 'POINT Properties' dialog box with the 'Setup' tab selected. The dialog has a title bar with a close button. Below the title bar are several tabs: 'Speed Alarm', 'Messages', 'Notes', 'Frequencies', 'Images', 'Vector', 'General', 'Setup' (selected), 'Orbit/SCL', 'Compliance', 'Filter Keys', and 'Overall'. The 'Setup' tab contains various configuration fields. At the top, there's a 'Full scale' field set to '5' with a unit 'g', and a 'Detection' dropdown menu set to 'RMS'. Below these is a checked checkbox for 'Enable ICP'. Further down, there are two columns of settings. The left column includes 'Freq. type' (dropdown set to 'Order track'), 'Save data' (dropdown set to 'Time'), 'Start order' (text box set to '0'), 'End order' (text box set to '10'), 'Low freq. cutoff' (text box set to '1200' with a unit 'CPM'), 'Pulses/Rev' (text box set to '1'), and 'Linear factor' (text box set to '0'). The right column includes 'Samples' (dropdown set to '1024'), 'Window' (dropdown set to 'Hanning'), 'Speed' (text box set to '1800' with a unit 'RPM'), and 'Linear speed units' (empty text box). At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

Figure 2 - 12.
The **POINT Properties** Screen's Microlog **Setup** Tab.

Setup fields include:

Full Scale – Enter a number to define the spectrum's maximum amplitude value.

- For *SEE* measurements, initially set the **Full Scale** value at 100 *SEEs*. You may change this value as you gain experience with measuring *SEEs*.

Detection – Click on the list box to view the choices (**Peak**, **Peak to Peak**, and **RMS**). Select the method of dynamic signal detection from the list.

Enable ICP – Click to enable the Microlog to provide power to the accelerometer or velocity sensor.

Freq. Type – Set to **Order Track** for Orbit POINTs.

Order Track – Specifies orders of running speed as the unit of measure for the horizontal axis of the FFT spectrum, requires a phase reference input to collect the measurement.

Save Data – Set to **Time** for Orbit POINTs.

- Freq. Type and Save Data fields currently not available. The Microlog currently does not support FFT data for an orbit POINT at this time.

Start / End Orders – Enter the lower and upper, full scale order range of the FFT between 0 and 100.0 orders. For optimum results, use values from approximately 2 to 10 orders.

Low Freq. Cutoff – Enter a low frequency cutoff filter value for dynamic (AC) measurements. Although values are allowed from 0.0 CPM to 1200 kCPM, the range for normal measurements is from approximately 200 CPM to 600 CPM, or the equivalent in Hz.

Pulses / Rev - Used to determine machine running speed. If a tachometer is connected, enter the number of tach. pulses that occur for each shaft revolution. Set to 1 for **Orbit/SCL** application type.

Samples – The spectrum's FFT resolution. Click the list box to view choices.

- The higher the resolution, the slower the data collection.

256	512	1024	2048
2560	4096	8192	

Window – Select the type of window used in the FFT processing. Click the list box to view the choices (**Uniform**, Hanning, or **Flat Top**). A window function must be applied to any periodic time record prior to performing an FFT. The **Hanning** and **Flat Top** window functions attenuate to zero both the leading and trailing edges of the sample in order to prevent leakage error caused by discontinuities in the time record.

Uniform – A dynamic signal analyzer window function with uniform weighting across time. Useful for measuring transients or mechanical response measurements.

Hanning – A dynamic signal analyzer window function that provides better frequency resolution than Flat Top, but with reduced amplitude accuracy. Useful for machine vibration measurements, general purpose measurement, and measurements containing random noise.

Flat Top – A dynamic signal analyzer window function which provides the best amplitude accuracy for measuring discrete frequency components. Useful for calibration of machine vibration measurements using displacement probes in fluid-film bearings.

Speed – Enter the nominal shaft speed in CPM or Hz.

Linear Factor – Type in the numeric linear factor.

Linear Speed Units – Type in the linear speed unit.

Orbit/SCL Tab

Enter orbit and shaft centerline information on this tab.

The screenshot shows the 'POINT Properties' dialog box with the 'Orbit/SCL' tab selected. The dialog has a title bar with a close button. Below the title bar is a tabbed interface with tabs for 'Speed Alarm', 'Messages', 'Notes', 'Frequencies', 'Images', 'Vector', 'General', 'Setup', 'Orbit/SCL', 'Compliance', 'Filter Keys', and 'Overall'. The 'Orbit/SCL' tab is active, displaying four sections of settings:

- Channel X settings:** 'X - Input mv/EU' is set to 7.874, and 'X - Sensor angle' is set to 135 degrees.
- Channel Y settings:** 'Y - Input mv/EU' is set to 7.874, and 'Y - Sensor angle' is set to 45 degrees.
- Orbit settings:** 'Top dead center' is set to 'TDC', 'Shaft rotation' is set to 'Counter clockwis' (with a dropdown arrow), 'Display tacho angle' is an unchecked checkbox, and 'Tacho angle' is set to 0 degrees.
- Shaft centerline settings:** 'X - Cold gap' is set to -9 volts, 'Y - Cold gap' is set to -9 volts, 'Cold gap position' is set to 'Bottom' (with a dropdown arrow), and 'Bearing clearance' is set to 10 micron.

At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

Figure 2 - 13.
The **POINT Properties** Screen's **Orbit/SCL Tab**.

POINT Properties / Orbit/SCL fields may include:

Channel X and Y Settings

X-Input mv/EU – Enter a number to define the sensitivity of the pickup to be used in taking measurements for channel X.

X-Sensor angle – Specify the angle that defines the X sensors' physical location.

Y-Input mv/EU – Enter a number to define the sensitivity of the pickup to be used in taking measurements for channel Y.

Y-Sensor angle – Specify the angle that defines the Y sensors' physical location.

- The orbit axis may use Scientific or Standard mode for the 0 degree reference point, depending on your **Angular axis view** preference setting. This setting should be taken into account when entering your sensor angles.

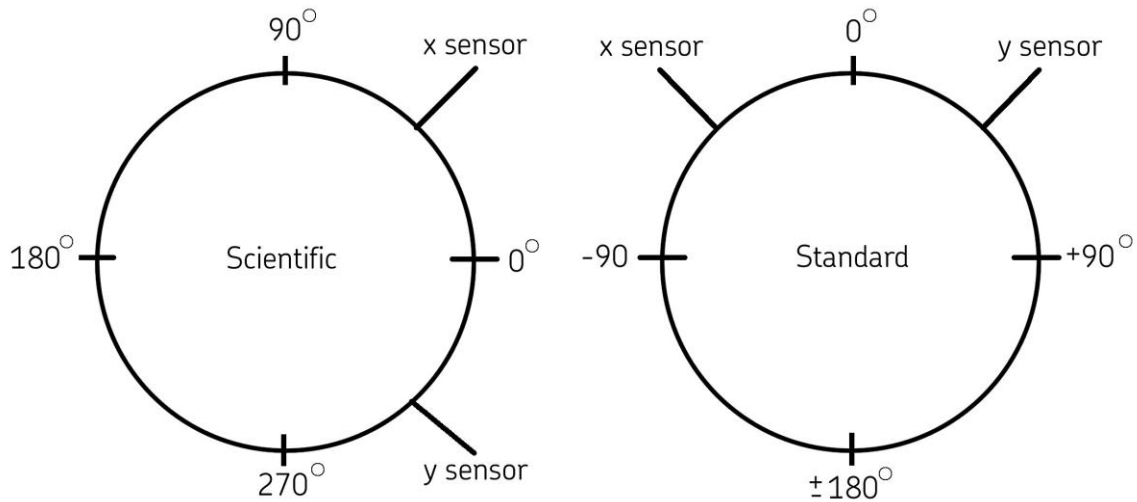


Figure 2 - 14.
Diagram Showing Scientific vs. Standard.

Orbit Settings

Top dead center – Specify the label to display at the top of the **Orbit/SCL** plot.

Display tachometer angle – Enable to allow the tachometer angle to display on the **Orbit/SCL** plot.

Shaft rotation – Specify the shaft rotation direction as either **Bidirectional**, **Clockwise**, or **Counter clockwise** for reference on the **Orbit/SCL** plot.

Tachometer angle – Specify the angle that defines the tachometer's physical location (0 to 359 degrees).

Shaft Centerline Settings

- This section is only available if the POINT uses a displacement probe.

X-Cold gap – Specify the X probe's cold gap value. Together the X and Y probe cold gap values define the distance between the displacement probe and the shaft's position in the bearing when the machine is at rest.

Y-Cold gap – Specify the Y probe's cold gap value.

Cold gap position – Define the cold gap position in the bearing clearance circle when viewing the shaft centerline plot. Choices are **Bottom**, **Center**, **Left**, **Right**, and **Top**.

Bearing clearance – Specify the bearing's clearance value (typically supplied by the manufacturer). The clearance value assumes the shaft is centered in the bearing and defines the physical distance between the shaft and the bearing, multiplied by 2.

Setup Tab (Manual POINTs)

- The **POINT Properties / Setup** tab displays differently, depending on the POINT type. The following **Setup** fields apply to POINTs defined with a manual sensor.

Enter Manual POINT Setup information in this tab.



Figure 2 - 15.
The **POINT Properties** Screen's Manual **Setup** Tab.

POINT Properties / Setup fields may include:

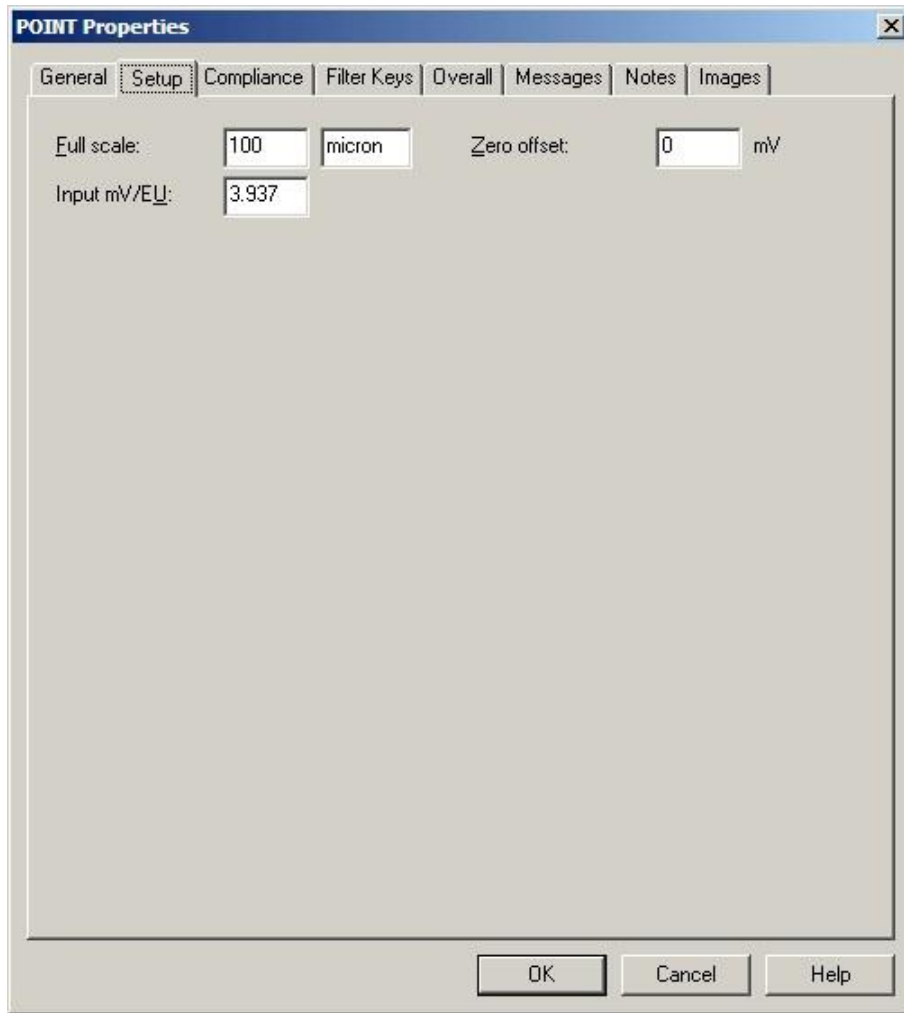
- The POINT Setup Validation Dialog launches when you enter incompatible or erroneous information on the **Setup** tab. Reference the **POINT Setup Validation** section later in this manual for more information.

Full Scale – Enter a number to define the spectrum's maximum amplitude value.

The **Units** selected on the **DAD/POINT Type Selection** screen display next to the **Full Scale** field. If **Any Units** was selected, the units may be edited. Adjust the units if necessary.

Setup Tab (DC POINTs)

If the sensor type is **DC**, enter POINT setup information on this tab.



The screenshot shows the 'POINT Properties' dialog box with the 'Setup' tab selected. The dialog has a title bar with a close button. Below the title bar are several tabs: 'General', 'Setup' (which is active and highlighted), 'Compliance', 'Filter Keys', 'Overall', 'Messages', 'Notes', and 'Images'. The 'Setup' tab contains three input fields: 'Full scale:' with a value of '100' and a unit dropdown set to 'micron'; 'Zero offset:' with a value of '0' and a unit dropdown set to 'mV'; and 'Input mV/EU:' with a value of '3.937'. At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

Figure 2 - 16.
The **POINT Properties** Screen's DC **Setup** Tab.

Full Scale – Enter a number to define the measurement's maximum value.

The **Units** selected on the **DAD/POINT Type Selection** screen display next to the **Full Scale** field. Adjust the units if necessary.

Zero offset – Enter a value (-1000000000.000 to 1000000000.000) in millivolts to offset the zero point of the measurement.

Input mV/EU - Enter a number to define the sensitivity of the pickup to be used in taking measurements.

Setup Tab (Derived POINTs)

A derived POINT provides data from an operator created formula that uses previously collected measurement POINT data in its calculation.

Prior to setting **Setup** tab options, use the **DAD / POINT Type Selection** screen's setup fields to specify a derived POINT type.

To specify a derived POINT type:

- Select the **Insert** menu's **New POINT** option. The **DAD / POINT Type Selection** screen displays.
- Select the **DAD type** field's **Derived POINT** option.
- Select the **Sensor** field's **Calculated** option. Note that for Microlog DADs, derived POINT data appears only in @ptitude Analyst (derived POINTs are not downloaded to the Microlog unit). The **Calculated** setting indicates that Microlog POINT data used in a derived POINT calculation is first uploaded to @ptitude Analyst and then automatically "calculated" for the derived POINT during upload data processing.
 - For Derived POINTs, the **DAD / POINT Type Selection** screen's **Application** field defaults to **General**, and the **Units** field defaults to **Any Units**.

Setup Tab Options

Enter Derived POINT Setup information in this tab. A Derived POINT consists of an operator created formula (expression) using measurement POINT data (variables), fixed numbers (constants; i.e., Pi) and mathematical functions (i.e., sin).

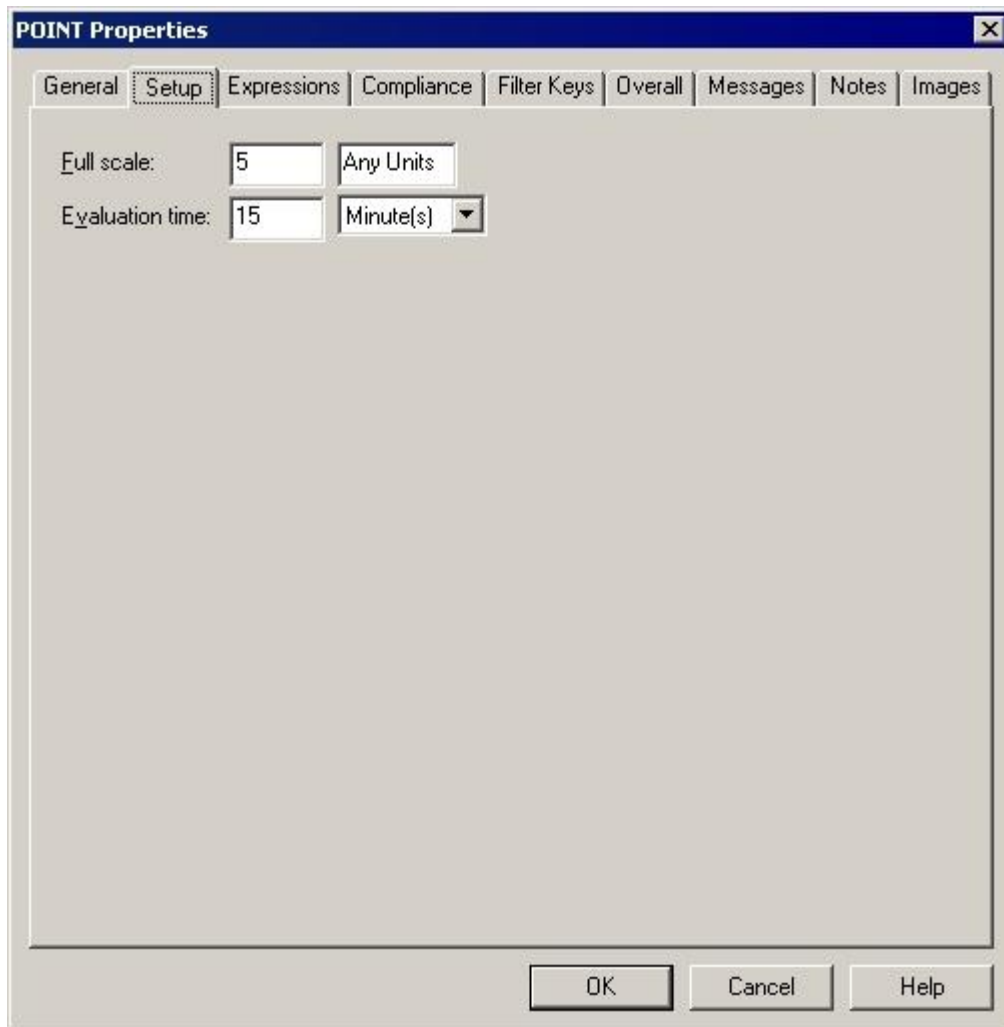


Figure 2 - 17.

The **POINT Properties** Screen's **Setup** Tab for Derived POINTs.

POINT Properties / Setup fields may include:

Full Scale – Enter a number to define the spectrum's maximum amplitude value.

Evaluation time – Ensures relevant variable data. Defines the maximum time range during which all variables (POINTs) must collect measurement data for the derived POINT to calculate. All variables in the expression formula must have data collected within this specified time range, or the derived POINT does not calculate. For example, if the Evaluation time is set to 15 minutes, all variables (POINTs) must be collected within 15 minutes of each other.

Expressions Tab (Derived POINTs)

- The **POINT Properties / Expressions** tab displays when the Derived POINT type is selected. Use this tab to create or edit the derived POINT's **Expression formula** (the derived POINT's calculation).

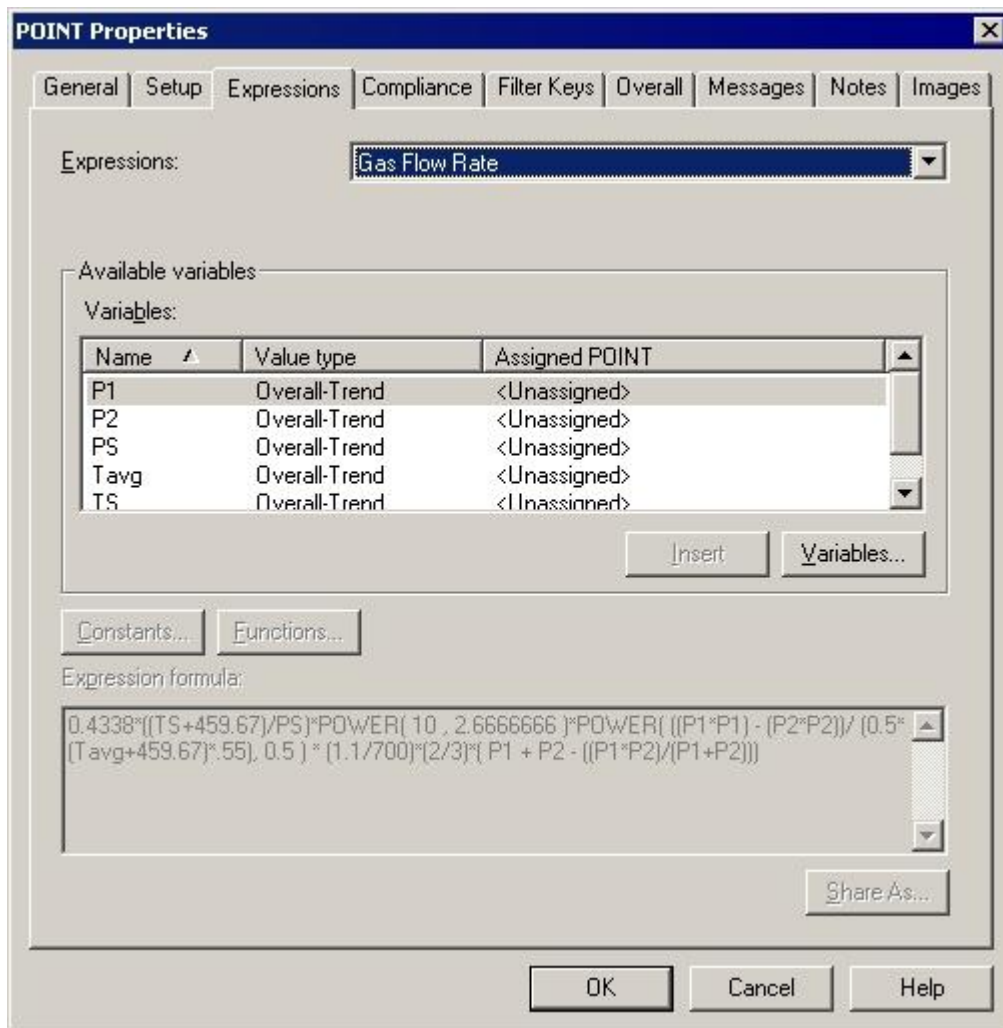


Figure 2 - 18.

The **POINT Properties** Screen's **Expressions** Tab for Derived POINTs.

The **Expressions** drop down list displays all previously created “shared” expression formulas (calculations) and a **<Private Expression>** option. Use this drop down list to specify whether you wish to set up a unique **<Private Expression>** for the current derived POINT only, or specify a previously defined “shared” expression formula (selected by name). If you specify a shared expression, its settings display in subsequent fields.

- Specify either a shared or Private Expression and proceed to configure the tab's expression settings as described below.

Assigning Variables

POINTS used in the derived POINT's calculation are identified as "variables." Assigned variables list in the **Available Variables** area.

To assign variables for a derived POINT:

- Click the **Variables** button. The **Variables** screen displays.

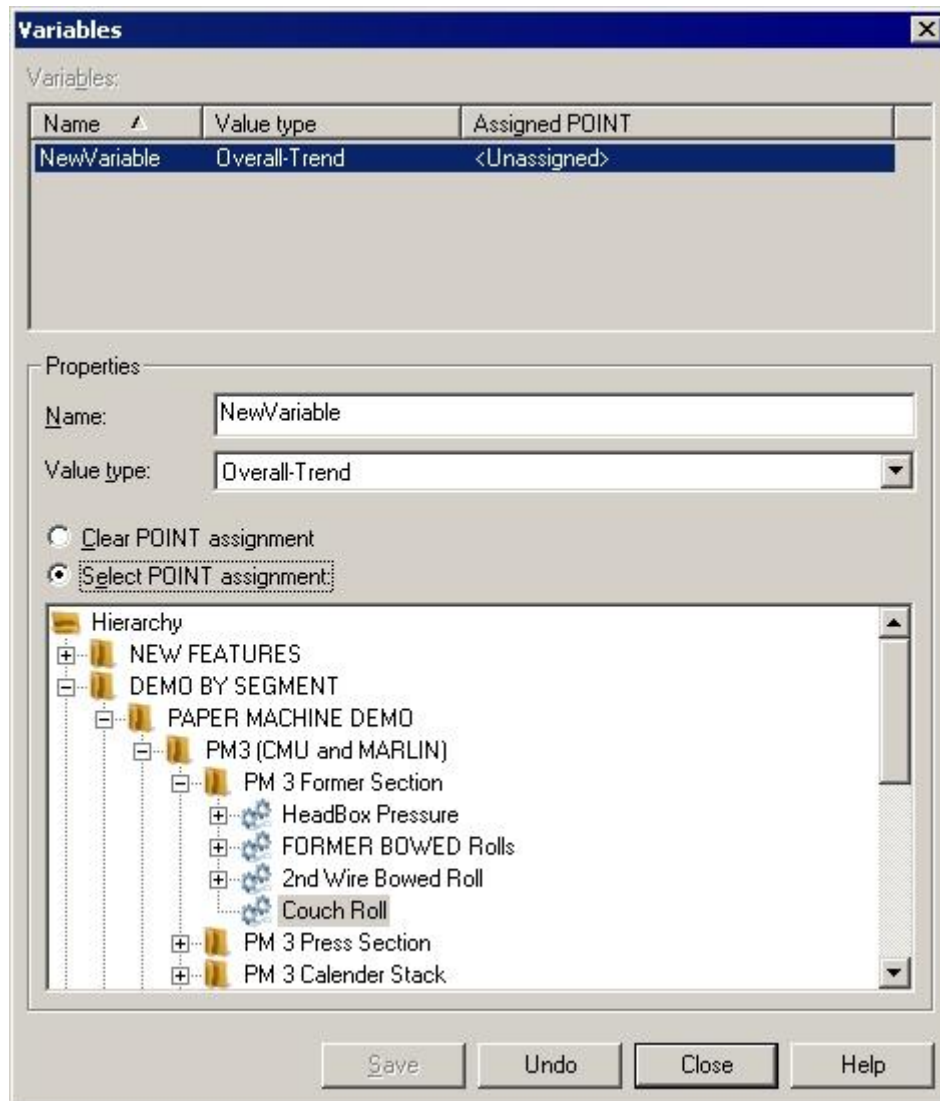


Figure 2 - 19.
The **Variables** Screen.

- In the **Variables** screen, click the **Add** button. The **Variables** area displays the **New Variable** with an "unassigned POINT." The **Properties** area also displays the **New Variable**.
- Click the **Select POINT assignment** option button to activate the hierarchy, allowing you to select the POINT to assign to the new variable.

- Click the **Clear POINT assignment** option to clear the point assigned to the selected variable. Once cleared, **<Unassigned>** displays in the **Assigned POINT** column in the **Variables** list.
- In the hierarchy, select the POINT to assign to the variable.
- In the **Properties** area, type in a name for the new variable. Tip - you may use the same name as the POINT ID.
- Specify the **Value type** as **FFT data, Overall-Trend, or Time wave form data**.
- Click the **Save** button to save the new variable. Its information displays in the **Variables** area. Repeat the process to **Add** all necessary variables.
 - You may click the **Remove** button to remove a variable from the **Variables** list for the current derived POINT.
- When finished adding variables, click the **Close** button to return to the **POINT Properties / Expressions** tab. The new variables display in the **Available Variables** area.

Once variables have been created for the derived POINT, you can create the POINT's expression formula (calculation). Enter the calculation in the **Expression formula** entry box. An expression formula must contain at least one variable, and may also contain constants and functions. Insert mathematical operators (e.g., +, -, /, *) as necessary.

To insert a variable to the expression formula:

- In the **Expression Formula** area, position the cursor where you wish to insert the variable.
- Select a variable from the **Variables** list and click the **Insert** button. The selected variable appears at the cursor position.

To add a constant to the expression formula:

- In the **Expression formula** field, position the cursor where you would like to insert the constant.
- Click the **Constants** button to display the **Constant** dialog.
- Select a constant, or create a new constant by clicking the **Add** button.

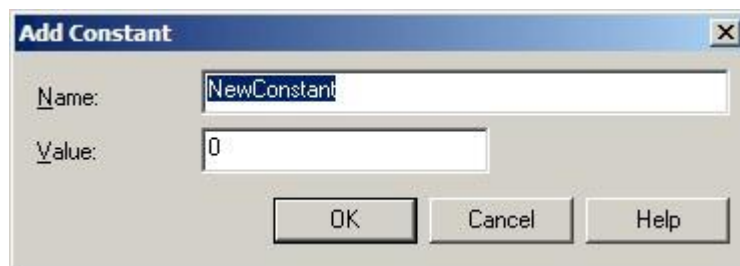


Figure 2 - 20.
The **Add Constant** Dialog.

- Click **OK**. The selected constant appears at the cursor position.

To add a function to the expression formula:

- Place the cursor in the **Expression formula** section where you wish to insert the function and click the **Functions** button. The **Functions** dialog displays.

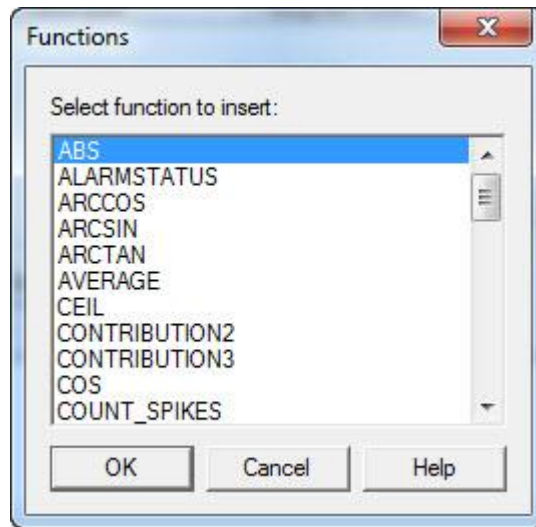


Figure 2 - 21.
The **Functions** Dialog.

- Select a function from the dialog and click **OK**. The selected function is entered at the cursor position in the **Expression formula** section along with the type of input data that is used for the function, shown in parentheses; for example: **AVERAGE(<Variable>, <Length>)**.
- Highlight the input data placeholder (e.g., **<Variable>**) and enter the applicable data, or select a constant to enter by using the **Constants** button. You can also enter a variable by selecting it from the **Variables** section and clicking **Insert**.
 - To calculate more complex formulas, you can enter multiple functions within a single expression formula.

Depending on the function, the type of input data can either be *scalar* data or *dynamic* data.

Scalar data can be derived from:

- Overall trend data from a Microlog Analyzer, Microlog Inspector/MARLIN, WMx/WVT, DMx, IMx, LMU/CMU/TMU
- Inspection results (the calculated formula for inspection results will produce a result of either 0 (not valid) or 1 (valid) based on the inspection result that is entered)
- Manual entry
- Data from XML import (from sources such as the SKF Wireless Machine Condition Sensor, third party developments, etc.)
- OPC from other systems (Digital Control Systems (DCS), Canary Labs and other data historians, etc.)
- Oil Analysis / Trend Oil

- MCD (Enveloped Acceleration, Velocity, or Temperature)
- WMCD
- Derived POINTS themselves

Dynamic data includes:

- Time waveform data
- FFT data

The table below contains a list of the different functions that you can use for an expression formula, along with a description of the function and whether the function is based on scalar or dynamic data.

Function	Description	Type of data
ABS(<Variable>)	Calculates the absolute value of the <Variable> entered.	Scalar
ALARMSTATUS (<Variable>)	Determines and stores the current alarm status for the <Variable> (POINT) entered. Notice that this function does not re-evaluate past alarm conditions and therefore must be operated immediately when new alarm conditions are set for the <Variable> . Returned values are: -1 No alarm level (when the <Variable> has no values, no set alarm) 0 Safe 1 Alert 2 Danger	Scalar Dynamic
ARCCOS(<Radians>)	Calculates the arc cosine of the <Radians> value entered. The value returned is in degrees.	Scalar
ARCSIN(<Radians>)	Calculates the arc sine of the <Radians> value entered. The value returned is in degrees.	Scalar
ARCTAN(<Radians>)	Calculates the arc tangent of the <Radians> value entered. The value returned is in degrees.	Scalar
AVERAGE(<Variable>, <Length>)	Calculates the average of the <Variable> entered using a sliding window of <Length> values entered.	Scalar
AVERAGE(<Dynamic Variable>, <Channel Number>)	Calculates the average of the <Dynamic Variable> entered for the specified <Channel Number> . For non-multi-channel measurements, <Channel Number> should be set to 1.	Dynamic
CEIL(<Param>)	Calculates the smallest (closest to negative infinity) integer that is not smaller than the <Param> value.	Scalar
CONTRIBUTION2 (<Dynamic Variable>, <Speed Multiple>)	Calculates the contribution (in percentage) of the energy periodical to the <Speed Multiple> entered. The <Dynamic Variable> entered is the time waveform. The <Speed Multiple> is specified in multiples of running speed including fractional values.	Dynamic (best for time waveform data)
CONTRIBUTION3 (<Dynamic Variable>, <Speed Multiple>, <Ref Speed>)	Calculates the contribution (in percentage) of the energy periodical to the <Speed Multiple> entered. The <Dynamic Variable> entered is the time waveform. The <Speed Multiple> is specified in multiples of running speed including fractional values. The <Ref Speed> entered is the machine speed value to use. The <Ref Speed> may be a fixed value, an overall value from a trend, or a speed value extracted with Speed() from a time waveform or spectrum.	Dynamic (best for time waveform data)
COS(<Radians>)	Calculates the cosine of the <Radians> value entered.	Scalar

Function	Description	Type of data
COUNT_SPIKES (<i><Dynamic Variable></i> , <i><Channel Number></i> , <i><Threshold></i> , <i><DC></i>)	Counts the number of spikes in the waveform indicated by the <Dynamic Variable> entered for the specified <Channel Number> entered. A spike is defined as a signal level equal or higher than the <Threshold> value entered. The <DC> bias value entered is subtracted from the signal prior to evaluation against the threshold value. Use the Average function to de-trend signals with strong DC bias i.e.: <i>COUNT_SPIKES(<Dynamic Variable>, <Channel Number>, <Threshold>, AVERAGE(<Dynamic Variable>, <Channel Number>))</i> For non-multi-channel measurements, <Channel Number> should be set to 1.	Dynamic (best for time waveform data)
CRESTFACTOR (<i><Dynamic Variable></i>)	Calculates the crest factor. The crest factor is defined as the time waveform's Peak value divided by its RMS value. The <Dynamic Variable> entered is the time waveform. The resulting value is dimensionless.	Dynamic (best for time waveform data)
CTA_PK_PK(<i><Waveform Data></i> , <i><Speed Multiple></i>)	Calculates the Cyclic Time Average of a time waveform using the <Speed Multiple> averaging period. The <Waveform Data> entered is the time waveform. The <Speed Multiple> entered must be in seconds. The returned value is in the same engineering units as the <Waveform Data> and Peak to Peak detection type.	Dynamic (best for time waveform data)
CTA_RMS(<i><Waveform Data></i> , <i><Speed Multiple></i>)	Calculates the Cyclic Time Average of a time waveform using the <Speed Multiple> averaging period. The <Waveform Data> entered is the time waveform. The <Speed Multiple> entered must be in seconds. The returned value is in the same engineering units as the <Waveform Data> and RMS detection type.	Dynamic (best for time waveform data)
CUSUM(<i><Variable></i> , <i><Variable></i>)	Calculates the cumulative difference of the first <Variable> entered against the second <Variable> entered.	Scalar
DEGTORAD(<i><Degrees></i>)	Converts the angle <Degrees> value entered to radians.	Scalar
DELTATIME(<i><Variable></i>)	Calculates the difference in seconds between two adjacent measurements.	Scalar Dynamic
DELTAVALUE(<i><Variable></i>)	Calculates the difference in value between two adjacent measurements.	Scalar
ENERGY_VALUE (<i><Dynamic Variable></i> , <i><Band Number></i>)	Calculates the overall energy found in the specified <Band Number> frequency band. <Band Number> starts at 1. Returns zero when no frequency band exists for the specified <Band Number> . Returns a band overall energy value with the same units and detection type as the <Dynamic Variable> entered.	Dynamic (best for FFT data)
FLOOR(<i><Param></i>)	Calculates the largest (closest to positive infinity) integer that is not greater than the <Param> value.	Scalar
FORECAST_EXP (<i><Variable></i> , <i><Length></i> , <i><Length></i>)	Calculates a forecasted alarm, in days, of the <Variable> entered using a sliding window of specified <Length> values. Uses an exponential fitting function.	Scalar
FORECAST_LIN (<i><Variable></i> , <i><Length></i> , <i><Length></i>)	Calculates a forecasted alarm, in days, of the <Variable> entered using a sliding window of specified <Length> values. Uses a linear fitting function.	Scalar
HAL(<i><Dynamic Variable></i> , <i><Speed Multiple></i>)	Calculates the Harmonic Activity Index for the frequency specified by the <Speed Multiple> entered in the <Dynamic Variable> entered. The <Speed Multiple> must be in orders. The returned value is a dimensionless indicator of the likelihood that a harmonic pattern at the <Speed Multiple> exists.	Dynamic (best for FFT data)

Function	Description	Type of data
KURTOSIS(<Variable>, <Length>)	For overall measurements, calculates the Kurtosis of excess for the <Variable> entered using a sliding window of specified <Length> values. There should be at least three measurements in the POINT referenced by the <Variable> .	Scalar
KURTOSIS(<Dynamic Variable>, <Channel Number>)	Calculates the standard deviation of a dynamic signal (FFT or waveform) for the specified <Channel Number> entered. For non-multi-channel measurements, <Channel Number> should be set to 1.	Dynamic
LN(<Param>)	Calculates the natural logarithm of the <Param> value entered.	Scalar
LOG(<Param>)	Calculates the logarithm of the <Param> value entered.	Scalar
MAX(<Variable>, <Variable>)	Calculates the maximum value between each <Variable> entered. Returns the appropriate <Variable> .	Scalar
MIN(<Variable>, <Variable>)	Calculates the minimum value between each <Variable> entered. Returns the appropriate <Variable> .	Scalar
MOD(<Param>, <Param>)	Calculates the remainder after the division of the first <Param> value entered by the second <Param> value entered; for example: <i>MOD(7, 3) = 1.</i>	Scalar
Operating Time	This function is available only by selecting "Operating Time" for Application Type when creating the POINT. It computes the amount of time an asset has been operative in the time unit specified in the create POINT dialog.	Scalar
PEAK_VALUE(<Dynamic Variable>, <Band Number>)	Calculates the peak value found in the specified <Band Number> frequency band. <Band Number> starts at 1. Returns zero when no frequency band exists for the specified <Band Number> . Returns a peak value with the same units and detection type as the <Dynamic Variable> entered.	Dynamic (best for FFT data)
PERCENTCHANGE (<Variable>)	Calculates the percentage change between two adjacent measurements. What is computed is: $(Value - PreviousValue) / PreviousValue$.	Scalar
POWER(<Base>, <Exponent>)	Raises the <Base> entered to the power of the <Exponent> entered.	Scalar
ROC(<Variable>, <Days Multiple>)	Calculates the rate of change (in days) between two adjacent measurements.	Scalar
ROUND(<Param>)	Calculates the integer closest to the <Param> value.	Scalar
SIN(<Radians>)	Calculates the sine of the <Radians> value entered.	Scalar
SKEW(<Variable>, <Length>)	Calculates the skew for the <Variable> entered using a sliding window of specified <Length> values. There should be at least four measurements in the POINT referenced by the <Variable> .	Scalar
SKEW(<Dynamic Variable>, <Channel Number>)	Calculates the skew of a dynamic signal (FFT or waveform) for the specified <Channel Number> . For non-multi-channel measurements, <Channel Number> should be set to 1.	Dynamic
SMAX(<Dynamic Variable>)	Calculates the maximum vector magnitude of an Orbit. The <Dynamic Variable> value entered must refer to a 2 channel time waveform value.	Dynamic (best for time waveform data)
SPEED(<Dynamic Variable>)	Extracts the machine speed from the <Dynamic Variable> entered. The <Dynamic Variable> must be either a time waveform or spectrum. The returned value is in Hertz.	Dynamic
SQRT(<Param>)	Calculates the square root of the <Param> value entered.	Scalar
STDEV(<Variable>, <Length>)	Calculates the standard deviation of the <Variable> entered using a sliding window of specified <Length> values. There should be at least two measurements in the POINT referenced by the <Variable> .	Scalar

Function	Description	Type of data
STDEV(<Dynamic Variable>, <Channel Number>)	Calculates the standard deviation of a dynamic signal (FFT or waveform) for the specified <Channel Number>. For non-multi-channel measurements, <Channel Number> should be set to 1.	Dynamic
SUMDURATION (<Variable>, <Duration>)	<p>Enter any number of days (for example: 1, 7, 31, etc.) or partial days (for example: 0.5, 3.5, 11.75, etc.) for <Duration>. This function sums the <Variable>'s (POINT's) last measurement with all of its previous measurements found within the specified number of days (or partial days) prior to the last measurement date/time.</p> <p>Sample cases:</p> <p>Enter a <Duration> of 7 to sum the <Variable>'s (POINT's) last measurement with all of its previous measurements starting exactly 7 days prior to the last measurement.</p> <p>Enter a <Duration> of 3.5 to sum the <Variable>'s (POINT's) last measurement with all of its previous measurements starting exactly 3 and one half days prior to the last measurement.</p>	Scalar
SUMPERIOD(<Variable>, <Period>)	<p>Enter a specific <Period> (defined in sample cases, below). This function sums the <Variable>'s (POINT's) last measurement with all of its previous measurements found within the specified <Period> and stamps the result with the period start date/time.</p> <p>SUMPERIOD differs from the other functions in that it always creates a measurement at the start of a period as soon as it begins, even when the source <Variable> (POINT) has not yet collected a measurement. The initial value is 0, and will be updated as the source <Variable> (POINT) collects measurements for that period.</p> <p>Sample cases:</p> <p>Enter a <Period> of Period_Hour to sum the Variable's (POINT's) last measurement with all of its previous measurements within the same hour, starting at the top of the hour (for example 08:00 AM). Alternatively, you can enter the constant 1 as the <Period> value to represent Period_Hour.</p> <p>Enter a <Period> of Period_Day to sum the Variable's (POINT's) last measurement with all of its previous measurements found within the same day, starting at 12:00 AM. Alternatively, you can enter the constant 2 as the <Period> value to represent Period_Day.</p> <p>Enter a <Period> of Period_Week_Sunday to sum the Variable's (POINT's) last measurement with all of its previous measurements found within the same week, starting Sunday at 12:00 AM. Alternatively, you can enter the constant 3 as the <Period> value to represent Period_Week_Sunday.</p> <p>Enter a <Period> of Period_Week_Monday to sum the Variable's (POINT's) last measurement with all of its previous measurements found within the same week, starting Monday at 12:00 AM. Alternatively, you can enter the constant 4 as the <Period> value to represent Period_Week_Monday.</p>	Scalar

Function	Description	Type of data
	<p>Enter a <Period> of Period_Month to sum the Variable's (POINT's) last measurement with all of its previous measurements found within the same month, starting the first day of the month at 12:00 AM. Alternatively, you can enter the constant 5 as the <Period> value to represent Period_Month.</p> <p>Enter a <Period> of Period_Quarter to sum the Variable's (POINT's) last measurement with all of its previous measurements found within the same quarter, starting Jan 1, Apr 1, Jul 1, or Oct 1 at 12:00 AM. Alternatively, you can enter the constant 6 as the <Period> value to represent Period_Quarter.</p> <p>Enter a <Period> of Period_Year to sum the Variable's (POINT's) last measurement with all of its previous measurements found within the same year, starting Jan 1 at 12:00 AM. Alternatively, you can enter the constant 7 as the <Period> value to represent Period_Year.</p>	
SUMSINCE(<Variable>, <Start Date>)	<p>Enter any <Start Date> code (using the format <i>yyyymmdd</i> or, optionally, <i>yyyymmddhhmmss</i>). This function sums all of the <Variable>'s (POINT's) measurements found on or after the specified date/time.</p> <p>Sample cases: Enter a <Start Date> of 20140101 to sum all of the Variable's (POINT's) measurements found on or after Jan 1, 2014 at 12:00 AM.</p> <p>Enter a <Start Date> of 20140101090000 to sum all of the Variable's (POINT's) measurements found on or after Jan 1, 2014 at 09:00 AM.</p>	Scalar
TAN(<Radians>)	Calculates the tangent of the <Radians> value entered.	Scalar
Total Operating Time	This function is available only by selecting "Operating Time" for Application Type when creating the POINT. It computes the total amount of time an asset has been operative in the time unit specified in the create POINT dialog.	Scalar Dynamic
TRUNC(<Param>)	Removes any fractional part from the <Param> value entered.	Scalar
XMAG(<Dynamic Variable>, <Channel Number>, <Channel Number>, <Speed Multiple>)	<p>Computes the cross magnitude value (as opposed to cross phase) between two time waveform signals. The waveform signals are referenced by the <Dynamic Variable> entered and either of the specified <Channel Number> values. The specific frequency the cross magnitude value is computed for is determined by the speed value associated with the measurement and the <Speed Multiple> value entered: $f = 1 / (s * Speed\ Multiple)$.</p> <p>This function operates on multi-channel measurements only.</p>	Dynamic (best for time waveform data)

Function	Description	Type of data
XPHASE(<Dynamic Variable>, <Channel Number>, <Channel Number>, <Speed Multiple>)	<p>Computes the cross phase value (as opposed to cross magnitude) between two time waveform signals. The waveform signals are referenced by the <Dynamic Variable> entered and either of the specified <Channel Number> values. The specific frequency the cross phase value is computed for is determined by the speed value associated with the measurement and the <Speed Multiple> value entered:</p> $f = 1 / (s * \text{Speed Multiple}).$ <p>This function operates on multi-channel measurements only.</p>	Dynamic (best for time waveform data)

- The value entered for the SIN, COS, and TAN functions must be in radians, not degrees. If the value entered is in degrees, the @ptitude Analyst will assume it is in radians, and the calculation will be wrong.
To convert degrees to radians, use the DEGTORAD function in the formula. For example, if you have a value of 45 degrees, the entered formula may look like this:
SIN(DEGTORAD(45))
When the formula is calculated, 45 degrees is automatically converted into radians.
- Use the DeltaTime function to calculate the difference in seconds between the two most recent measurements for that POINT.
- Use the DeltaValue function to calculate the difference in value between the two most recent measurements for that POINT.
- Use the PercentChange function to calculate the percent change between the two most recent measurements for that POINT. The formula will look like this:
(LastValue – PreviousValue) / PreviousValue

Important – After initial setup of a derived POINT that references variables (POINTS) with existing data records, you must manually calculate the derived POINT to immediately acquire derived POINT data based upon the variable POINTs' historical data records. Reference the Calculating Derived POINTs section later in this chapter for details.

Share As

- Click **Share As** to make the expression a shared expression. The **Enter Name** dialog displays.
- Enter a name for the shared expression and click **OK**.

The new shared expression now appears as an available selection in the tab's drop down list. Shared expressions are easily assigned to other POINTs to simplify setup and maintenance.

Compliance Tab

Use the **Compliance** tab to enter data collection and archiving scheduling information.

The **Data collection** area allows you to specify an **Interval-based** or **Calendar-based** data collection schedule for the POINT.

Interval Based

An interval-based collection schedule allows you to schedule data collection at a set time interval. For example, if data is scheduled to be collected for a POINT every seven days, the POINT must be collected within seven days of the last time data was collected for the POINT. If data is not collected within the set time interval, the POINT is considered **Overdue** and displays as missed when included in generated reports.

Calendar-Based

A calendar-based collection schedule allows you to schedule data collection starting from a specified calendar date and time, at a specified calendar interval (hours, days, weeks, etc.). If, for such a POINT, data is not collected at all within the time period, the POINT is considered **Out of Compliance** and displays as missed when included in generated reports.

- To learn how to set up a calendar-based data collection schedule, reference the **Customize / Database Operations / Compliance** section later in this chapter.

@ptitude Analyst allows you to archive collected data using its **Scheduler** feature, its **Monitor** application, or **Manually**. To archive with Analyst's Scheduler wizard or with the Monitor application, you must set archive parameters in the **POINT Properties / Compliance** tab and in the Scheduler wizard or Monitor application respectively.

The screenshot shows the 'POINT Properties' dialog box with the 'Compliance' tab selected. The 'Interval-based' radio button is chosen under the 'Data collection' section. The 'Take data every' field is set to '1' with a unit dropdown menu showing 'Hour(s)'. The 'Starting from' and 'Data due every' fields are empty. The 'Keep current data for' field is set to '55' with a unit dropdown menu showing 'Measurement(s)'. The 'Short term archive' section has 'Archive data every' set to '1' with a unit dropdown menu showing 'Week(s)', and 'Keep archive for' set to '55' with a unit dropdown menu showing 'Measurement(s)'. The 'Long term archive' section has 'Archive data every' set to '1' with a unit dropdown menu showing 'Month(s)', and 'Keep archive for' set to '55' with a unit dropdown menu showing 'Measurement(s)'. The 'Unscheduled data' section has 'Keep for' set to '55' with a unit dropdown menu showing 'Measurement(s)'. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

Figure 2 - 22.

The **POINT Properties** Screen's **Compliance** Tab – Interval-Based.

- **IMPORTANT - Keep current data for, Short term archive, and Long term archive** settings operate **ONLY** with the **Scheduler's** archive process or when using the **Monitor** application's archive feature. They do not apply to Manual archives.

Interval-based fields include:

Take data every – Enter a numerical value to indicate how often data should be collected and select the appropriate units from list box options (**None, Second(s), Minute(s), Hour(s), Day(s)**). The POINT is tagged as overdue for data collection if the time range between the current date (today) and the last data collection date is longer than the specified **Take data every** setting.

- The **Take data every** field is used to determine if a POINT is overdue for data collection.

Keep current data for – Enter a value to indicate how long to keep (store) the measurement record in the hierarchy's "current data" bin and select the appropriate units (**Week(s)**, **Month(s)**, **Year(s)**, **Forever**, **Measurement(s)**). When the specified time from data collection elapses, and a Scheduled or Monitor archive process is performed, the measurement is typically moved from the "current data" bin into the "short term archive" bin (or discarded) as specified in the **Short term archive / Archive data every** field.

- The **Keep current data for** field determines the length of time a measurement is kept before it is archived.

Example - Using a Microlog DAD, you may select to **Take data every** <30 days> and **Keep current data for** <1 Yr>. If you use Analyst's **Scheduler** feature to schedule an archiving process every month, no archiving will take place for the first year. After the first year, on a monthly basis, all measurement records in the "current data" bin whose date / timestamp is older than 1 year from the current date will either be placed in the "short term archive" bin (if short term criteria are met) or discarded.

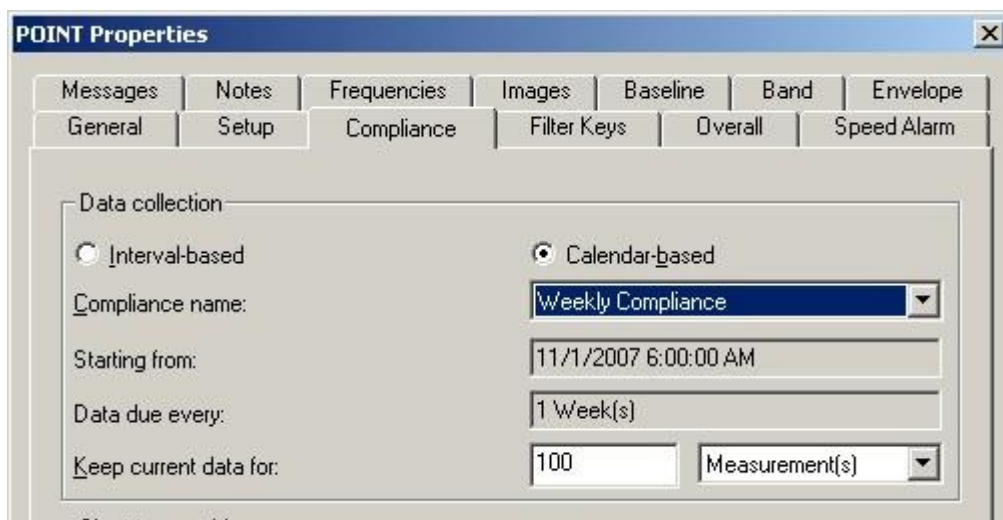


Figure 2 - 23.

The **POINT Properties** Screen's **Compliance** Tab – Calendar-Based.

Calendar-based fields include:

Compliance name – Select a pre-configured compliance schedule from the drop down list.

- Create and edit compliance schedules on the **Customize / Database / Compliance** tab. Reference **Chapter 3's Customize / Database Operations** section for details.

Starting from – Displays the initial start date / time of when the data collection interval is scheduled.

Data due every – Displays the frequency of when the scheduled data collection is due to be collected.

Keep current data for – Enter a value to indicate how long to keep (store) the measurement record in the hierarchy's "current data" bin and select the appropriate units (**Week(s)**, **Month(s)**, **Year(s)**, **Forever**, **Measurement(s)**). When the specified time from data collection elapses, and a Scheduled or Monitor archive process is performed, the measurement is typically moved from the "current data" bin into the "short term archive" bin (or discarded) as specified in the **Short term archive / Archive data every** field.

- The **Keep current data for** field determines the length of time a measurement is kept before it is archived.

Short term archive (optional, but typically enabled)

Fields in the **short term archive** section include:

Archive data every – Determines whether data leaving the "current data" bin is archived in the "short term archive" bin. Enter numerical value to indicate how often data leaving the "current data" bin is stored in the "short term archive" bin and select appropriate units (**None**, **Day(s)**, **Week(s)**, **Month(s)**, **Year(s)**). As scheduled archives occur, measurements leaving the "current data" bin are accepted into the "short term archive" bin only if this **Archive data every** setting has expired since the last measurement was stored in the "short term archive" bin. Otherwise, they are discarded.

Example – To continue with our example of a scheduled monthly archive. If we set this **Archive data every** setting to *three months*, on the 13th month of data collection, the measurement(s) leaving the "current data" bin are placed in the "short term archive" bin as there is no data yet stored in the "short term archive" bin. On months 14 and 15, measurement(s) that exceed the **Keep for** setting and leaving the "current data" bin are discarded, as three months have not expired since the last "short term archive" data was stored. On month 16, measurement(s) leaving the "current data" bin are *three months* newer than the last measurement stored in the "short term archive" bin, and are therefore stored in the "short term archive" bin. Thus, by configuring this setting to three months, you are able to "thin" the data stored in the "short term archive" bin (store short term archive data every three months instead of every month).

Keep archive for – Enter a value to indicate how long to keep (store) the measurement record in the "short term archive" bin and select appropriate units (**Week(s)**, **Month(s)**, **Year(s)**, **Forever**, **Measurement(s)**). When the specified time of storage elapses, and a scheduled archive process performed, the measurement is typically moved from the "short term archive" bin into the "long term archive" bin (or discarded) as specified in the **Long term archive** fields.

Fields in the **long term archive** section include:

Archive data every – Determines whether data leaving the "short term archive" bin is archived in the "long term archive" bin. Enter numerical value to indicate how often data leaving the "short term archive" bin is stored in the "long term archive" bin and select appropriate units (**None**, **Day(s)**, **Week(s)**, **Month(s)**, **Year(s)**). As scheduled archives occur, measurements leaving the

“short term archive” bin are accepted into the “long term archive” bin if this **Archive data every** setting has expired since the last measurement was stored in the “long term archive” bin.

Keep archive for – Enter value to indicate how long to keep (store) the measurement record in the “long term archive” bin and select appropriate units (**Week(s), Month(s), Year(s), Forever, Measurement(s)**). When the specified time of storage elapses, and a scheduled archive process is performed, the measurement is discarded.

Unscheduled data

The last section of the tab schedules alarm data. In on-line DAD systems, alarm data is automatically placed in the “Unscheduled data” bin. This setting determines how long alarm data is stored in the alarm data bin before it is discarded. Fields include:

Keep for – Specify value to indicate the desired length of time to store alarm data and select appropriate units (**Week(s), Month(s), Year(s), Forever, Measurement(s)**). After the specified storage time elapses, the alarm data is discarded.

Filter Keys Tab

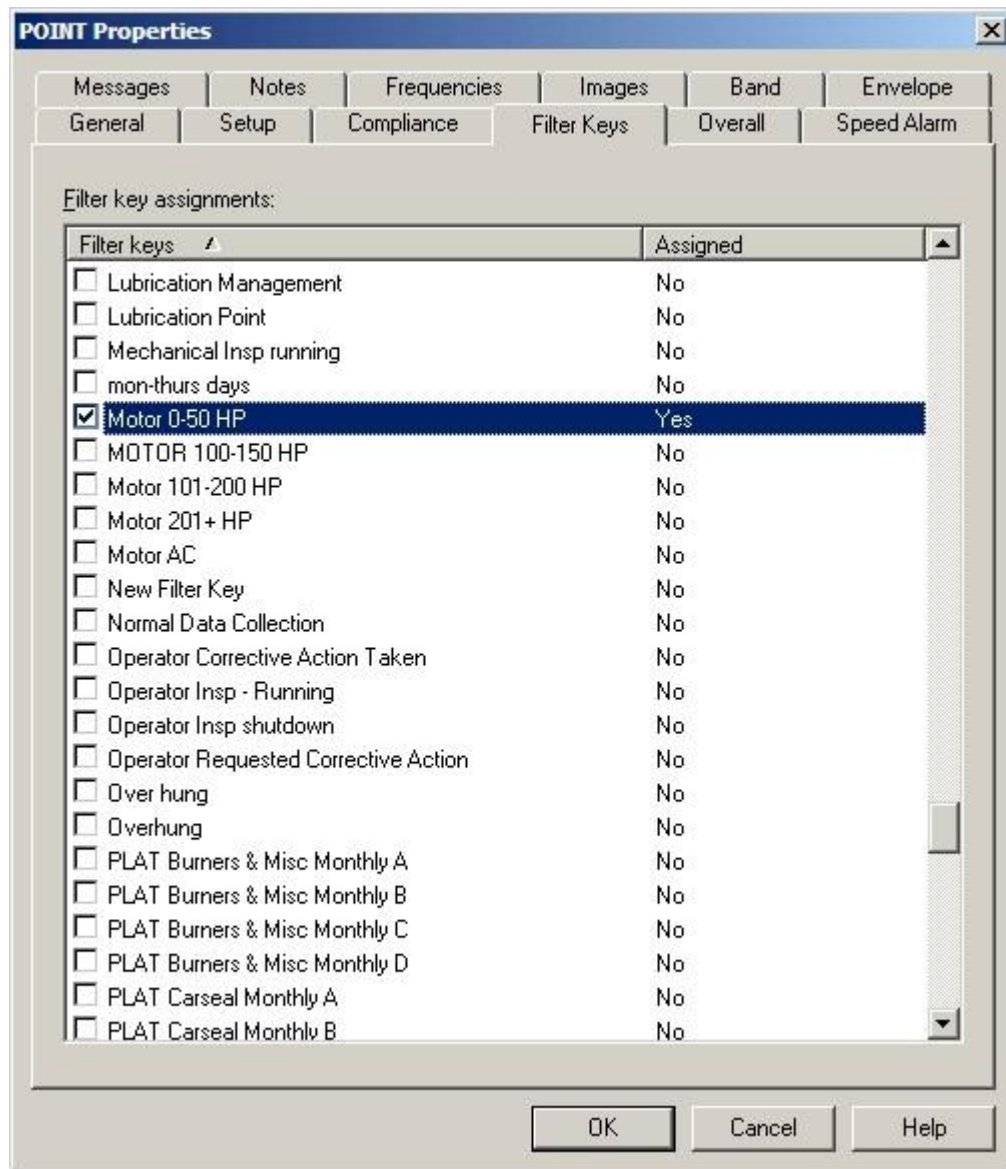


Figure 2 - 24.
The **POINT Properties** Screen's **Filter Keys** Tab.

@ptitude Analyst allows you to create **Filter Keys** which can be associated with POINTs and Machines for automated filtering purposes. For example, if you activate a "Pump" filter key for a Group and later filter a hierarchy list using the **Filter Key / Pump**, then all Groups with active Pump filter keys display in the filtered Workspace.

➤ Filter key creation is discussed later in this chapter.

Filter key searches list all POINTs or Machines sharing a specified filter key (or multiple filter keys). The **Filter Key** tab lists all created filter keys and indicates whether or not they are currently assigned.

- Click a specific filter key's checkbox to associate it to the current POINT.

- The checkbox appears gray if the filter key is enabled for a parent hierarchy item.
- Click the **Filter Key** dialog's **OK** button to save your filter key assignments.

Overall Tab

The **Overall** tab allows you to re-apply previously defined “shared” overall alarms, eliminating the need to define alarms individually, saving time and hierarchy space.

Use the **Overall** tab to set a POINT's overall alarm settings. The alarm can be configured in a variety of ways using the **Overall** tab's fields.

The current alarm appears in the **Overall alarm** field. The current alarm's values display below in the tab's **Properties** and **Settings** areas.

The screenshot shows the 'POINT Properties' dialog box with the 'Overall' tab selected. The 'Channel' dropdown is set to '1'. The 'Overall alarms' dropdown shows '<Private alarm>'. Under the 'Properties' section, the 'Level' radio button is selected. Under the 'Settings' section, both 'Danger high' and 'Alert high' are checked, with values of 3.5 and 2 respectively. A color-coded alarm indicator shows 'Danger high' in red, 'Alert high' in yellow, and 'Clear' in green. A 'Share As...' button is located at the bottom right of the settings area. At the very bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons.

Figure 2 - 25.
The **POINT Properties** Screen's **Overall** Tab.

The **Channel** drop down list displays all available channels. Specify the channel to which to apply the overall alarm, or click **Set All**, to apply the alarm to all available channels.

The **Overall alarms** drop down list displays all previously created overall alarms and a **<Private Alarm>** option. Use this drop down list to specify whether you wish to set up a unique **<Private Alarm>** for the current POINT only, or specify a previously defined “shared” alarm (selected by name). If you specify a shared alarm, its alarm settings automatically display in subsequent fields. If you specify a Private Alarm, proceed to configure the tab’s alarm settings as described below.

The **Properties** area options relate to Alert and Danger alarm detection values specified in the **Settings** area. Select from:

None – No overall alarm is set for the POINT.

Level – Measurements *exceeding* the specified **Settings** will result in an alarm condition.

In Window – Measurements *falling within* the specified **Settings** will result in an alarm condition.

Out of Window – Measurements *falling outside* the specified **Settings** will result in an alarm condition.

To assign a shared alarm to the current POINT:

- Select the shared alarm from the drop down list and click the **OK** button. Shared alarms may be applied to an unlimited number of POINTs.

Shared Alarm

Alarms initially created as private alarms may be converted into shared alarms. To share a newly created Private alarm, select the new Private alarm and click the tab’s **Share As** button.

The **Share As** dialog specifies the alarm as a shared alarm. When the **Share As** dialog displays, you will be prompted to give the shared alarm a unique name for easy identification.

- Enter a name for the shared alarm and click the **OK** button.

The new shared alarm now appears as an available selection in the drop down list. Shared alarms are easily assigned to other POINTs to simplify POINT setup and maintenance.

Variable Speed Alarms

As a machine's speed increases, the overall vibration increases. In order to accurately determine if measurements are in alarm, alarm levels should be adjusted based on the machine's speed levels. @ptitude Analyst's variable speed alarms allow you to customize overall and band alarm levels based on machine speed.

The **POINT Properties / Speed Alarm** tab allows you to specify the POINT's alarm adjustments for each speed region.

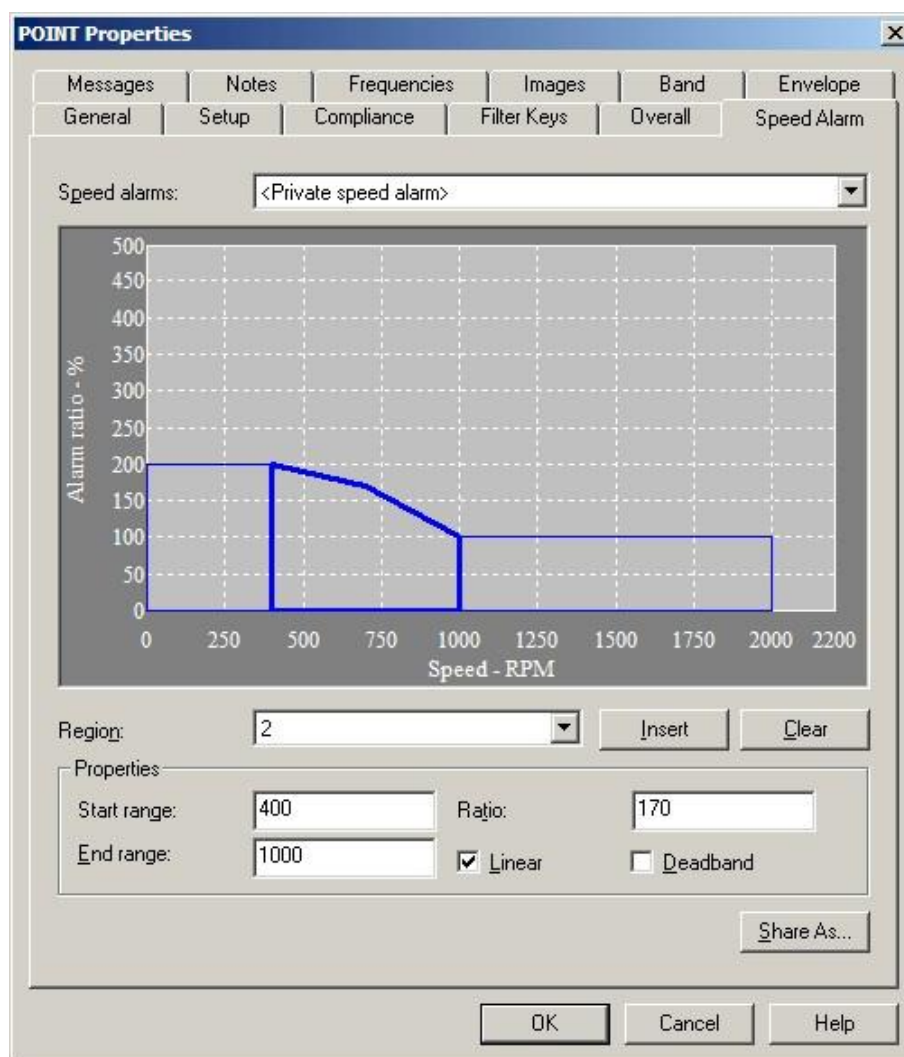


Figure 2 - 26.
The **POINT Properties' Speed Alarm** Tab.

Speed alarm fields include:

Speed Alarm – Specify a private or shared alarm from the drop down list.

Range – Select the speed regions for which the **Properties** settings will apply. You may select the region from the **Range** drop down list, or by clicking on the specific region on the speed alarm display. The values in the **Properties** fields update to reflect the specified speed region.

- Click **Insert** to add a new region to the speed alarm.
- Click **Clear** to remove the selected speed region.

Start / End Range– Enter each region’s start and end RPMs (i.e., 0 to 1000, 1000 to 2000, 2000 to 3000, etc.).

Ratio – Enter the adjustment to overall and band alarm levels. The normal running speed region’s ratio will be 100. If the next higher speed range is expected to produce vibration levels 10% higher than the nominal running speed, then the next speed range ratio would be set to 110.

Linear – This option allows for either a flat, rectangular definition of the adjustment (if disabled, the entire region will have the same ratio), or a more linear definition of the ratio (if enabled, the ratio will start from the level defined in the previous speed region and rise throughout the region until it reaches the next speed region’s level).

Deadband – When enabled, no alarm processing will occur for this region. This is mainly to be used when the machine reaches its resonant speed, at which vibration will be indeterminately high. When enabled, **Ratio** and **Linear** fields are disabled.

The variable speed alarm settings produce a table of speed ratios for the POINT. When data is collected, the overall alarm value is multiplied by the speed ratio before it is compared to the overall value returned from the sensor to determine whether the POINT is in alarm. When viewing a trend display, the variable speed alarm overlay adjusts based on the speed of the measurement.

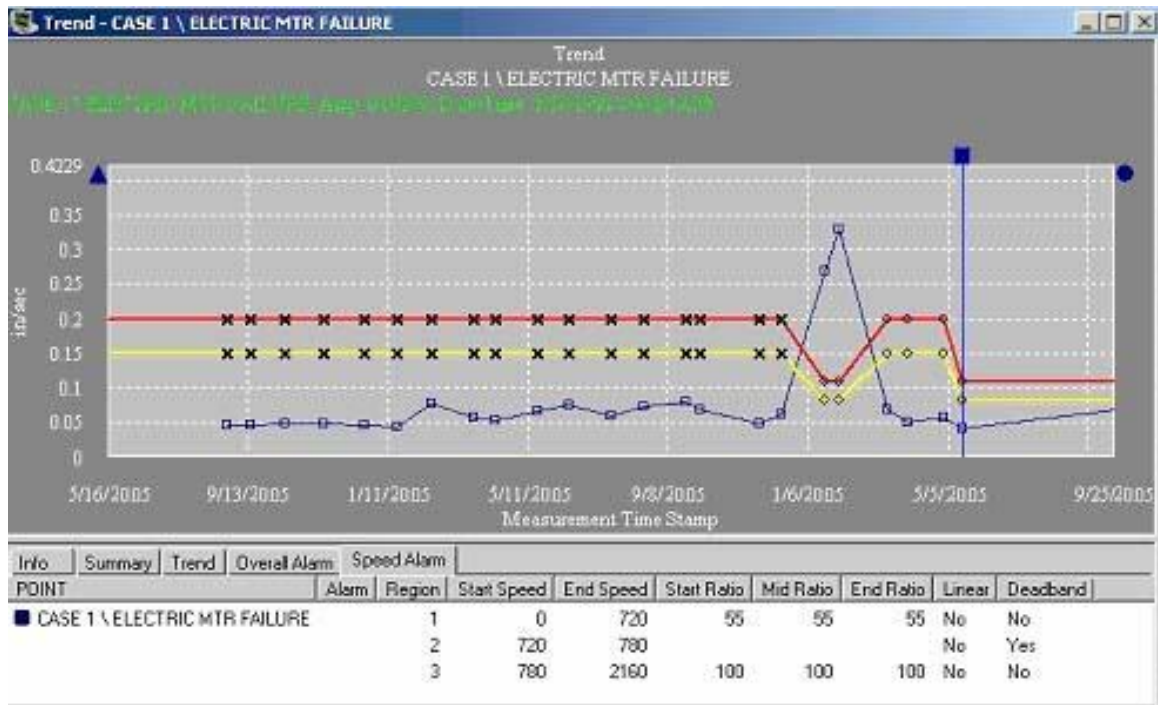


Figure 2 - 27.
Trend Display with Variable Speed Alarm Overlay.

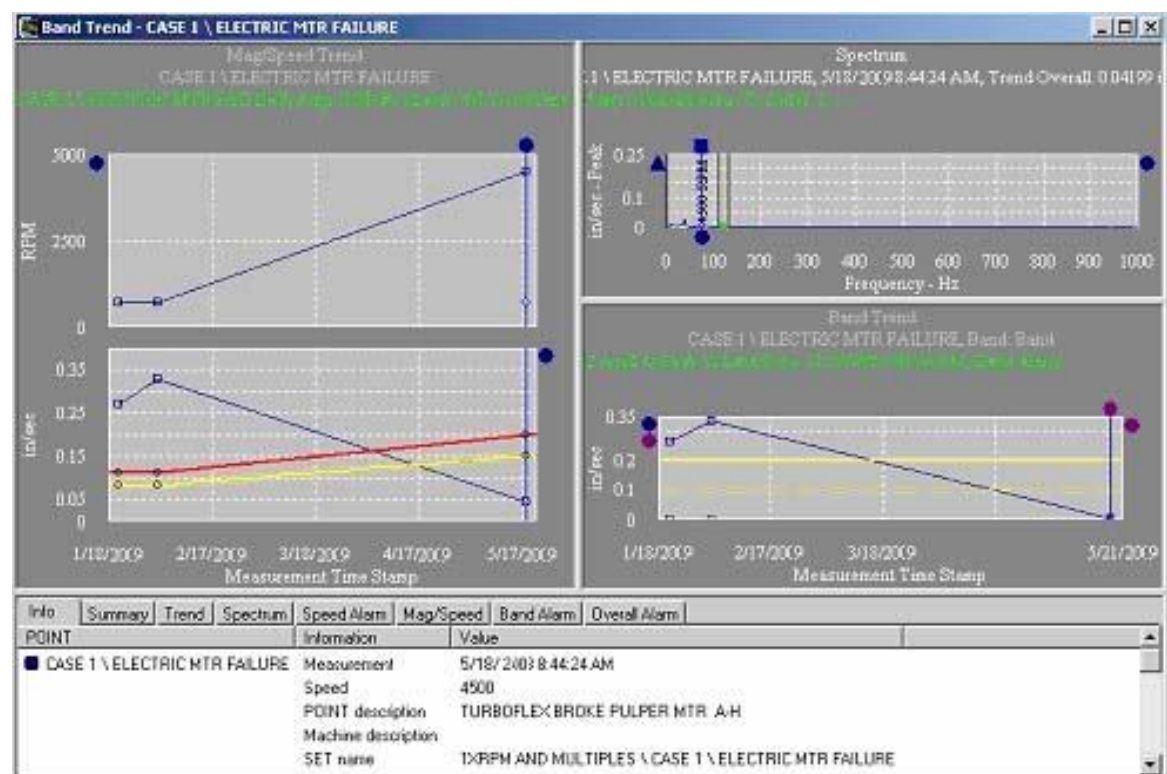


Figure 2 - 28.
Band Trend Display with Variable Speed Alarm Overlay.

Shared Alarm

Variable speed alarm adjustments initially created as private definitions may be converted into shared definitions. To share a newly created Private definition, select the new Private definition and click the tab's **Share As** button.

The **Share As** dialog specifies the definition as a shared definition. When the **Share As** dialog displays, you will be prompted to give the shared definition a unique name for easy identification. Enter a name for the shared definition and click the **OK** button.

The new shared definition now appears as an available selection in the drop down list. Shared definitions are easily assigned to other POINTs to simplify POINT setup and maintenance.

Messages

The **Messages** tab allows you to apply previously defined “shared” alarm messages, and to create new alarm messages for various overall alarm levels.

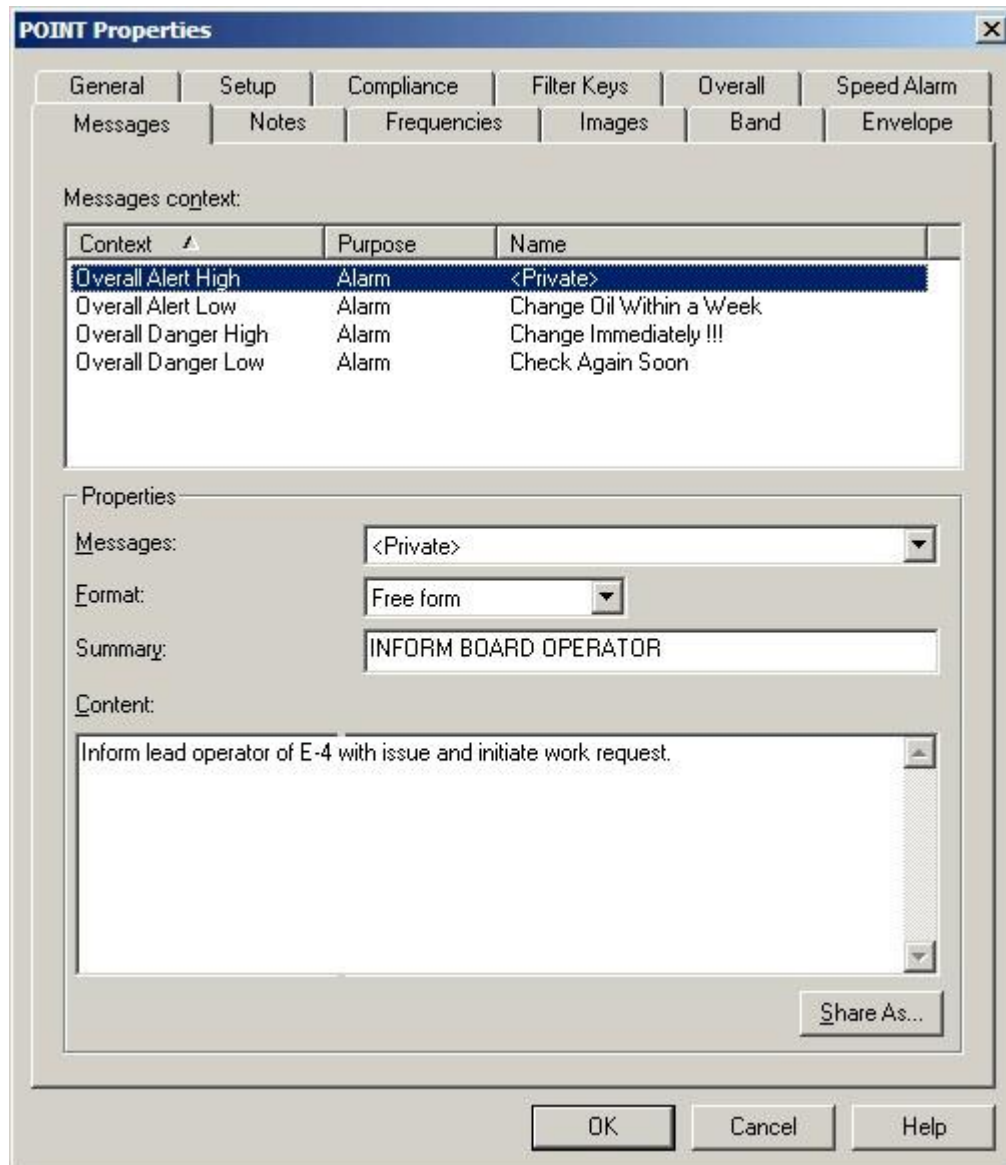


Figure 2 - 29.
The **POINT Properties** Screen's **Messages** Tab.

@ptitude Analyst's **POINT Properties / Messages** feature allows you to create and assign four alarm messages corresponding to the four overall alarm levels; **Overall Alert High**, **Overall Alert Low**, **Overall Danger High**, and **Overall Danger Low**. The **Messages context** area displays the message context available for message assignment and any existing alarm messages already applied. You can assign a created public alarm message to one or more alarm levels, or create a new private alarm message and apply it to the selected POINT.

The **Name** drop down list displays all previously created alarm messages and a **<Private>** option. Use this drop down list to specify whether you wish to set up a unique **<Private>** message for the current POINT only, or specify a previously defined "shared" message (selected by name). If you specify a shared message, its format, summary, and content automatically display in subsequent fields. If you specify a Private message, proceed to configure the message settings as described below.

- For more information on creating and managing public alarm messages, refer to the **Customize / Hierarchy Operations** section later in this chapter.

Format – This drop down list allows you to specify your alarm message's format.

Free form – Allows you to manually type in the summary and content for your alarm message.

Summary – Type in text summarizing your alarm message for easy recognition. For example, if you have an alarm message that details shut down instructions in the case of an overall danger high alarm level, your summary may read, "Emergency Shut Down Instructions."

Content – Enter your complete alarm message in the content text area. Using the above example, your alarm message content would include detailed shut down instructions, and any other pertinent information required in the case of the triggered alarm type.

To assign a shared message to the current POINT:

- Select the shared message from the drop down list and click the **OK** button. Shared messages may be applied to an unlimited number of POINTs.

Shared Message

Alarm messages initially created as private messages may be converted into shared (public) messages. To share a newly created Private message, select the new Private message and click the tab's **Share As** button.

The **Enter Name** dialog specifies the message as a shared (public) message. When the **Enter Name** dialog displays, you will be prompted to give the shared message a unique name for easy identification.

- Enter a name for the shared message and click the **OK** button.
- The new shared message **now** appears as an available selection in the tab's drop down list. Shared messages are easily assigned to other POINTs to simplify POINT setup and maintenance.

Frequencies Tab

The **POINT Properties** screen's **Frequencies** tab allows you to re-apply previously defined **Frequency Sets**, or configure a new fault **Frequency Set** to attach to the current POINT.

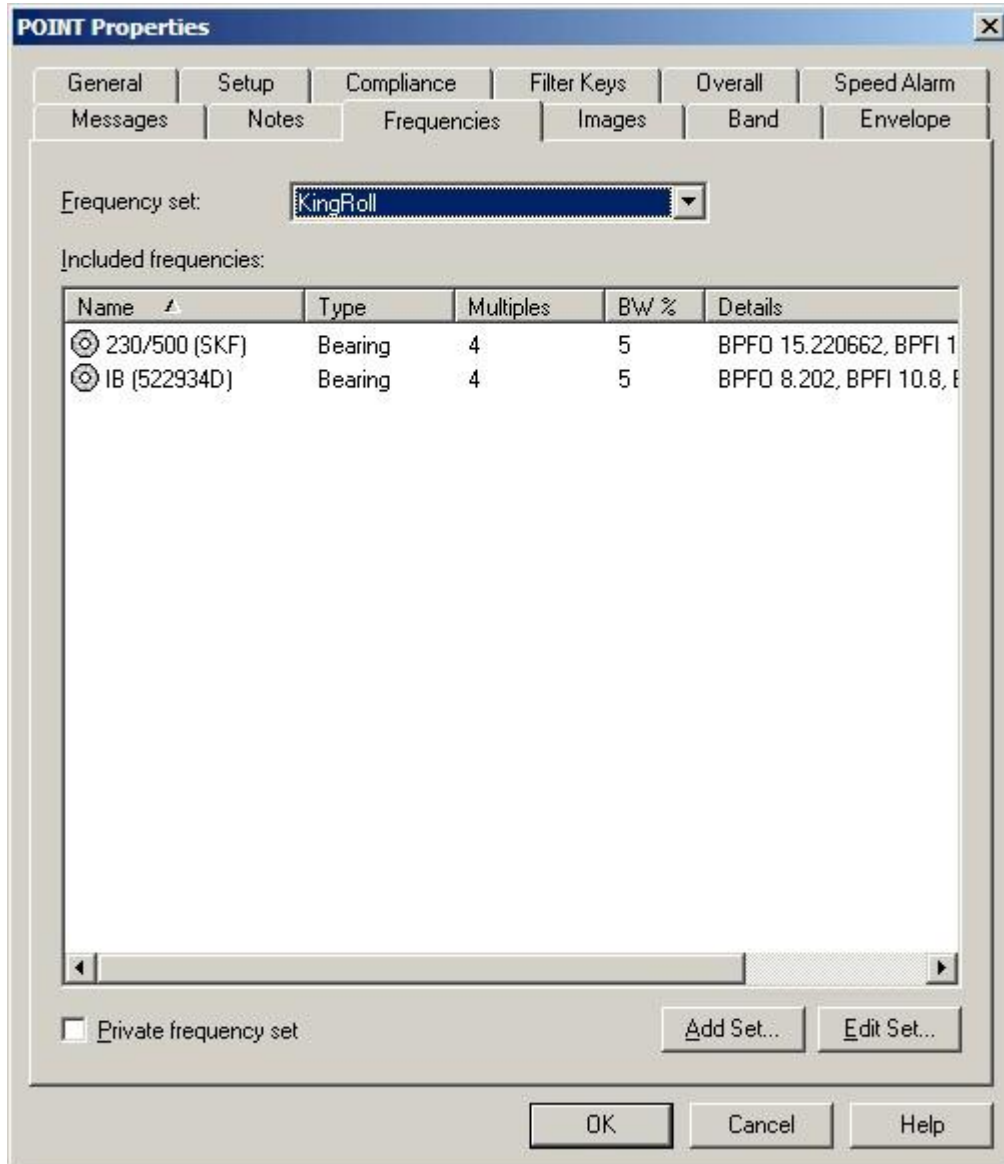


Figure 2 - 30.
The **POINT Properties** Screen's **Frequencies** Tab.

You can select a frequency shared with other POINTs or create a private frequency set for use with the current POINT *only*.

To assign a shared frequency set to the current POINT:

- Select the shared frequency set from the **Frequency Set** drop down list. The corresponding included frequencies appear in the tab's **Included frequencies** area.
- Click **OK** to assign the selected set to the current POINT.

Use the **Frequency** tab to create a private set for use with the current POINT *only*.

- Check the **Private frequency set** checkbox. **<Private frequencies>** displays in the tab's **Frequency Set** field.
- Click the **Edit Set** button. The **Frequency Sets Editor** dialog opens automatically.
- Complete edits and click **OK**.

The **Frequencies** tab also allows you to create a private set based on an existing shared set. This is convenient when your new frequency set is only slightly different from an existing frequency set.

- When a shared frequency set is made private, changes made to the shared set will not be reflected in private sets.

To edit a shared set for private use:

- Select the shared frequency set you wish to modify from the **Frequency Set** drop down list.
- Click the **Private Frequency** set box. The **Frequency Sets Editor** dialog opens.
- Complete edits and click **OK**.
 - Refer to the **Frequency Sets** section in this chapter for more information on Frequency Sets.

Notes Tab

The **POINT Properties / Notes** tab allows you to attach a text note to the POINT along with a date / time stamp. This feature conveniently stores and records relevant POINT information such as maintenance history.

- Coded notes uploaded from the Microlog for the current Machine display in the **Notes** tab.
- Click the **Notes** tab's **Add** button to add a new note and date / time stamp.
- Click the **Save** button to save edits made to a note.
- Click the **Undo** button to cancel edits made to a note.
- Click the **Remove** button to remove the selected note from the display.

POINT Properties / Notes fields include:

Date – Select the current date from the drop down list.

Time – Select the current time.

The selected date and time appear in the tab's left **Notes** field.

Text – Type in desired note text in the text field.

- Click the tab's **OK** button to save all entries.

HAL Alarms Tab

HAL (harmonic activity locator) alarms provide alert and danger alarms on Harmonic Activity Index (HAI) indicators for designated frequencies. Use the **HAL Alarms** tab to configure HAL alarms for a dynamic measurement POINT.

POINT Properties

Channel: Channel X Copy to All Channels

☐ None

☐ HAL Alarms for all frequencies

☐ Danger High: 8

☐ Alert High: 5

☒ HAL Alarms for individual frequencies

Name	Frequency		Danger		Alert
01B507 (COOPER) BPFI	9.067 x RPM	<input checked="" type="checkbox"/>	8	<input checked="" type="checkbox"/>	5
01B507 (COOPER) BPFO	6.933 x RPM	<input checked="" type="checkbox"/>	8	<input checked="" type="checkbox"/>	5
01B507 (COOPER) BSF	3.683 x RPM	<input checked="" type="checkbox"/>	8	<input checked="" type="checkbox"/>	5
01B507 (COOPER) FTF	0.433 x RPM	<input type="checkbox"/>	8	<input type="checkbox"/>	5
2xRPM	2 x RPM	<input type="checkbox"/>	8	<input type="checkbox"/>	5
3xRPM	3 x RPM	<input type="checkbox"/>	8	<input type="checkbox"/>	5
7414B (SKF) BPFI	6.070011 x RPM	<input checked="" type="checkbox"/>	8	<input checked="" type="checkbox"/>	5
7414B (SKF) BPFO	3.929989 x RPM	<input checked="" type="checkbox"/>	8	<input checked="" type="checkbox"/>	5
7414B (SKF) BSF	1.707838 x RPM	<input checked="" type="checkbox"/>	8	<input checked="" type="checkbox"/>	5.000
7414B (SKF) FTF	0.392999 x RPM	<input type="checkbox"/>	8	<input type="checkbox"/>	5

Copy Paste Copy to All Frequencies

OK Cancel Help

Figure 2 - 31.
HAL Alarms Tab.

If you are working with a multi-channel POINT, first select a **Channel**. Any existing HAL alarm settings that display and any existing or new HAL alarm settings you configure are for the selected **Channel** only.

- At any time, you can click **Copy to All Channels** to apply the selected **Channel**'s settings to all channels.

To exclude all frequencies from HAL alarm analysis on the selected channel:

- Select (mark) the **None** radio button.
 - If no frequencies are defined for the POINT, **None** is the only available option. To associate a frequency set with the POINT, go to the **Frequencies** tab.

To set the same HAL alarms for all frequencies on the selected channel:

- Select (mark) the **HAL Alarms for all frequencies** radio button.
 - At least one frequency must be defined for the POINT before you can select this radio button.
- Select (check) the **Danger High** checkbox and enter a value to represent the HAI value danger alarm threshold. Any calculated HAI values for any of the frequencies on this channel that are greater than or equal to the value entered will trigger a danger alarm.
 - The default value is “8.”
- Select (check) the **Alert High** checkbox and enter a value to represent the HAI value alert alarm threshold. Any calculated HAI values for any of the frequencies on this channel that are greater than or equal to the value entered but less than the **Danger High** threshold value will trigger an alert alarm.
 - The default value is “5.”

To set HAL alarms individually per frequency on the selected channel:

- Select (mark) the **HAL Alarms for individual frequencies** radio button.
 - At least one frequency must be defined for the POINT before you can select this radio button.

Each row in the grid represents an individual frequency on the selected channel and contains the **Name** assigned to the frequency, the **Frequency** value itself, the **Danger** alarm threshold, and the **Alert** alarm threshold.

- Select (check) a row's **Danger** checkbox and enter a value to represent the HAI value danger alarm threshold for the frequency. Any calculated HAI value for this frequency on this channel that is greater than or equal to the value entered will trigger a danger alarm.
- Select (check) a row's **Alert** checkbox and enter a value to represent the HAI value alert alarm threshold for the frequency. Any calculated HAI value for this frequency on this channel that is greater than or equal to the value entered but less than the frequency's **Danger** threshold value will trigger an alert alarm.

To copy one frequency's HAL alarm settings to other individual frequencies on a channel:

- Select the entire source frequency row and click **Copy**.
- Select the entire destination frequency row and click **Paste**.
 - To copy the source frequency's thresholds to all frequencies on this channel, click **Copy to All Frequencies** instead of **Paste**.
- If you wish to disable an alarm for any frequency, deselect (uncheck) the appropriate checkbox.

If you are working with a multi-channel POINT, select each **Channel** and proceed with any of the appropriate steps described above. When you click **OK** to save all changes on the POINT Properties screen, the system saves all settings you have configured or updated for each applicable channel on this tab.

Contribution Tab

To configure the combination contribution bar chart and profile plot display, the **POINT Properties** provides the **Contribution** tab. The list of frequencies presented on the **Contribution** tab is always based on the frequencies currently associated with the POINT on the **Frequency** tab. Any frequency types that are not supported on the **Contribution** plot are excluded from the **Contribution** tab. The **Contribution** tab displays two types of frequencies:

- Frequencies from bearings
- Non-bearing RPM multiple frequencies
 - Unsupported frequencies are: Non-bearing Constant, Non-bearing Offset and Non-bearing Sideband

Use the **Contribution** tab to choose which frequencies to include in the contribution bar graph and roundness profile plot display, as well as to select an external source to use as the **Speed Reference**.

Important! Upon opening, the Contribution tab list of frequencies will update to match changes made to the Frequency tab list. If frequencies from bearings or non-bearing RPM-multiple frequencies were edited on the Frequencies tab, the list on the Contribution tab will update to match those changes. Any frequencies of the relevant types (from bearings or Non-bearing RPM multiple frequencies) that were deleted are removed from the Contribution tab list. Any frequencies of the relevant types that were added are also added to the Contribution tab list. They are set to their default settings: unchecked, with the speed reference set to the current point.

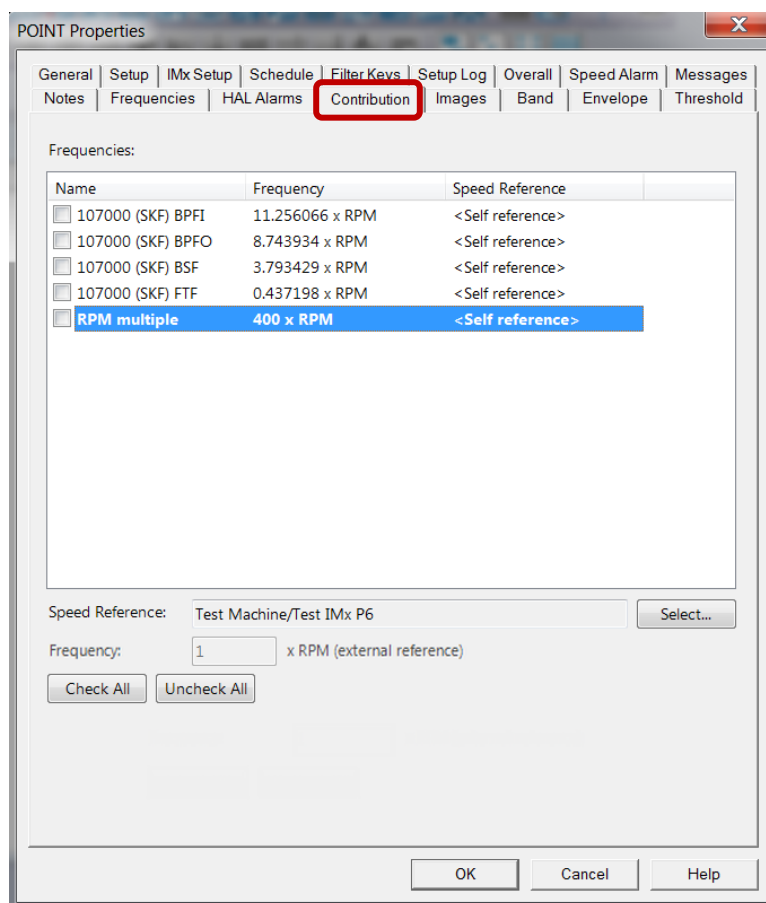


Figure 2 - 32.
POINT Properties, Contribution Tab.

The columns and features on the **Contribution** tab are described below:

Name – If the checkbox in the **Name** column is selected, that frequency will be displayed in the POINT's contribution bar graph and roundness profile plot display. Click **Check All** to select and include all the frequencies. Click **Uncheck All** to deselect all the frequencies.

Frequency – This column displays the frequency as $\langle F \rangle \times \text{RPM}$. The value of F depends on the frequency type, the **Speed reference** and **Frequency: $\langle \text{value} \rangle \times \text{RPM}$ (external reference)** values. If the frequency is for a bearing, the numeric value substituted for F will be the Fundamental frequency for the row (for example, BPFO, BPFI etc.).

- Bearing frequencies do not support external **Speed References** or **Frequency: $\langle \text{value} \rangle \times \text{RPM}$ (external reference)** values.

Speed Reference – Each frequency has its own speed reference. The default speed reference is the current POINT itself, shown in the column as $\langle \text{Self reference} \rangle$. If the frequency is for a non-bearing RPM multiple and no external speed reference is set, F is the value of the **Frequency formula** of the row.

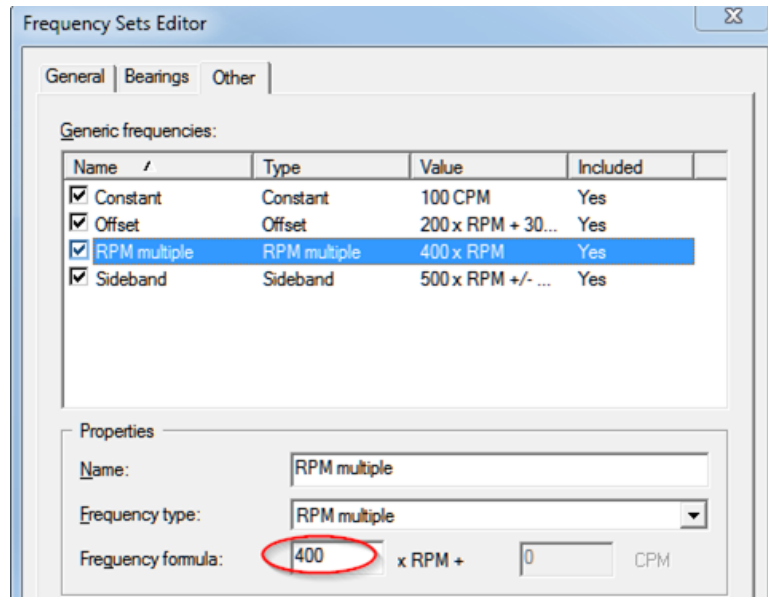


Figure 2 - 33.

Frequency Sets Editor > Other Tab, Frequency Formula Field.

The speed reference value for a non-bearing RPM multiple frequency can be changed to an external speed reference (for example, a tachometer signal), as detailed in the procedure below.

To change the speed reference POINT for the selected frequency:

- Highlight the frequency you want to modify. The **Speed Reference** field displays the speed reference point that will be used to derive the speed for calculations made in contribution graphs for this point.
- Click the “**Select...**” button. The **POINT Selection** dialog opens.

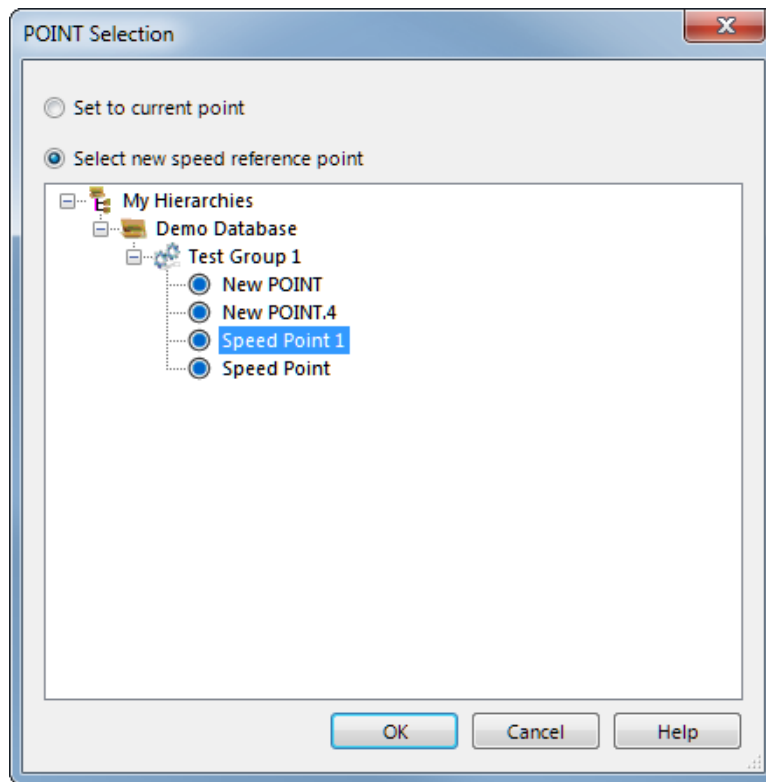


Figure 2 - 34.

POINT Selection Dialog for Selecting a New Speed Reference Point.

If the speed reference for the current frequency is set to the default, the **Set to current point** option button will be selected and the machine for the current POINT will be displayed in the item hierarchy presented.

- Select the option button **Select new speed reference point**.
- Browse to the POINT in the hierarchy that you want to use as the speed reference. (See the section *About Speed References*, below.)
- When the correct POINT is highlighted, click **OK**.
 - To return the speed reference to its default, select the option button **Set to current point**, and then press **OK**.

You are returned to the **Contribution** tab. The new reference for the selected row displays in the **Speed Reference** field as "<Machine>/<Point>".

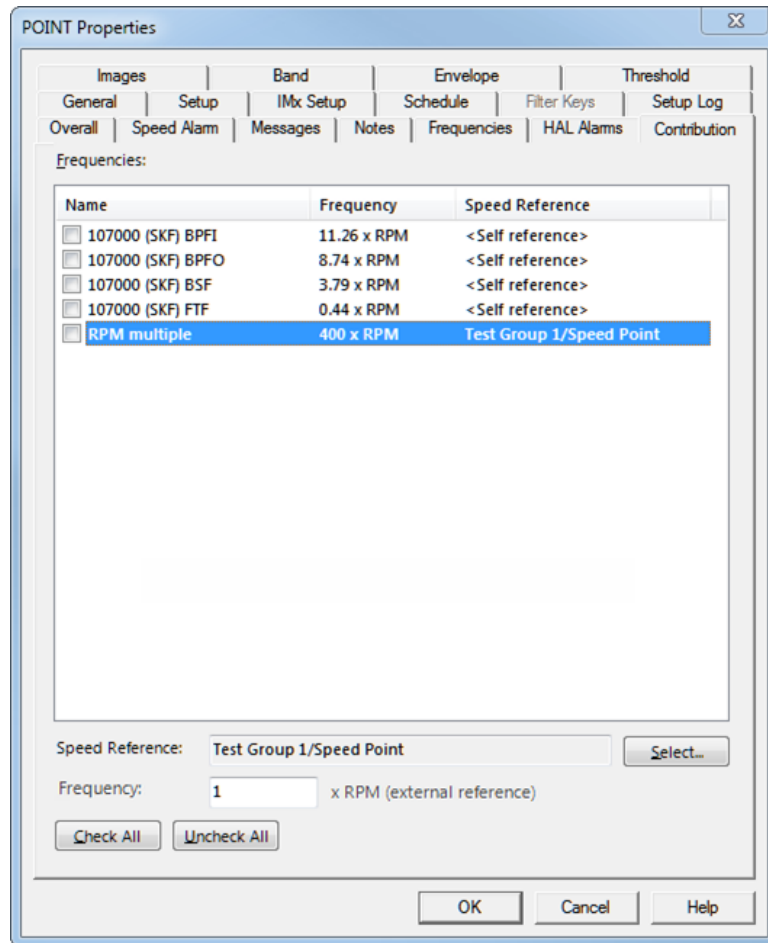


Figure 2 - 35.
Contribution Tab Showing One External Speed Reference.

Frequency: <value> x RPM (external reference) is enabled when the selected row is using an external speed reference. The **Frequency: <value> x RPM (external reference)** value is used in conjunction with the frequency to calculate the speed for the frequency on the Contribution plot. The default value is 1.0. Enter the **Frequency: <value> x RPM (external reference)** value.

- If the **Frequency: <value> x RPM (external reference)** value is *not* 1.0, *F* is the value of the **Frequency: <value> x RPM (external reference)** field.
- If the **Frequency: <value> x RPM (external reference)** is 1.0, *F* is the value of the Frequency formula of the row (the same as no external reference).
- If the speed reference is set back by using the **Set to current point** option button, then the **Frequency: <value> x RPM (external reference)** returns to its default value of 1.0.

OK – Click **OK** to save changes. Settings changed on the **Contribution** tab are saved only when one of the following conditions is met:

- At least one frequency is checked, or
- At least one **Speed Reference** or **Frequency: <value> x RPM (external reference)** value is set to something other than the default.

More about Speed References

Valid speed references can be any POINT (static or dynamic). For static measurements, the overall value is to be taken as the speed reference. For dynamic measurements which are speed stamped, the speed stamp will be used as the external reference. OPC provided speeds, as well as MODBUS provided speeds, are also supported.

The date/time stamp (DTS) of the incoming measurement and DTS of the tachometer/speed reference must be within a user-defined window of time (in seconds) or else a warning message will be displayed on the Contribution plot. The message states: Speed reference out of range.

The initial size of this window is set in a pair of Plot preferences: Speed Reference Time Window (Unit) and Speed Reference Time Window (Value). Go to **Customize > Preferences > Plot** tab to set these preferences.

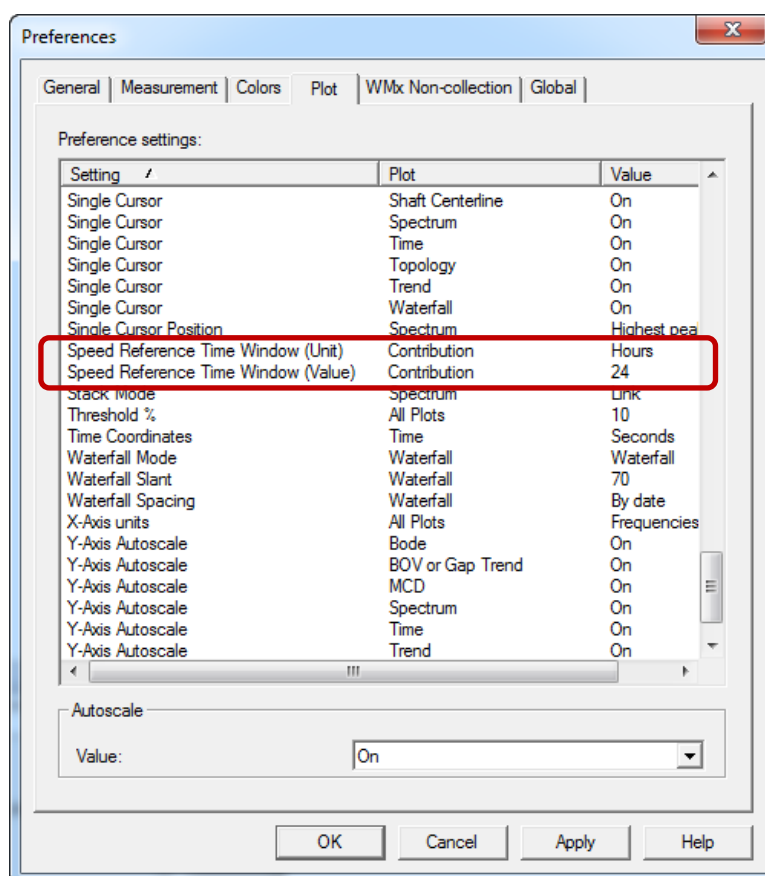


Figure 2 - 36.
Contribution Plot Preferences for Speed Reference Time Window.

You can change the Speed Reference Time Window values from within the Contribution plot by right-clicking to open the context menu. Select **Settings** to open the **Contribution Plot Settings** dialog. The default is 24 hours; the maximum is 48 hours.

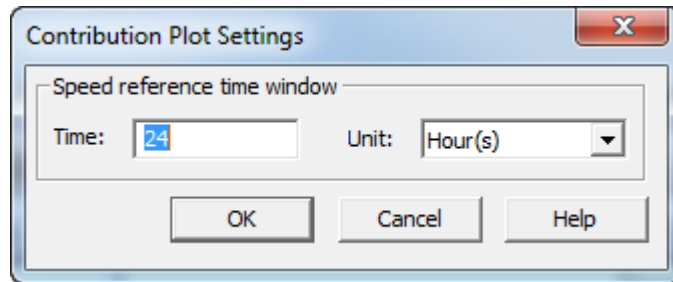


Figure 2 - 37.
Contribution Plot Settings Dialog.

Images Tab

Scanned photographs or digital images can be added to a particular POINT, stored in the hierarchy, and viewed from the **Images** tab. Images help identify SETs / machines, organize similar equipment, and document known defects.

POINT Properties / Images fields include:

Image – All attached images display in the drop down list.

Description – Enter text to identify the image. Click the **Save** button to save your description entry. If saved, the new description replaces the filename in the **Images** list.

To add a new image:

- Click the **Add** button to add a new image. The Windows' **Open** dialog displays. Select desired image and click **Open** to add or **Cancel** to undo.
 - Added images use the filename as the default description.

To replace the current image file with a newer image:

- Click the **Browse** button.
- Select a replacement image file. The new image displays on the tab.
 - The image name and description of the old image are retained for the replacement image.
- Click **Save** to confirm the image replacement.
- Click **Cancel** to undo the image replacement.

To export an image to a specific location:

- Select the image to export.
- Click the **Export** button.
- When prompted, enter the desired export location and filename and click **OK**.

The image is copied and saved to the specified location, but still remains attached to the assigned POINT.

Baseline Tab

A **Baseline** is a measurement taken when the machine is in “known good” operating condition. Baseline spectra are used for analysis comparison with future spectral measurement results.

- The **POINT Properties / Baseline** tab is available only when the current POINT has stored spectral data. If there is no collected FFT data, or the POINT type does not support FFT data, the **Baseline** tab does not appear.

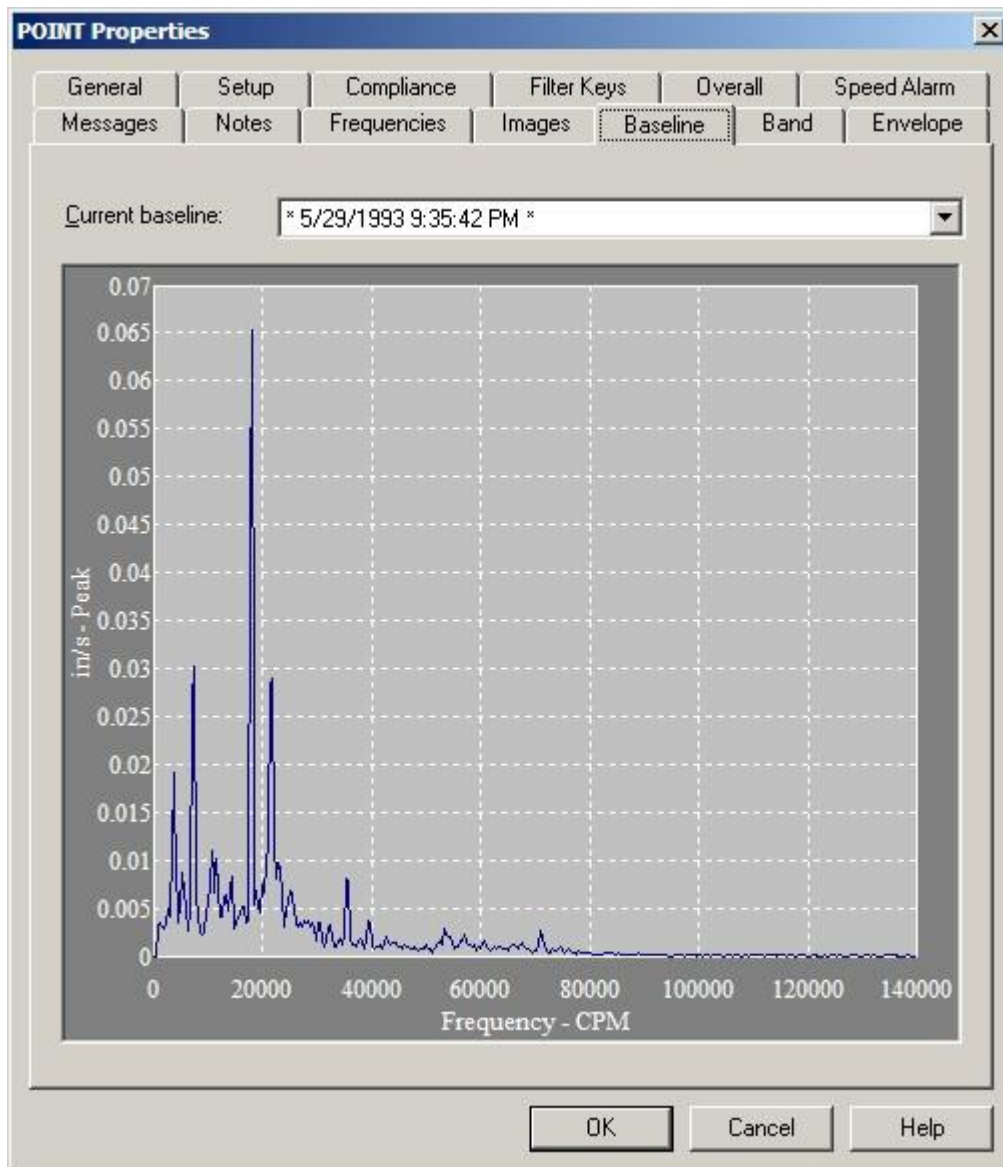


Figure 2 - 38.
The **POINT Properties** Tab's **Baseline** Tab.

To specify a POINT's baseline spectrum:

- Select the POINT in the hierarchy list.
- Right-click to display the POINT's context menu and select the **Properties** option. The **POINT Properties** tab displays.
- Select the **Baseline** tab.

Current Baseline

The **Current baseline** field lists measurement record timestamps for the POINT's stored measurements. Click to specify the measurement to use as the baseline spectrum. The specified measurement's spectrum displays graphically in the tab's lower area.

- A **No baseline** option appears in the drop down list as the default, and to clear the current baseline selection.
- In the drop down list, the assigned baseline is tagged for easy recognition.

All measurements with FFT data for the current POINT appear with a time / date stamp in the **Current Baseline** drop down list. The last assigned baseline is tagged for easy recognition. The current baseline value is indicated by " ___ date / ___ time" in the **Current baseline** field.

Phase Tab

- This tab is available only if the POINT has stored phase data.

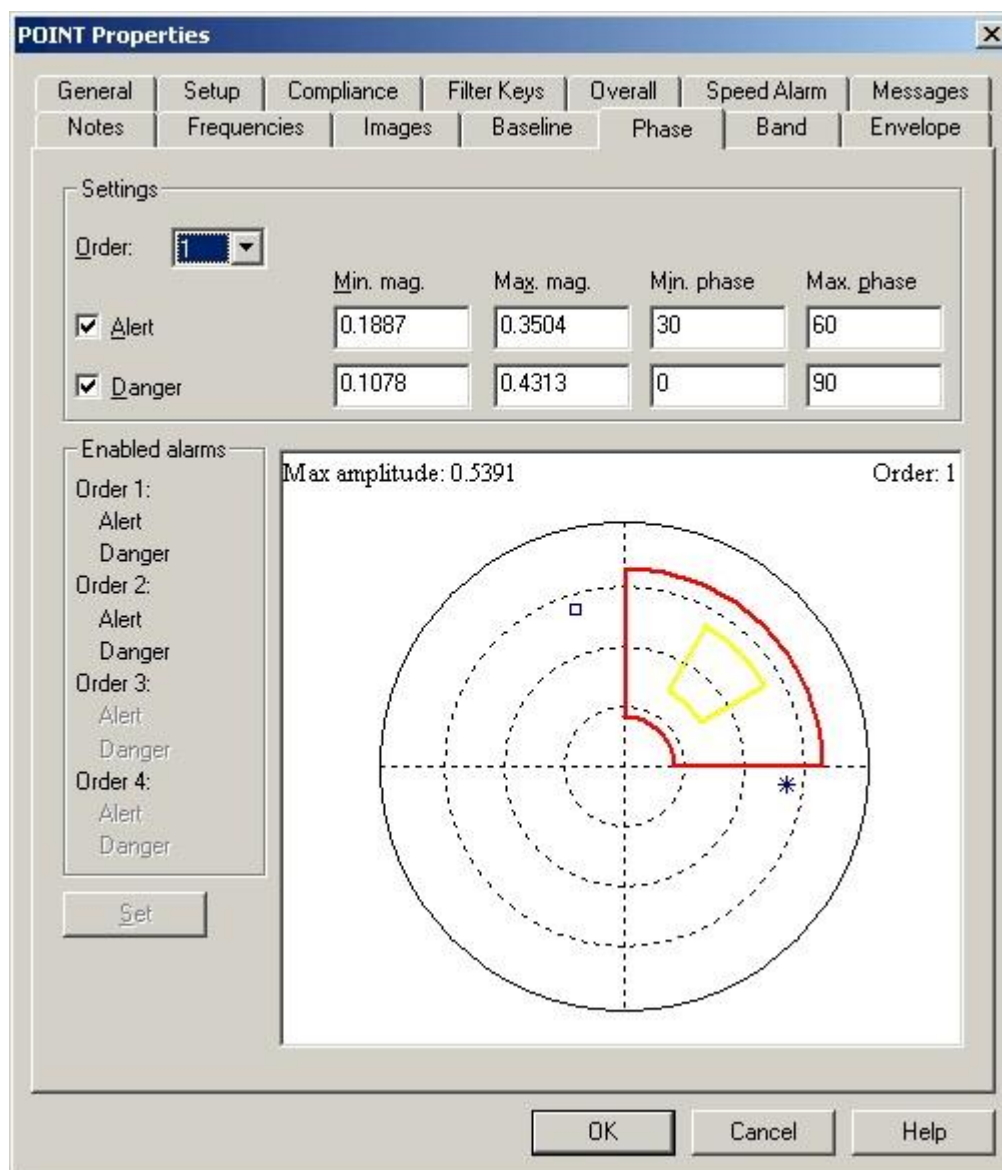


Figure 2 - 39.
The **POINT Properties** Screen's **Phase** Tab.

Polar vector plots show vibration amplitude and phase. The phase angle is the angle the shaft travels from the start of a triggering event to when the point at which the sensor experiences maximum positive force. This relationship provides valuable information on shaft orbit and shaft position and is used for analysis, balancing, and shaft orbital analysis.

The **POINT Properties** / **Phase** tab set up area specifies polar vector alarm settings, and provides a graphical display of the defined alert and danger acceptance regions.

Orders are multiples of running speed. Use the **Order** drop down list box to assign new acceptance regions to a specific order of the phase measurement (1X, 2X, 3X, 4X).

Alert / Danger alarm fields

- Click the **Alert** or **Danger** checkbox to enable set-up of an alert or danger acceptance region.
- Use text box operations to enter **Min Mag.**, **Max Mag.**, **Min Phase**, and **Max Phase** polar vector settings.

A summary of **Enabled alarms** displays vertically in the tab's lower left column. Alarm settings may also be defined graphically with drag and drop operations.

To define graphically:

- Move the mouse cursor over the line to be modified.
- Depress and hold the left mouse button and drag the line to its new location before releasing the mouse button.
- Click the **SET** button to apply alarm settings.

Band Tab

Band Alarms provide alert and danger alarms on both peak and spectral values within a defined frequency band. Use the **Band** tab to **Add** new band alarms for the POINT, or **Load** existing "shared" band alarms for the POINT.

- Loaded band alarms may not be edited from this tab. Use the **Customize** menu's **Alarm Hierarchy** option to edit "shared" alarm parameters.

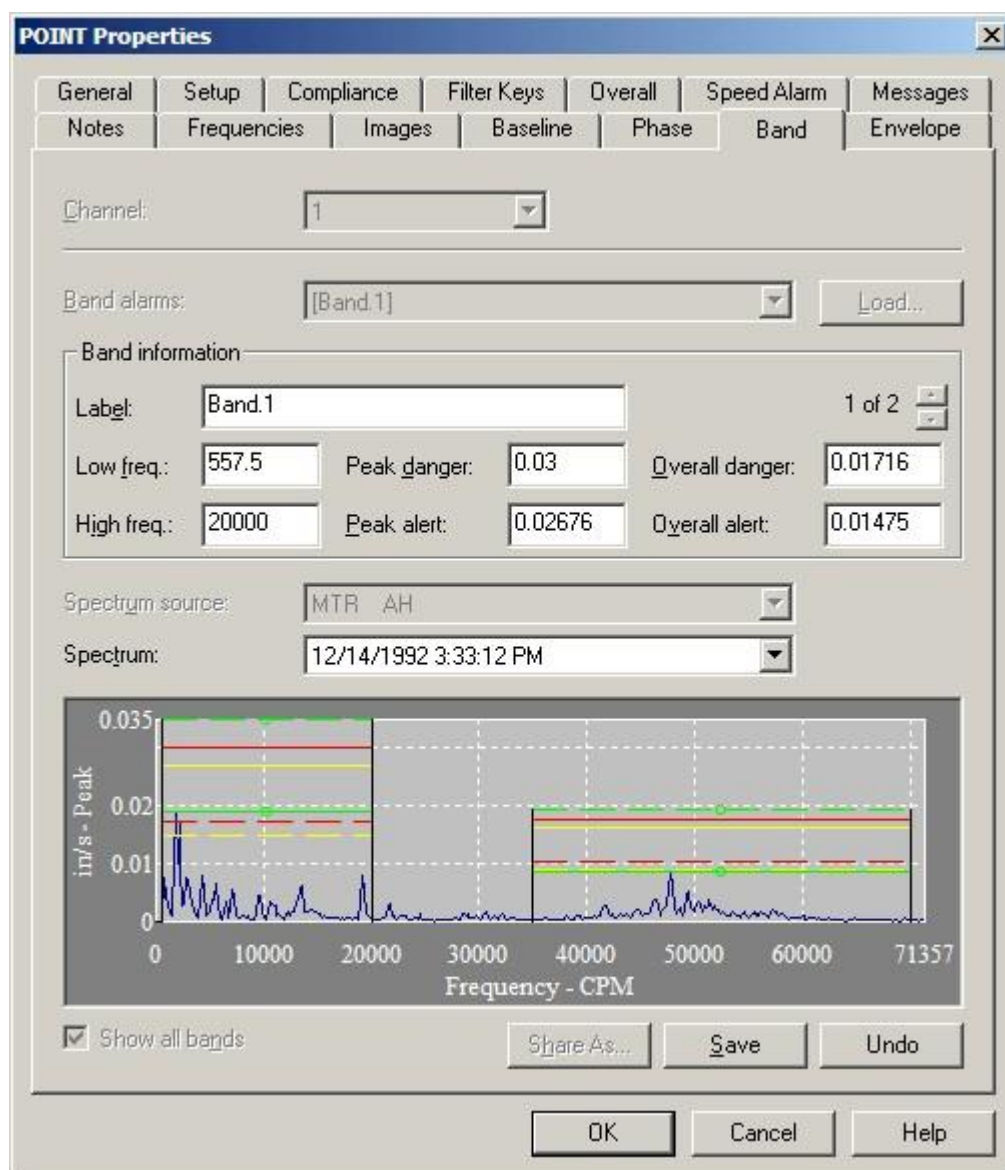


Figure 2 - 40.
The **POINT Properties** Screen's **Band** Tab.

The **Channel** drop down list displays all available channels. Specify the channel to which to apply the band alarm, or click **Set All**, to apply the alarm to all available channels.

The current band alarm name appears in the **Band alarms** field. All available band alarms are listed in the drop down list.

To Load "shared" alarms to the selected POINT:

- Click the **Band** tab's **Load** button, the **Load Band Alarms** dialog displays all available shared band alarms by name. Enable all band alarms to assign to the POINT and click **OK**. The names of the enabled band alarms appear in the **Band** tab's **Band Alarms** drop down list.

To Add a new band alarm for the POINT:

- You may mix added band alarms with loaded band alarms. However, only added band alarms may be edited from this tab.
- Click the **Band** tab's **Add** button, the tab's **Band Information** fields become available.

Edit and view alarm values in the tab's **Band information** area. The band name appears in the **Label** field.

The following fields are available for viewing set values or editing:

Label – Enter band name.

Low freq – View or edit the low frequency value or multiple of running speed.

High freq – View or edit the high frequency value or multiple of running speed.

- In **Low** and **High Frequency** fields, you may specify a multiple of running speed by adding **x** to the end of the number. For example, enter "1.5x" for 1.5 times running speed.

Peak danger – View or edit the peak danger value or % Full Scale value.

Peak alert – View or edit the peak alert danger value or % Full Scale value.

- In **Peak** and **Overall** alarm fields, you may specify the alarm setpoint as a percentage of full scale by adding "%" to the end of the entered number. For example, enter "10%" to set the alarm at 10 percent of the full scale value.

Overall danger – View or edit the overall danger value or % Full Scale value.

Overall alert – View or edit the overall alert value or % Full Scale value.

- The tab's spectrum graphic display automatically updates as edits are made.

Edits may be made on the tab's spectrum graphic display.

To edit the band graphically:

Spectrum source - If two or more POINTs are currently active, specify the POINT whose spectrum you wish to graphically display.

Spectrum - using its time record, specify the spectrum measurement to display.

Once the proper spectrum is displayed, specify the band alarm to edit from the **Band Alarms** drop down list. Notice the mouse pointer changes when positioned over a band alarm parameter (line) on the graphic.

- Click on the line of the band to edit and drag the line to its new position. The value in the affected field automatically updates to reflect your setting.
- Use the **Save** or **Undo** buttons to save or undo changes for the *current* band alarm edit. After editing all necessary band alarms, use the tab's **OK** or **Cancel** buttons to save all edited band alarms with the POINT, or cancel all edited and new band alarm efforts.

The total number of band alarms appears in the upper right corner of the tab's **Band information** area. Use the up and down arrow buttons to navigate between band alarms.

- Click the **Show all bands** checkbox to display all available band alarms on the spectrum display. The checkbox is not available when editing a band.
- Click **Share As** to make the current band alarm a shared alarm. The **Enter Name** dialog displays. Enter a name and click **OK**.
- Click **Add** to create a new band alarm.
- Click **Remove** to remove the current band alarm. A confirmation dialog displays.
- Confirm action. The band alarm is deleted.
 - A band alarm may not be removed if it is currently assigned.

Load Band Alarms

Use the **Load Band Alarms** dialog to select shared band alarm(s) for the active POINT. All available shared band alarms display.

- Click the checkbox to select alarm(s) to be included / assigned to the active POINT.
- Click **OK** to select, **Cancel** to close dialog without saving selections.
 - You may sort the available shared alarms by band alarm name, inclusion status (included or excluded), or frequency range.

Envelope Tab

Use the **POINT Properties' Envelope** tab to specify a "total spectrum" envelope alarm for the POINT. You can select from a list of previously created envelope alarms or edit a private (unique) alarm for the current POINT.

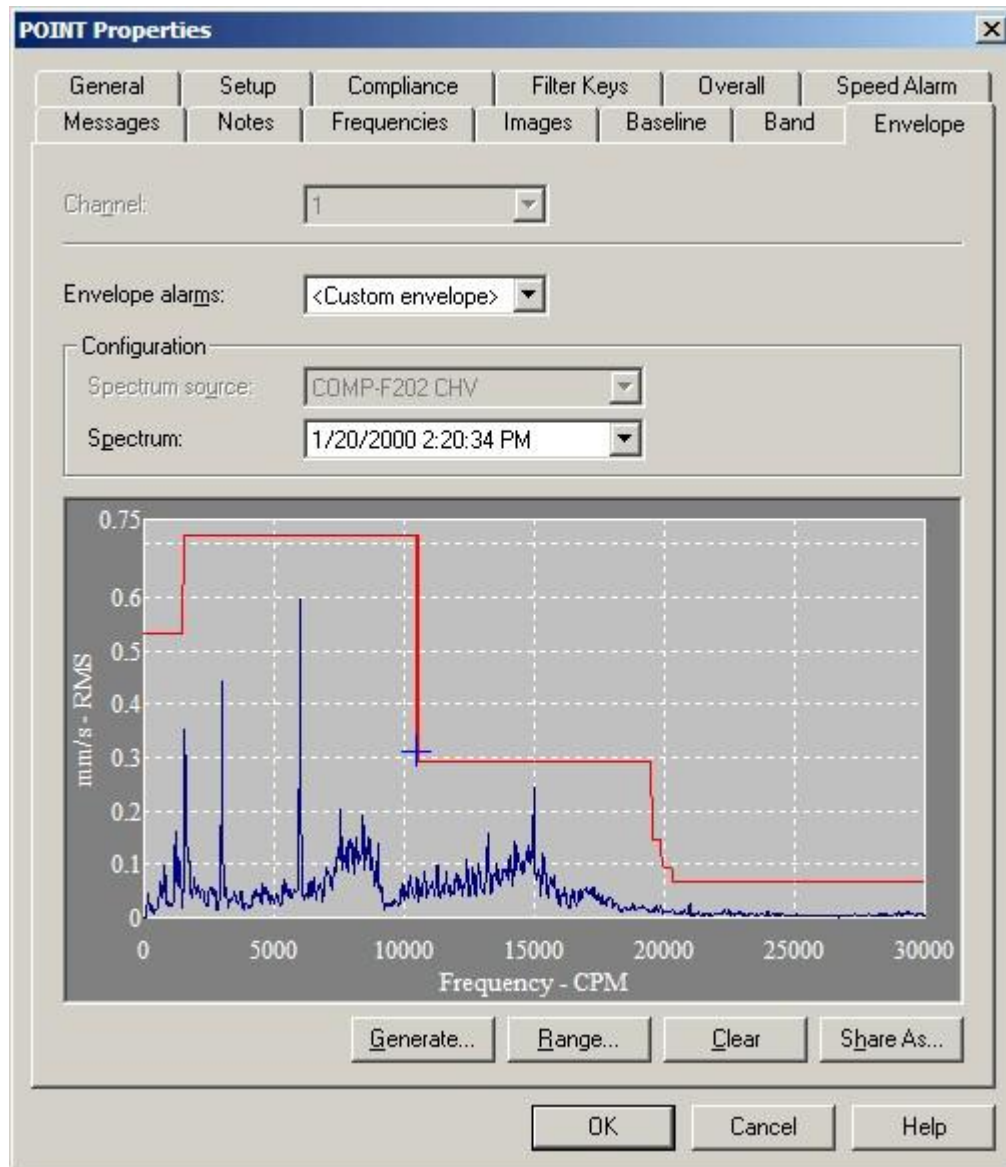


Figure 2 - 41.
The **POINT Properties** Screen's **Envelope** Tab.

The **Channel** drop down list displays all available channels. Specify the channel to which to apply the envelope alarm, or click **Set All**, to apply the alarm to all available channels.

All available envelope **alarms** display in the Envelope alarm drop down list, or you may Generate a new envelope alarm.

Shared envelope alarms may not be edited from this tab (use the Customize menu's Alarm Hierarchy option to edit "shared" alarm parameters).

- First, select the FFT spectrum to which the envelope alarm will conform, using:

Spectrum source – specifies from which POINT to graphically display the spectrum if two or more POINTs are currently active.

Spectrum – displays all available time record measurements for the active POINT (typically the baseline measurement) in a drop down list. The current spectrum displays graphically below.

To assign a "shared" envelope alarm to the POINT:

- On the **Envelope** tab, select the desired shared envelope alarm's name from the **Envelope Alarms** drop down list, the tab fields display the specified alarm's settings and the specified envelope appears on the displayed spectrum.

To Generate a new envelope alarm for the POINT:

- Select the **Envelope Alarms** drop down list's **<Custom envelope>** option.
- Click the **Generate** button. The **Generate Envelope Alarm** dialog displays.

Use the **Generate Envelope Alarm** Dialog to create an envelope alarm based on your entered values.

% Overdrive – Enter the percent of the POINT's full scale value to determine the height of the envelope alarm above the spectral peak. The smaller the number specified, the tighter the comparison envelope conforms to the designated spectrum.

Spreading % – Enter percent of full scale (or center frequency) to increase the width of the envelope alarm around spectral peaks. The smaller the number specified, the tighter the envelope conforms to the sides of the peaks in the specified spectrum.

Spreading Type – (either **Center Frequency** or **Full Scale**). If **Center Freq.** is selected, the bandwidth about each center frequency increases with higher frequencies. If **Full Scale** is selected, the bandwidth about each center frequency is constant, based on a percent of the full scale frequency.

Threshold – Enter % of the POINT's full scale value, or an absolute value. The threshold value provides an opportunity to eliminate false alarms due to vibration "noise." It also establishes the envelope alarm's low amplitude "threshold" on the displayed spectrum. The envelope alarm conforms around all peaks whose amplitudes are higher than the established threshold as per the **Overdrive %**, **Spreading %**, and **Spreading Type** settings. All peaks below the established threshold are ignored by the envelope alarm. The **Threshold %** default value is set using the **Customize** menu's **Preferences / Plot** tab.

- Click **OK** to generate an envelope alarm based on your entries. Click **Cancel** to close the dialog without creating an envelope alarm.

Editing the Envelope Alarm

After you have generated an envelope alarm, you can edit it graphically using your mouse, or enter numeric envelope parameters using the **Set Frequency Range** dialog.

To graphically edit the envelope alarm:

- Click anywhere inside the **Envelope** dialog's spectrum window. The cursor appears as an up arrow.
- Click the mouse on the portion of the envelope alarm line to be edited. A square icon identifies where the line will be drawn.

- Drag the mouse to draw the line to create the new envelope alarm.
- Click the dialog's **OK** button to save your changes.

Tip - You can use your keyboard's Insert key to begin drawing the envelope alarm line. Then, use the arrow keys to move the line, and the Insert key again to stop drawing the line. Refer to **Section 1 - Appendix B - SKF @ptitude Analyst Keyboard Support** for more information on using your keyboard to edit your envelope alarm.

To edit the envelope alarm using numeric frequency ranges:

- Click the **Set Range** button. The **Set Frequency Range** dialog displays.
- Use the **Set Frequency Range** dialog to enter low frequency, high frequency, and level values to edit an existing envelope alarm.

To numerically edit an envelope alarm:

- Enter the desired low frequency, high frequency, and level value.
- Click **OK**. The displayed envelope alarm automatically conforms to your entries.

Share As

- Click **Share As** to make the envelope alarm a shared alarm. The **Enter Name** dialog displays.
- After completing the POINT's envelope alarm setup, click the **OK** button to save the envelope alarm with the POINT.

Waveform Tab

When analyzing orbit data, it is desirable to filter out impurities in the shaft. This can be accomplished by capturing a waveform measurement when the shaft is rotating very slowly (1 – 400 RPM). This “slow roll” waveform highlights the normal variances in the rotation of the shaft, which can then be factored out when viewing orbit plots.

The **Waveform** tab in **POINT Properties** lets you select the desired waveform measurement.

- The **POINT Properties / Waveform** tab is available only when the current POINT has stored data. If there is no collected data, or the POINT type is not Orbit / SCL, the **Waveform** tab does not appear.

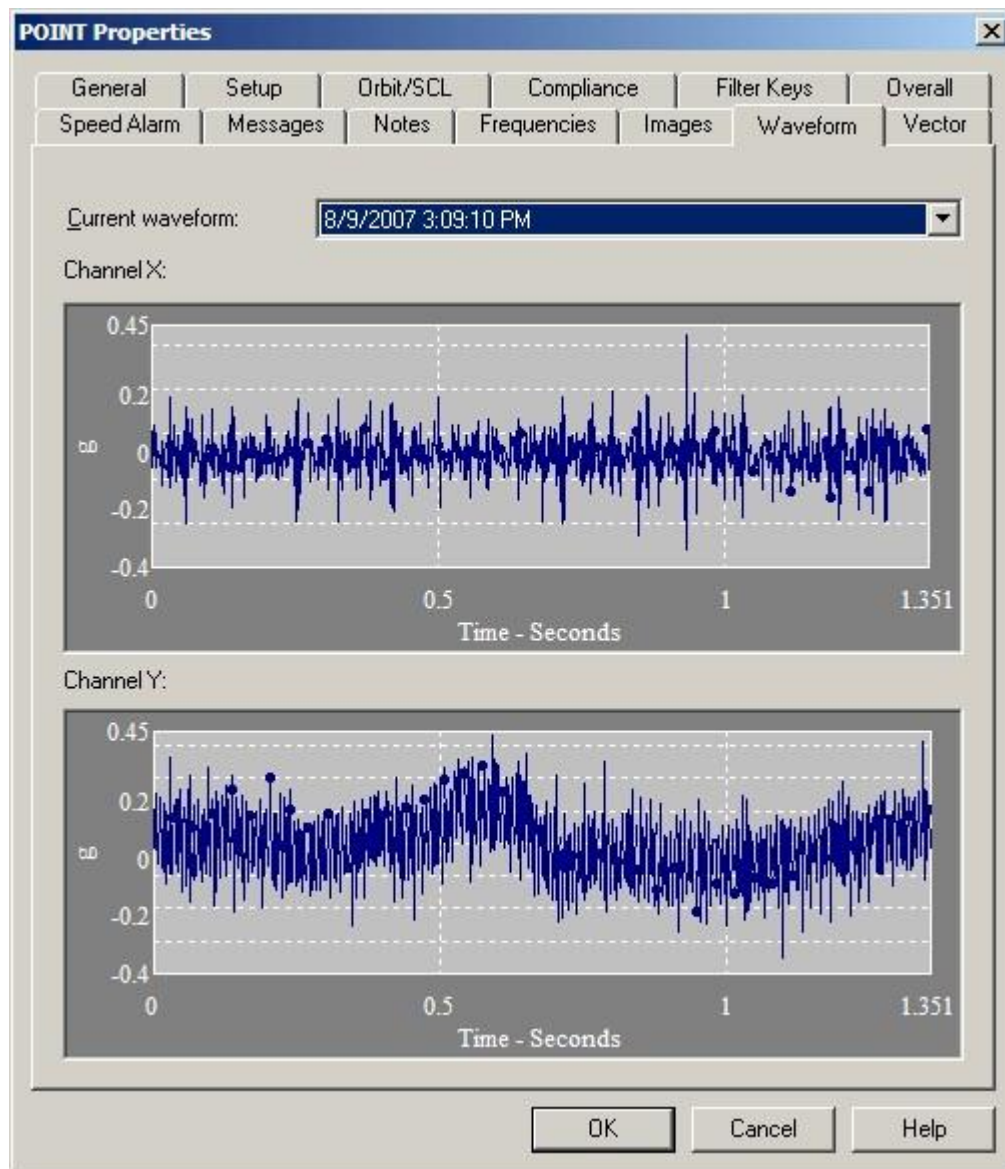


Figure 2 - 42.
The **POINT Properties** Screen's **Waveform** Tab.

To specify a POINT's waveform measurement:

- Select the POINT in the hierarchy list.
- Right-click to display the POINT's context menu and select the **Properties** option. The **POINT Properties** screen displays.
- Select the **Waveform** tab.

Current Waveform

The **Current Waveform** field lists measurement record timestamps for the POINT's stored measurements. Click to specify the measurement to use as the slow roll waveform. The specified measurement's time waveforms display graphically in the tab's lower area.

- A **<No waveform>** option appears in the drop down list as the default, and to clear the current waveform selection.

Vector Tab

When analyzing orbit data, orbit plots utilize a vector containing the magnitude and phase angle. Vector compensation allows you to specify known magnitude and phase angle values that represent inherent impurities in the shaft. These values are used in orbit plots to subtract out these known impurities.

- Vector compensation is applied based on the **Orbit Compensation** setting in **Plot Preferences**.
- The vector settings are also used with Bode and Nyquist plots.

The **Vector** tab in **POINT Properties** lets you enter the magnitude and angle that should be used to compensate orbit plots for Channel X and Channel Y at 1X, 2X, and 3X machine running speed.

- If the POINT type is not Orbit / SCL, the **Vector** tab does not appear.

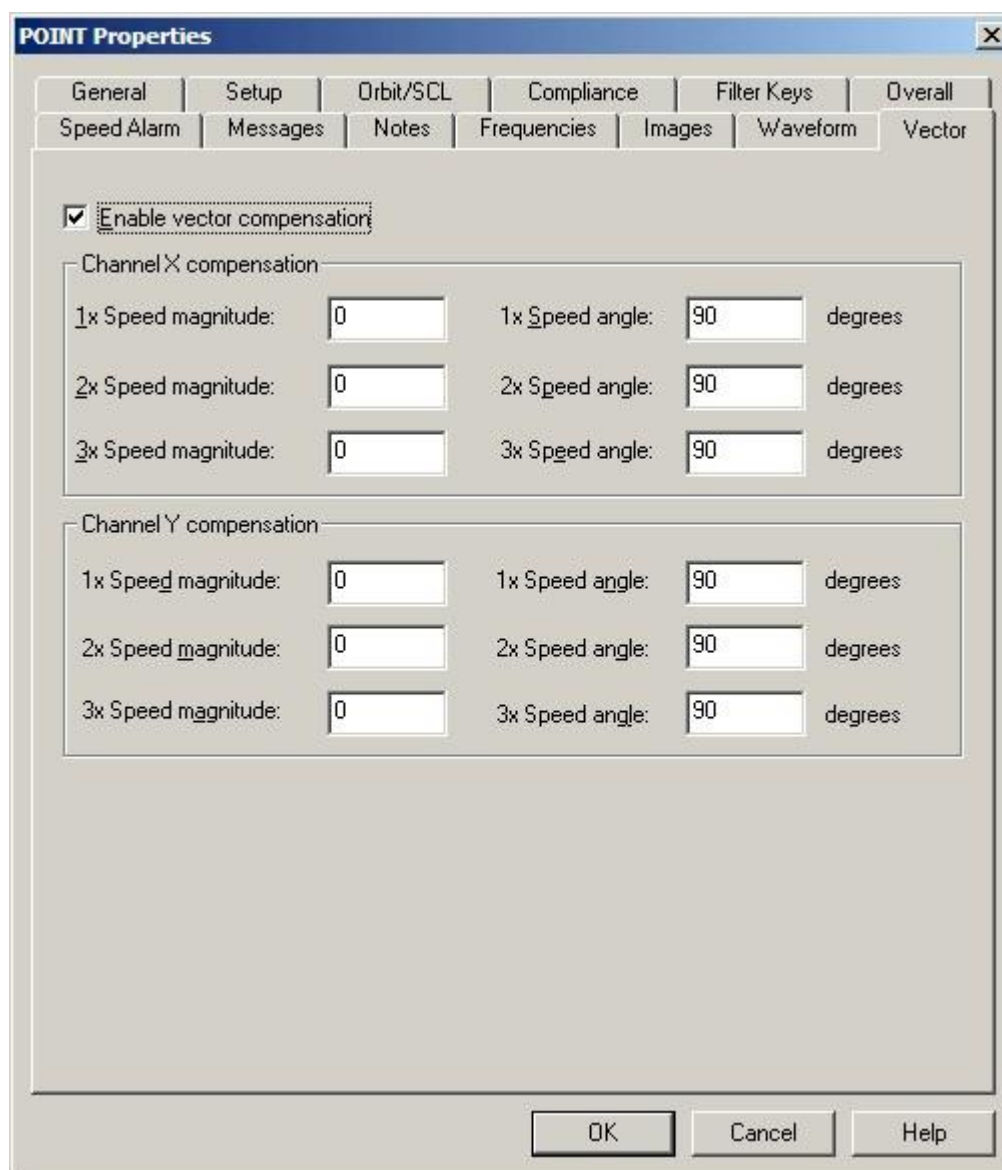


Figure 2 - 43.
The **POINT Properties** Screen's **Vector** Tab.

To specify a POINT's vector compensation settings:

- Select the POINT in the hierarchy list.
- Right-click to display the POINT's context menu and select the **Properties** option. The **POINT Properties** screen displays.
- Select the **Vector** tab.

Enable vector compensation – Mark this check box to enable the fields on this tab. If this is unmarked, no vector compensation is performed for the POINT.

- Vector compensation is applied to the measurement as it is stored to the database. Marking this check box only affects new

measurements. Vector compensation will not be available for any measurements that were taken with this check box unmarked.

- The General Preferences **Angular Axis View** setting specifies whether to use Scientific or Standard mode when determining the 0° reference point to define probe placement. This setting should be taken into account when entering your compensation angles.

Channel X and Y compensation – The vector compensation settings that should be used in orbit plots for Channel X and Channel Y data, respectively.

magnitude (1X, 2X, and 3X Speed) – The magnitude of the vector that should be factored out of orbit plots at 1X, 2X, and 3X the machine running speed.

angle (1X, 2x, and 3X Speed) – The phase angle, in degrees, of the vector that should be factored out of orbit plots at 1X, 2X, and 3X the machine running speed.

- The **magnitude** and **angle** settings together define the vector.

POINT Setup Validation Dialog

The **POINT Setup Validation** dialog launches when you enter incompatible or erroneous information on the **Setup** or **Expressions** tabs.

The **POINT Setup Validation** dialog displays both errors and recommendations. For recommendations, a message box displays prior to the **POINT Setup Validation** dialog, which allows you to ignore or view the **POINT Setup Validation** dialog.



Figure 2 - 44.

The POINT Setup Validation Recommendation Message Box.

- If you do not wish to see the POINT Setup Validation Message Box for recommendations or warnings, uncheck and disable the **Show this message box again** checkbox.
 - You may also modify this preference from the **Customize** menu's **Preferences** screen.
- Press **Yes** to view the **POINT Setup Validation** dialog.
 - Press **No** if you wish to close the message box without viewing the recommendation details.

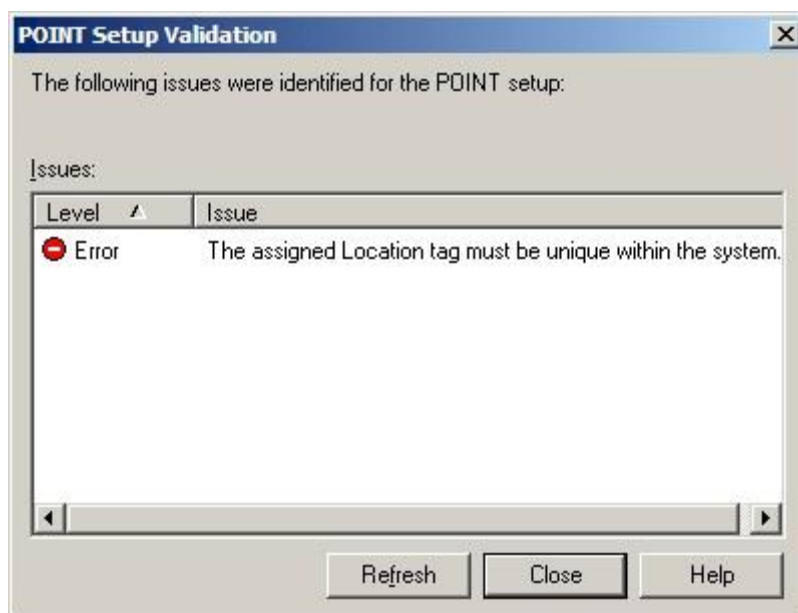


Figure 2 - 45.
The **POINT Setup Validation** Dialog for the **Setup** tab.

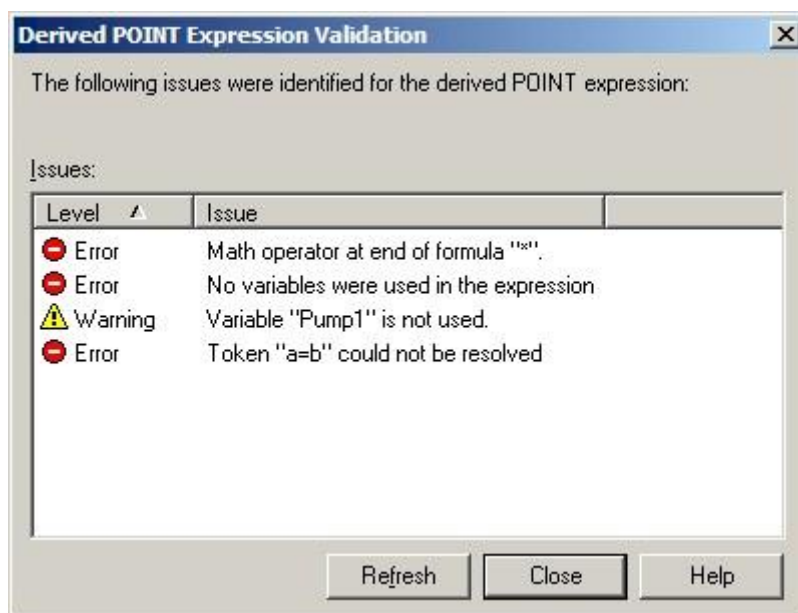


Figure 2 - 46.
The **POINT Setup Validation** Dialog for the **Expressions** tab.

- The **POINT Setup Validation** dialog displays automatically for settings in error, and after the message box for settings that are recommendations or warnings.

You may edit POINT setup information while the **POINT Setup Validation** dialog is displayed. Simply move the dialog out of the way, and make any changes to your **POINT Properties / Setup** or **Expressions** tab while referencing the errors or recommendations.

- Press the **Refresh** button if you have made corrective changes to your **POINT Properties / Setup** or **Expressions** tab in the background. If you have eliminated the error or recommendation, they will no longer display in the **POINT Setup Validation** dialog.
- Press the **Close** button to close the **POINT Setup Validation** dialog and return to the **POINT Properties Setup** or **Expressions** tab.

Multiple POINT Properties

The **Multiple POINT Properties** screen is available when more than one POINT is selected. This screen provides a set of tabs to view and modify set-up parameters common among the set of selected POINTs. The type of POINTs selected determine which tabs display in the **Multiple POINT Properties** screen.

- Configured parameters overwrite each selected POINT's previous settings.

Schedule Tab

The **Schedule** tab allows you to set a common schedule for all the currently selected POINTs.

Fields in the **data collection** portion of the **Schedule** tab include:

Take data every – Enter a numerical value to indicate how often data should be collected and select the appropriate units from list box options (**Second(s)**, **Minute(s)**, **Hour(s)**, **Day(s)**). The POINT is tagged as overdue for data collection if the time range between the current date (today) and the last data collection date is longer than the specified **Take data every** setting.

- The **Take data every** field is used to determine if a POINT is overdue for data collection.

Keep current data for – Enter a value to indicate how long to keep (store) the measurement record in the hierarchy's "current data" bin and select the appropriate units (**Wk(s)**, **Mo(s)**, **Yr(s)**). When the specified time from data collection elapses, and a Scheduled or Monitor archive process is performed, the measurement is typically moved from the "current data" bin into the "short term archive" bin (or discarded) as specified in the **Short term archive / Archive data every** field.

- The **Keep current data for** field determines the length of time a measurement is kept before it is archived.

Short term archive (optional, but typically enabled)

Fields in the **short term archive** section include:

Archive data every – Determines whether data leaving the "current data" bin is archived in the "short term archive" bin. Enter numerical value to indicate how often data leaving the "current data" bin is stored in the "short term archive" bin and select appropriate units (**Wk(s)**, **Mo(s)**, **Yr(s)**). As scheduled archives occur, measurements leaving the "current data" bin are accepted into

the “short term archive” bin only if this **Archive data every** setting has expired since the last measurement was stored in the “short term archive” bin. Otherwise, they are discarded.

Keep archive for – Enter a value to indicate how long to keep (store) the measurement record in the “short term archive” bin and select appropriate units (**Wk(s)**, **Mo(s)**, **Yr(s)**). When the specified time of storage elapses, and a scheduled archive process performed, the measurement is typically moved from the “short term archive” bin into the “long term archive” bin (or discarded) as specified in the **Long term archive** fields.

Fields in the **long term archive** section include:

Archive data every – Determines whether data leaving the “short term archive” bin is archived in the “long term archive” bin. Enter numerical value to indicate how often data leaving the “short term archive” bin is stored in the “long term archive” bin and select appropriate units (**Wk(s)**, **Mo(s)**, **Yr(s)**). As scheduled archives occur, measurements leaving the “short term archive” bin are accepted into the “long term archive” bin if this **Archive data every** setting has expired since the last measurement was stored in the “long term archive” bin.

Keep archive for – Enter value to indicate how long to keep (store) the measurement record in the “long term archive” bin and select appropriate units (**Wk(s)**, **Mo(s)**, **Yr(s)**). When the specified time of storage elapses, and a scheduled archive process is performed, the measurement is discarded.

Unscheduled data

The last section of the tab schedules alarm data. In on-line DAD systems, alarm data is automatically placed in the “Unscheduled data” bin. This setting determines how long alarm data is stored in the alarm data bin before it is discarded. Fields include:

Keep for – Specify value to indicate the desired length of time to store alarm data and select appropriate units (**Wk(s)**, **Mo(s)**, **Yr(s)**). After the specified storage time elapses, the alarm data is discarded.

Filter Keys Tab

@ptitude Analyst allows you to create **Filter Keys** which can be associated with POINTs and Machines for automated filtering purposes. For example, if you activated a “Pump” filter key for a Group and later filtered by **Filter Key / Pump**, the group would display.

- Filter key creation is discussed later in this chapter.

Filter key searches list all POINTs or Machines sharing a specified filter key (or multiple filter keys). The **Filter Key** tab displays all created filter keys and indicates whether or not they are currently assigned.

- Click a specific Filter Key’s checkbox to associate it with the current Group.
- Click the **Filter Key** dialog’s **OK** button to save your filter key assignments.
 - The checkbox appears gray if the filter key is assigned to the current group only because it was assigned to the group’s parent.

- Click the **Filter Key** dialog's **OK** button to save your filter key assignments.

Overall Tab

The **Overall** tab allows you to re-apply previously defined “shared” overall alarms, eliminating the need to define alarms individually, saving time and hierarchy space.

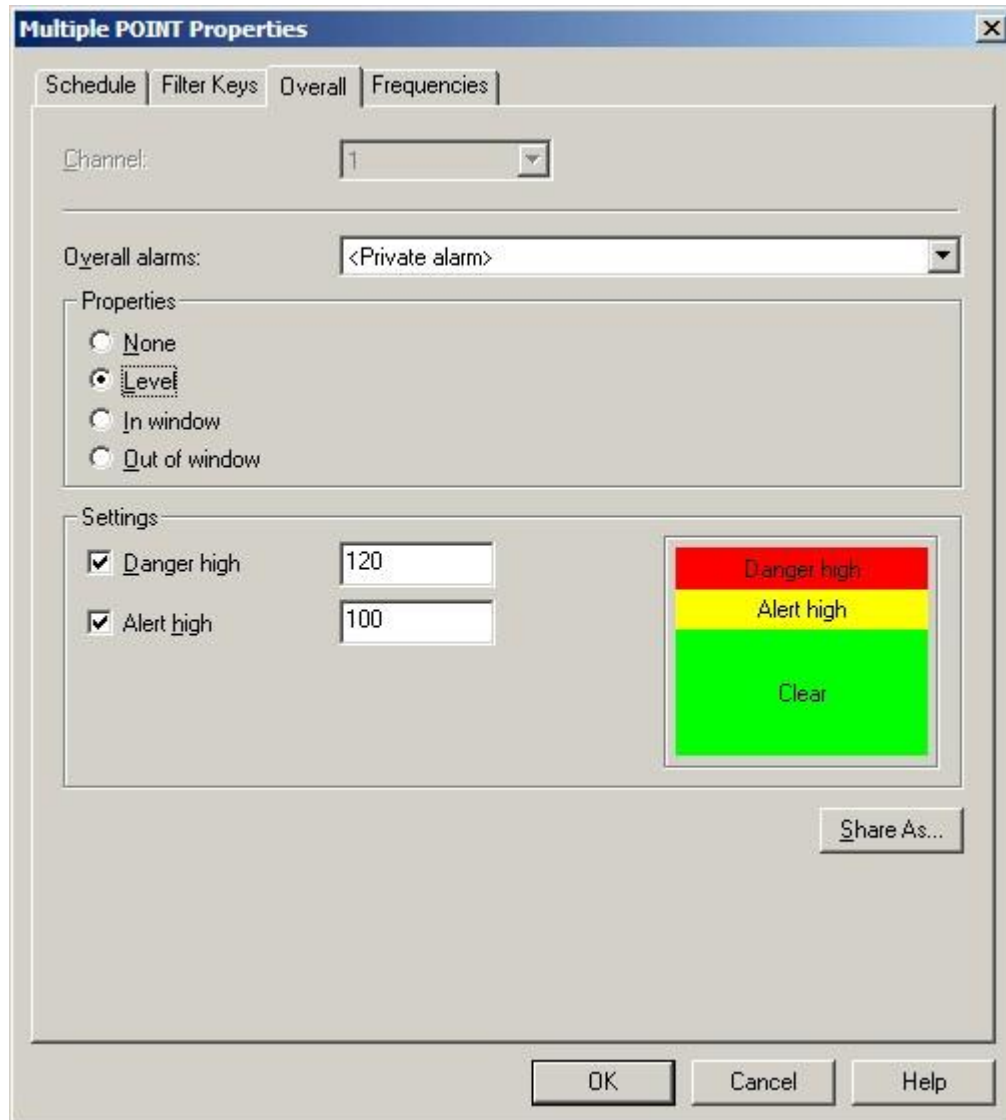


Figure 2 - 47.

The **Multiple POINT Properties** Screen's **Overall** Tab.

Use the **Overall** tab to set POINTs' overall alarms. The alarm can be configured in a variety of ways using the **Overall** tab's fields.

The current alarm appears in the **Overall alarm** field. The current alarm's values display below in the screen's **Properties** and **Settings** areas.

The **Overall alarms** drop down list displays all previously created overall alarms and a **<Private Alarm>** option. Use this drop down list to specify whether you wish to set up

a unique **<Private Alarm>** for the current POINTs only, or specify a previously defined “shared” alarm (selected by name). If you specify a shared alarm, its alarm settings automatically display in subsequent fields. If you specify a **<Private Alarm>**, proceed to configure the tab’s alarm settings as described below.

The **Properties** area displays alarm detection options. Select from:

None – No overall alarm is set for the POINTs.

Level – Measurements *exceeding* the set levels will result in an alarm condition.

In Window – Measurements *falling within* the set levels will result in an alarm condition.

Out of Window – Measurements *falling outside* the set levels will result in an alarm condition.

To assign a shared alarm to the current POINTs:

- Select the shared alarm from the drop down list and click the **OK** button. Shared alarms may be applied to an unlimited number of POINTs.

Shared Alarm

Alarms initially created as private alarms may be converted into shared alarms. To share a newly created Private alarm, select the new Private alarm and click the tab’s **Share As** button.

The **Share As** dialog specifies the alarm as a shared alarm. When the **Share As** dialog displays, you will be prompted to give the shared alarm a unique name for easy identification.

- Enter a name for the shared alarm and click the **OK** button.

The new shared alarm now appears as an available selection in the drop down list. Shared alarms are easily assigned to other POINTs to simplify POINT setup and maintenance.

Frequencies Tab

The **Multiple POINT Properties** screen’s **Frequencies** tab allows you to reapply previously defined **Frequency Sets**, or configure a new fault **Frequency Set** to attach to the current POINT.

The **<Private Alarm>** is used to set the same alarm values for all currently selected POINTs, yet making the alarm definition private for each POINT. This option may be used when you know all the selected POINTs will have unique alarm values, but the initial settings will be the same.

To assign a shared frequency set to the current POINTs:

- Select the shared frequency set from the drop down list. The corresponding included frequencies appear in the **Included frequencies** portion of the tab.
 - Two additional options are available, **<No selection made>** and **<No frequencies>**. Use the **<No selection made>** option when no changes to the current frequency setting for the POINTs are

needed. Use the **<No frequencies>** option to clear all frequency settings for all selected POINTs.

- Click **OK** to assign the selected set to the current POINT.

Band Tab

Band Alarms provide alert and danger alarms on both peak and spectral values within a defined frequency band. Use the **Band** tab to **Add** new band alarms for the active POINTs, or **Load** existing “shared” band alarms for the POINTs.

- Loaded band alarms may not be edited from this tab. Use the **Customize** menu’s **Alarm Hierarchy** option to edit “shared” alarm parameters.

The current band alarm name appears in the **Band alarms** field. All available band alarms are listed in the drop down list.

To Load “shared” alarms to the selected POINTs:

- Click the **Band** tab’s **Load** button, the **Load Band Alarms** dialog displays all available shared band alarms by name. Enable all band alarms to assign to the POINT and click **OK**. The names of the enabled band alarms appear in the **Band** tab’s **Band Alarms** drop down list.

To Add a new band alarm for the POINTs.

- You may mix added band alarms with loaded band alarms. However, only added band alarms may be edited from this tab.
- Click the Band tab’s Add button, the tab’s Band Information fields become available.

Edit and view alarm values in the tab’s **Band information** area. The band name appears in the **Label** field.

The following fields are available for viewing set values or editing:

Label – Enter band name.

Low freq – View or edit the low frequency value or multiple of running speed.

High freq – View or edit the high frequency value or multiple of running speed.

- In **Low** and **High Frequency** fields, you may specify a multiple of running speed by adding **x** to the end of the number. For example, enter “1.5x” for 1.5 times running speed.

Peak danger – View or edit the peak danger value or % Full Scale value.

Peak alert – View or edit the peak alert danger value or % Full Scale value.

Overall danger – View or edit the overall danger value or % Full Scale value.

Overall alert – View or edit the overall alert value or % Full Scale value.

- In **Peak** and **Overall** alarm fields, you may specify the alarm setpoint as a percentage of full scale by adding “%” to the end of the entered number. For example, enter “10%” to set the alarm at 10 percent of the full scale value.

- The tab's spectrum graphic display automatically updates as edits are made.

Edits may also be made on the tab's spectrum graphic display.

To edit the band graphically:

Spectrum source - If two or more POINTs are currently active, specify the POINT whose spectrum you wish to graphically display.

Spectrum - using its time record, specify the spectrum measurement to display.

Once the proper spectrum is displayed, specify the band alarm to edit from the **Band Alarms** drop down list. Notice the mouse pointer changes when positioned over a band alarm parameter (line) on the graphic.

- Click on the line of the band to edit and drag the line to its new position. The value in the affected field automatically updates to reflect your setting.
- Use the **Save** or **Undo** buttons to save or undo changes for the *current* band alarm edit. After editing all necessary band alarms, use the tab's **OK** or **Cancel** buttons to save all edited band alarms with the POINT, or cancel all edited and new band alarm efforts.

The total number of band alarms appears in the upper right corner of the tab's **Band information** area. Use the up and down arrow buttons to navigate between band alarms.

- Click the **Show all bands** checkbox to display all available band alarms on the spectrum display. The checkbox is not available when editing a band.
- Click **Share As** to make the current band alarm a shared alarm. You will be prompted to assign the band alarm a unique name. Enter a name and click **OK**.
- Click **Add** to create a new band alarm.
- Click **Remove** to remove the current band alarm. A confirmation dialog displays.
- Confirm action. The band alarm is deleted.

- A band alarm may not be removed if it is currently assigned.

Load Band Alarms

Use the **Load Band Alarms** dialog to select shared band alarm(s) for the active POINTs. All available shared band alarms display.

- Click the checkbox to select alarm(s) to be included / assigned to the active POINTs.
- Click **OK** to select, or **Cancel** to close dialog without saving selections.
 - You may sort the available shared alarms by band alarm name, inclusion status (included or excluded), or frequency range.

Envelope Tab

Use the POINT Properties' Envelope tab to specify a "total spectrum" envelope alarm for the POINT. You can select from a list of previously created envelope alarms or edit a private (unique) alarm for the current POINT.

All available envelope **alarms** display in the Envelope alarm drop down list, or you may Generate a new envelope alarm.

Shared envelope alarms may not be edited from this tab (use the Customize menu's Alarm Hierarchy option to edit "shared" alarm parameters).

- First, select the FFT spectrum to which the envelope alarm will conform, using:

Spectrum source – specifies from which POINT to graphically display the spectrum if two or more POINTs are currently active.

Spectrum – displays all available time record measurements for the active POINT (typically the baseline measurement) in a drop down list. The current spectrum displays graphically below.

To assign a "shared" envelope alarm to the POINT:

- On the **Envelope** tab, select the desired shared envelope alarm's name from the **Envelope Alarms** drop down list, the tab fields display the specified alarm's settings and the specified envelope appears on the displayed spectrum.

To Generate a new envelope alarm for the POINT:

- Select the **Envelope Alarms** drop down list's **<Custom envelope>** option.
- Click the **Generate** button. The **Generate Envelope Alarm** dialog displays.

Use the **Generate Envelope Alarm** dialog to create an envelope alarm based on your entered values.

% Overdrive – Enter the percent of the POINT's full scale value to determine the height of the envelope alarm above the spectral peak. The smaller the number specified, the tighter the comparison envelope conforms to the designated spectrum.

Spreading % – Enter percent of full scale (or center frequency) to increase the width of the envelope alarm around spectral peaks. The smaller the number specified, the tighter the envelope conforms to the sides of the peaks in the specified spectrum.

Spreading Type – (either **Center Frequency** or **Full Scale**). If **Center Freq.** is selected, the bandwidth about each center frequency increases with higher frequencies. If **Full Scale** is selected, the bandwidth about each center frequency is constant, based on a percent of the full scale frequency.

Threshold – Enter % of the POINT's full scale value, or an absolute value. The threshold value provides an opportunity to eliminate false alarms due to vibration "noise." It also establishes the envelope alarm's low amplitude "threshold" on the displayed spectrum. The envelope alarm conforms around all peaks whose amplitudes are higher than the established threshold as per the **Overdrive %**, **Spreading %**, and **Spreading Type** settings. All peaks below the established threshold are ignored by the envelope alarm. The **Threshold %** default value is set using the **Customize** menu's **Preferences / Plot** tab.

- Click **OK** to generate an envelope alarm based on your entries. Click **Cancel** to close the dialog without creating an envelope alarm.

Editing the Envelope Alarm

After you have generated an envelope alarm, you can edit it graphically using your mouse, or enter numeric envelope parameters using the **Set Frequency Range** dialog.

To graphically edit the envelope alarm:

- Click anywhere inside the **Envelope** tab's spectrum window. The cursor appears as an up arrow.
- Click the mouse on the portion of the envelope alarm line to be edited. A square icon identifies where the line will be drawn.
- Drag the mouse to draw the line to create the new envelope alarm.
- Click the tab's **OK** button to save your changes.

Tip - You can use your keyboard's Insert key to begin drawing the envelope alarm line. Then, use the arrow keys to move the line, and the Insert key again to stop drawing the line. Refer to **Section 1 - Appendix B - SKF @ptitude Analyst Keyboard Support** for more information on using your keyboard to edit your envelope alarm.

To edit the envelope alarm using numeric frequency ranges:

- Click the **Set Range** button. The **Set Frequency Range** dialog displays.
- Use the **Set Frequency Range** dialog to enter low frequency, high frequency, and level values to edit an existing envelope alarm.

To numerically edit an envelope alarm:

- Enter the desired low frequency, high frequency, and level value.
Click **OK**. The displayed envelope alarm automatically conforms to your entries.

Setup Log

The **POINT Properties' Setup Log** tab records changes made to the POINT's configuration.

POINT Properties / Setup Log fields include:

Date/Time – Displays the date/time stamp when the change occurred.

User – Displays the user's name that made the change.

Category – Displays the POINT properties tab to which changes were made.

Previous Value – Displays the previous value before the current change occurred.

Reason – Displays the user entered reason for making a change to the POINT's configuration. If no reason is required or entered, this column is empty.

- When you make a change to a POINT's properties, you are requested to enter a reason for the change. Reference **Chapter 2 - Setting Your @ptitude Analyst Preferences** in the **SKF**

@ptitude Analyst Introduction and Global Features user manual for details.

Save As – Click to save a copy of the log file to your computer's hard drive.

Print – Click to print a copy of the log file.

Modify by Attribute

@ptitude Analyst's **Modify by Attribute** feature allows you to make similar changes for one or more machines or POINTs by allowing you to change specific attributes (for example, alarm values, collection schedules, etc.) all at once.

- POINT setup changes made in Modify by Attribute are not incorporated into POINT Properties.

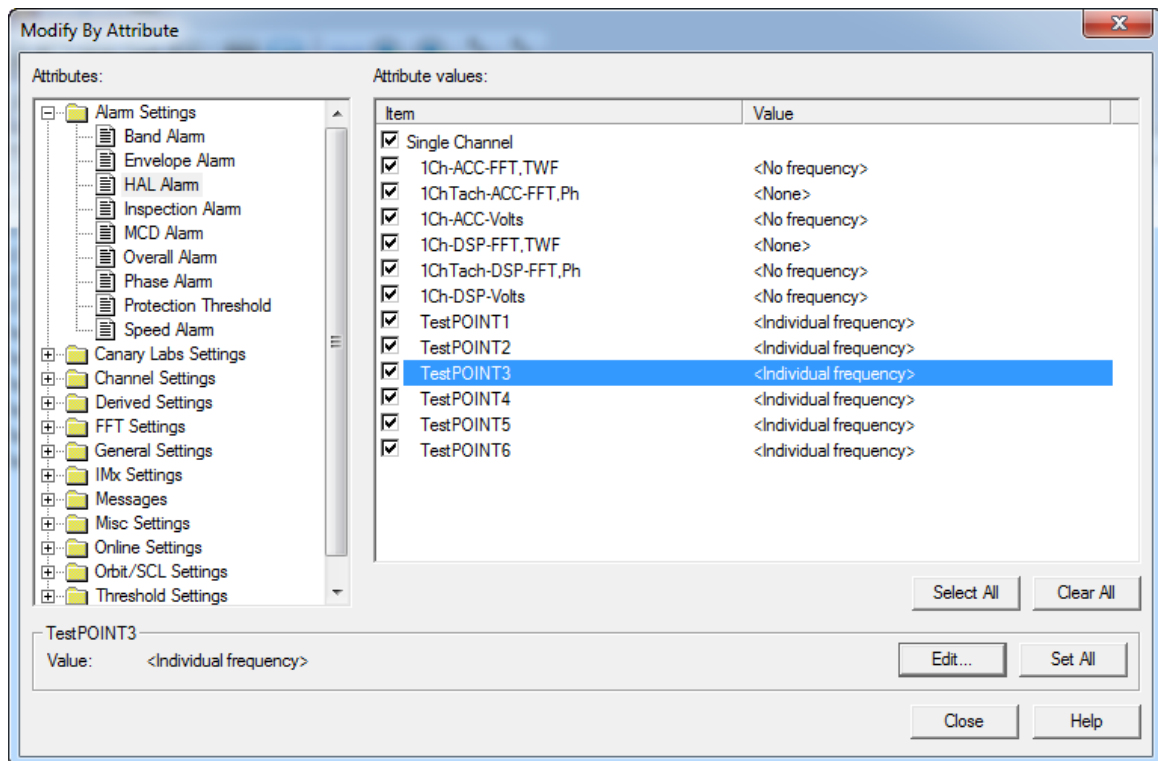


Figure 2 - 48.
The **Modify by Attribute** screen.

To Modify Settings:

- Select the hierarchy group (SET / Machine) that contains POINTs whose attributes you wish to modify.
 - All Groups and POINTs branching from the specified Group display in the **Modify by Attribute** screen.
- Select the **Edit** menu's **Attributes** option. The **Modify by Attribute** screen displays.

The **Modify by Attribute** screen is split into two panels:

Right panel - displays the selected hierarchy items and their value for the currently selected attribute in the left panel.

- Click to highlight the POINT for which you wish to modify the selected attribute. Its current setting / value displays in an area beneath the panels.

Left panel - displays the attributes available for modification organized into eight categories: Alarm Settings, Derived Settings, FFT Settings, General Settings, Messages Settings, Misc. Settings, Multi-Channel Settings, and Orbit/SCL Settings.

- If you have in the full version of @ptitude Analyst (CMSW 7400), you will also have an **On-line Settings** option.
- Open the appropriate category's folder to view its attributes, then click to specify the attribute you wish to modify. The right panel updates to show the selected attribute's current setting for each item.
- Edit the setting.
- Click the **Set** button to update the attribute setting for the selected POINT only, or click the **Set All** button to update the attribute setting for all POINTs in the right panel.
 - Use the **Set All** feature to quickly modify an attribute value for multiple items simultaneously. For example, if you want to set all **Averages** to an identical value, select **Averages** from the **Attributes** list. Attribute values display for all items in the tab's **Attribute values** area. Select an individual item, enter the desired value, and click the **Set All** button. All items will now have the specified number of averages.
- After completing attribute modifications for all POINTs, click the **OK** button to save the settings in the hierarchy.

Measurement Properties

General Tab

The **Measurement Properties** screen displays properties for individual measurement data records.

To view / edit a measurement's properties:

- Select the measurement record.
- Select the **Edit** menu's **Properties** option, or use the Properties toolbar button. The **Measurement Properties** screen displays.

The current measurement's time and date appears in the **Date** and **Time** fields of the **Measurement Properties / General** tab.

Measurement Properties fields include:

Date - View or edit the measurement record's data collection date. Select a new date from the drop down list.

Time - View or edit the measurement record's data collection time. Use the arrows to adjust the time.

- This feature should only be used to edit an incorrect date or time.

Overall / Channel # - View or edit the measurement record's overall value. Values are displayed for **Channel 1**, **Channel 2**, and/or **Channel 3** as applicable.

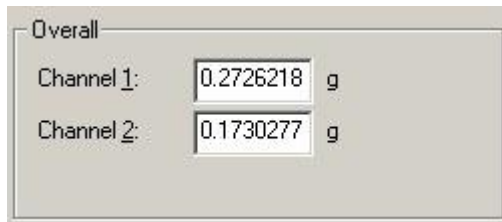


Figure 2 - 49.

The **Measurement Properties** Screen's **General** Tab's **Overall** Area.

- This feature should only be used to edit an incorrect overall value.
- If necessary, the measurement's alarm status will automatically update for the new measurement value.

Exclude measurement - Enables / disables the measurement record for inclusion in statistical calculations.

Readings - Displays which readings correspond to the current measurement on the indicated date / time.

Alarm status will be automatically updated for the new current measurement, if necessary.

The overall value for the current Process measurement's indicated date / time appears in the tab's **Overall** area. Values are displayed for **Channel 1** and/or **Channel 2** as

applicable. These values may be edited in the **General** tab. Enter a new value in the appropriate channel's text box.

- This feature should only be used to edit an incorrect overall value.

The tab's **Readings** area displays which readings correspond to the current measurement on the indicated date / time.

- Click the **Exclude measurement** checkbox to exclude the current measurement from being included in statistical calculations.
- After editing all necessary properties, click the **OK** button to save changes.
- Click **Cancel** to close the screen without saving changes.

Set Baseline

Use the **Edit** menu's **Set Baseline** dialog to specify the selected POINT's (or multiple POINTs') baseline. This feature allows you to quickly reset baselines within a hierarchy after a change is made to the machinery.

- In the hierarchy list, select one or more POINTs (or a hierarchy branch) whose baseline you wish to set as the oldest measurement record or the newest measurement record, or to clear the baseline altogether.
- Select the **Edit** menu's **Set Baseline** option.
- Using the dialog's option buttons, specify whether to use the **Oldest measurement** or **Newest measurement** record as the baseline for the selected POINT(s), or select **Clear baseline** to remove the current baseline for the selected POINT(s).
 - A baseline spectrum is a vibration spectrum taken when a machine is in good operating condition. It is used as a reference for monitoring and analysis.
- Click **OK** to save setting.
- Click **Cancel** to undo.

Set Speed (Multiple)

Use the Set Speed (Multiple) feature to set the same measurement speed for multiple FFT measurements:

- Starting from a hierarchy, ROUTE, or workspace, expand the appropriate machine. Beneath the machine in the hierarchy, right-click on the measurement POINT you wish to use as a reference and select **Set Speed (Multiple)** from the resulting context menu.

OR

- Starting from a hierarchy, ROUTE, or workspace, expand the appropriate machine. Beneath the machine in the hierarchy, click on the appropriate measurement POINT to display its measurements in the right panel. Then, right-click on the

single measurement you wish to use as a reference and select **Set Speed (Multiple)** from the resulting context menu.

OR

- Starting from an FFT measurement plot, right-click on the single cursor and select **Set Speed (Multiple)** from the resulting context menu.

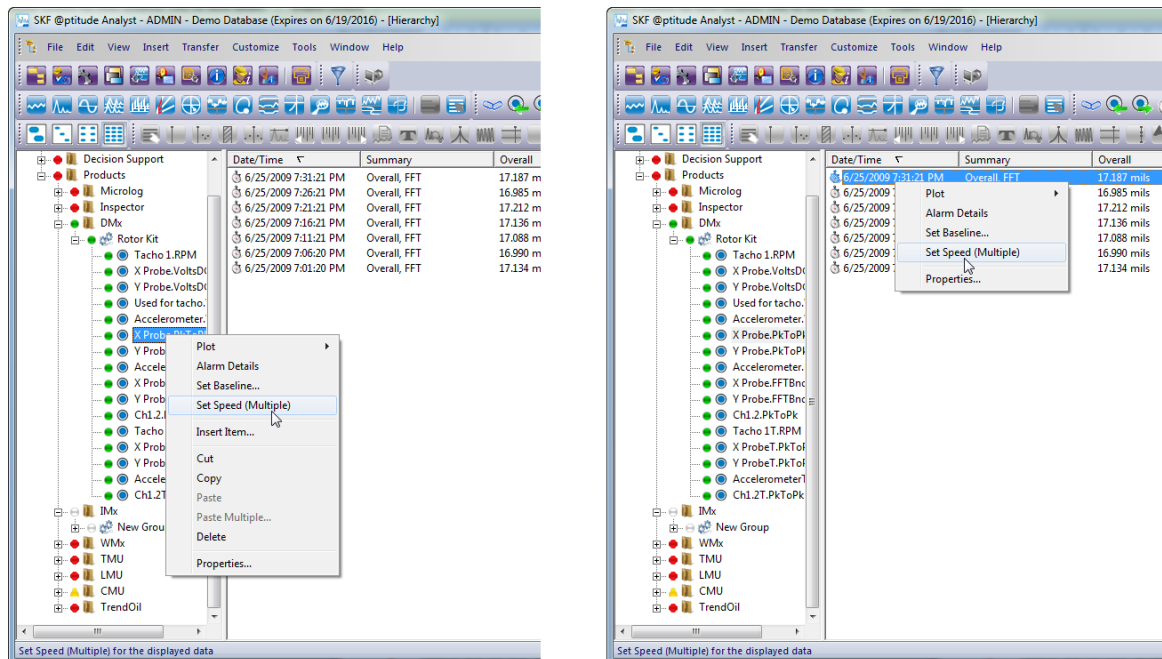


Figure 2 - 50.

Selecting **Set Speed (Multiple)** from a POINT Versus from a Measurement within a Hierarchy.

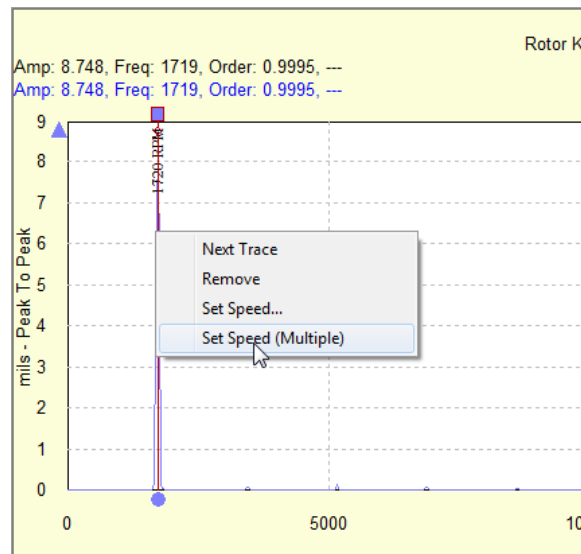


Figure 2 - 51.

Selecting **Set Speed (Multiple)** from an FFT Measurement Plot.

The **Set Speed (Multiple)** window appears.

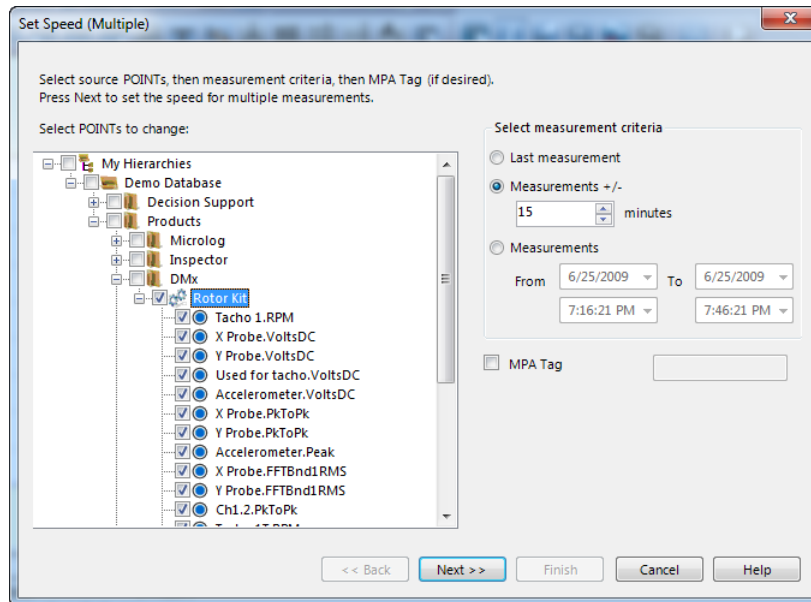


Figure 2 - 52.
Set Speed (Multiple) Window.

- Expand the machine in the **Set Speed (Multiple)** window's hierarchy view and deselect (remove checks from) any POINTs for which you do *NOT* intend to set a measurement speed value. By default, all POINTs are selected (checked) for adjustment.
- Specify the range of measurements for which you intend to set a measurement speed value:

Last measurement – Select to work only with the last measurement collected for each selected POINT.

Measurements + / - ... minutes – Select, then specify x number of minutes to work only with measurements collected within the range starting x minutes prior to and ending x minutes following the basis date and time.

- If you selected a POINT as the reference (launched this window from a POINT), the basis date and time are equal to the date/time stamp of the POINT's last measurement. If you selected a single measurement as the reference (launched this window from a single measurement or from an FFT plot), the basis date and time are equal to the date/time stamp of that measurement.
- The system will remember the specified number of minutes when you launch this dialog again.

Measurements... From... To... – Select, then specify starting and ending dates and times to work only with measurements collected within that range.

- By default, this range starts x minutes prior to and ends x minutes following the basis date and time, based on the current **Measurements + / - ... minutes** setting.

- Select, then enter an **MPA Tag** value to work only with measurements that contain that value in their Description (Point Properties > General tab).
- Click **Next>>**. The **Set Speed (Multiple) Measurement List** window appears, displaying a list of all measurements for the applicable POINTs that meet the criteria established.

The **Set Speed (Multiple) Measurement List** window displays a list of all measurements for the applicable POINTs that meet the criteria established in the **Set Speed (Multiple)** window.

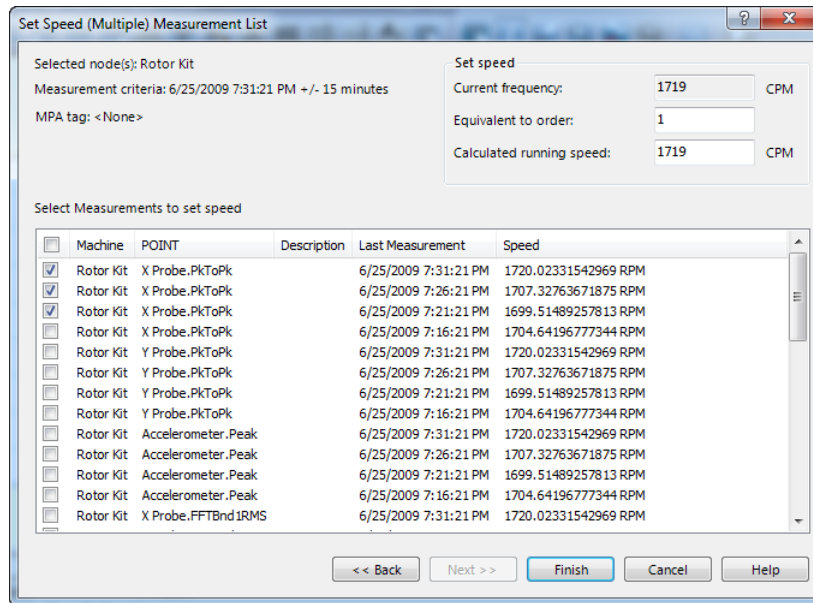


Figure 2 - 53.
Set Speed (Multiple) Measurement List Window.

- From the measurement list, select (check) each measurement to which you intend to apply the reference POINT's measurement speed.
 - Select (check) the checkbox in the list header to select all measurements.
 - To change the criteria established in the previous window that determine the measurements in this list, click **<<Back**.
 - Click on any column header to sort the list according to that column.
- Verify and/or enter **Set Speed** values.

Current Frequency – The speed value from the reference POINT measurement.

- If you initially selected a POINT as the reference, this speed value comes from the POINT's last measurement. If you initially selected a single measurement as the reference, this speed value comes from that measurement. If you launched this function from

an FFT plot, this speed value is the frequency value of the single cursor on that FFT plot.

Equivalent to order – If the speed value entered is at a known harmonic, then you can use this value to factor the **Calculated running speed** to its 1x component.

Calculated running speed – Enter the speed value you wish to apply to all selected (checked) measurements.

- Click **Finish**. The system applies the **Calculated running speed** and **Equivalent to order** values to all measurements selected (checked) in this list.

Calculate Derived POINTs

You must manually calculate derived POINTs upon the initial creation of a derived POINT, or after editing a derived POINT's expression settings. Once the initial calculation has been performed manually, @ptitude Analyst automatically calculates the derived POINT during data upload processing.

- Upon the initial creation of a derived POINT, if the assigned variables do not have existing measurement data, it is not necessary to manually calculate the derived POINT. It is necessary to manually calculate a derived POINT only when the assigned variables already have measurement data.

To manually calculate a derived POINT:

- Select the newly created or recently edited derived POINT from the Hierarchy.
- Select the **Edit** menu's **Calculate Derived POINTs** option to quickly calculate measurement values for the derived POINT.
- The **Calculate Derived POINTs** message dialog displays. Select **Yes** to calculate the selected derived POINT.
 - If calculating a newly created derived POINT, new measurement data displays in the Hierarchy's right panel. Existing measurement data for the assigned variables is used in the calculation to create measurement data records for the derived POINT.
 - If calculating a recently edited derived POINT, all existing derived POINT measurement values previously calculated for the selected derived POINT(s) are deleted and replaced with new derived POINT measurements.

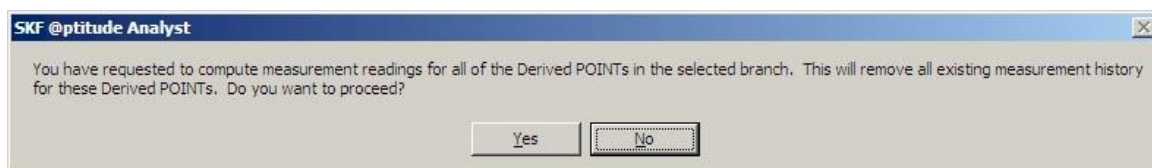


Figure 2 - 54.
The **Edit** menu's **Calculate Derived POINTs** Message Dialog.

After manual calculation of a derived POINT, @ptitude Analyst automatically calculates any newly uploaded data for the derived POINT during data upload processing. The newly calculated data displays along with the existing derived POINT data measurement records in the right panel.

- For a multi-user environment, Machine Monitor calculates the new data for derived POINTs. If Machine Monitor is not running, then the derived POINTs will not be calculated.

Manual Archive

@ptitude Analyst's **Manual Archive** feature adds flexibility as it allows you to specify POINTs to archive, and allows you to archive the newest data in addition to the oldest data.

The **Manual Archive** process differs from a Scheduled or Monitor archive process in several ways.

Manual Archive:

- Takes place immediately.
- Archives only POINTs branching from the selected hierarchy item (or specified measurement records).
- Only archives measurements from the "current data" bin (unless a specific measurement record from another bin is specified).
- Allows you to specify whether to archive each selected POINT's **Oldest** or **Newest** measurement record from the current data bin.
- Allows you to specify the archive bin in which to place the archived measurements.

Use **Manual Archive** to change the archive status for any or all hierarchy items.

Manual Archive is useful to manually set a measurement's archive status, bypassing automatic archive schedule (if applicable).

To use manual archive:

- In the hierarchy list, select a hierarchy item(s) whose measurements you wish to manually archive. All POINTs branching from the selected item are archived.
- Select the **File** menu's **Manual Archive** option. The **Manual Archive** dialog displays.

The dialog's top area displays a warning if the selected data is tagged as **baseline**. Baseline data cannot be modified.

Change archive status in the dialog's **Store measurements as** area. Select from:

Current data bin (available only when archiving a measurement record from other bins)

Unscheduled data bin

Short term archive data bin

Long term archive data bin

The dialog's bottom area displays **Archive measurements**. If working from a POINT or above on the hierarchy branch, select from:

Oldest Measurement – Each selected POINT's oldest measurement in the current data bin.

Newest Measurement – Each selected POINT's newest measurement in the current data bin.

- Manual Archive does **not** utilize “scheduled” archive settings

@ptitude Analyst Scheduler

Current Scheduled Events

The **Scheduler** feature allows you to configure the software to perform scheduled functions based on specific conditions. A scheduled event consists of a system event and an action to be executed whenever that event occurs. For example, you can use **Scheduler** to configure the software to display a message when a specific operation completes (action) when a DAD has completed processing (system event).

- Select the **Customize** menu's **Scheduler** option. The **Scheduler** dialog displays.

The **Scheduler** dialog displays all current scheduled events and the action assigned to each event. Use the **Scheduler** dialog to add new events and maintain existing events.

To add an event:

- Click the **Add** button to define an event. The **Event Scheduler Wizard** launches automatically.

You can also add an event by copying an existing event, then modifying the copy as necessary.

To copy an event:

- Highlight the event you would like to copy and click **Copy**. The **Event Scheduler Wizard** launches. As you navigate the wizard, options default to the settings from the copied event. You may modify the settings as necessary.

To edit an event:

- Highlight the event you would like to modify and click **Edit**. The **Event Scheduler Wizard** launches with the settings from the event you are editing.
- Navigate the wizard to the settings you wish to modify and edit the event as necessary.

To remove an event:

- Click the **Remove** button to delete a scheduler entry.
 - Scheduled entries remain in effect until they are removed.

Event Scheduler Wizard

A scheduled event consists of a system event and an action to be executed whenever that event occurs.

The **Event Scheduler Wizard** guides you through the process of scheduling events.

- Click the **Next** button to continue.
- Select the event you want the system to monitor and that will cause the scheduled action to be performed. All available events appear in the **Select an event** window.

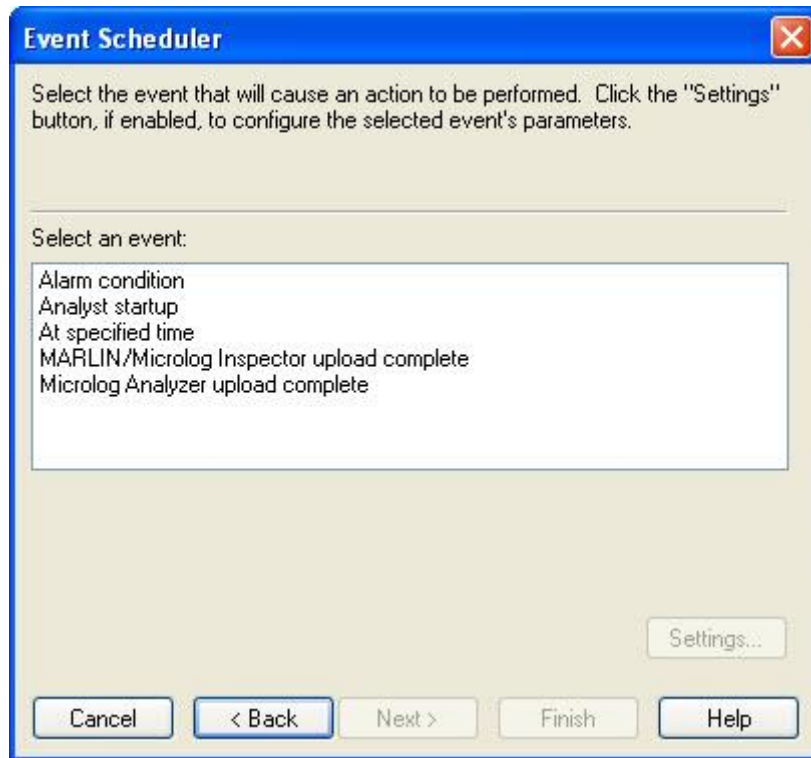


Figure 2 - 55.
The **Event Scheduler** Wizard.

Some events require specific settings that further define the event. When settings are required, the **Settings** button is enabled. You must specify the required **Settings** before the **Next** button is enabled.

- Complete all **Settings** entries, if required.
- Click the **Next** button.
 - Individual events are detailed later in this section.

All available actions display in the **Select an action** area.

- Select the action you wish the system to perform when the indicated event occurs

Some actions require specific settings that further define the action. When settings are required, the **Settings** button is enabled. You must specify the required **Settings** before the **Next** button is enabled.

- Complete all **Settings** entries, if required.

- Click the **Next** button.
 - Individual actions are detailed later in this section.

By default, scheduled events only execute if the user who created the event performs the triggering action. (For example, a report set to run on @ptitude Analyst startup only runs when the user who created the event logs in.)

If the user creating the scheduled event is an administrator, an additional dialog displays providing the option of assigning the event to another user, or delegating it to the Transaction Server.

The **Select Users** list shows all @ptitude Analyst users.

- Select the user who should trigger this event.
 - Events scheduled to trigger at a specified time only occur if the user with whom the event is associated is logged into @ptitude Analyst. This applies to both users who are assigned an event by an administrator and non-administrator users who create an event for themselves. For example, if the event is scheduled for three a.m., the specified action will not be performed if the designated user is shut down at three a.m., and it will not be automatically performed when the program is restarted.

Alternatively, if you have selected to generate a report with this scheduled event, **Delegate to Transaction Server** enables. The transaction server is a process that stays running in the background at all times. If your triggering event is on Microlog upload, this option allows you to have the transaction server generate the report whenever any user uploads Microlog data. If your triggering event is a specified time, the report runs at that time, regardless of whether the associated user is logged in.

- The report is generated to a file in the path specified in the **Report Location** field on the **Report Generator's Assign** tab. If the **Delegate to Transaction Server** option is selected and the report location path references a local hard drive, the report is written to the Transaction Server host computer. It is recommended that you set the report location to a network drive and make sure the Transaction Server has read / write access to that location.
- Enable **Delegate to Transaction Server** to have the transaction server generate the report, rather than a specified user.
- Click the **Next** button.

The **Event Scheduler Wizard** displays a summary of the new scheduled event settings.

- Click the **Finish** button to save the scheduled event.
- Click the **Back** button to modify the scheduled event.
- Click the **Cancel** button to cancel the wizard dialog.

Scheduler Events

Analyst startup

This event is the application's start up. Performs an action as soon as the application completes its startup process.

Alarm condition

This event is used to schedule an action to be performed when specific alarms occur.

- Click the **Settings** button to specify the data source, alarm condition, and alarm type for which this event should occur. The **Alarm Condition Settings** dialog displays.

Data source –Select the Hierarchies, SETs, Machines, POINTs, ROUTEs, and / or Workspaces to monitor for alarm conditions.

Alarm Conditions –Select the alarm condition (**In alert**, **In danger**, or **Both**) to monitor.

Alarm Type – Select one or more alarm types to monitor.

- Click **OK** to save settings.
- Click **Cancel** to discard settings.

At specified time

Schedules a task to be performed at a specific time.

- Click the **Settings** button to specify the time that this event should occur. The **Time Event Settings** dialog appears.

Start Date - Select the date on which the scheduled event should run for the first time.

Start Time – Select the time at which the scheduled event should run for the first time.

Specify the interval for the event. Options are:

Hourly – Select to run the event **Every X hour(s)**. Enter the hourly time increment in the field (e.g., every 8 hours).

Daily - Select to run the event **Every X day(s)**. Enter the number of days in the field (e.g., every 3 days).

Weekly – Select to run the event **Every X week(s)**. Enter the number of weeks in the field, and enable the check box(es) for the day(s) of the week on which the event should run. (e.g., Every 2 weeks on Monday and Wednesday)

Monthly – Select to run the event on a monthly basis. Select the day of the month (1-31) and the frequency of the event in month(s) (e.g., Day 15 of every 2 month(s)); or select a day of the week and the **1st**, **2nd**, **3rd**, **4th**, or **last** week of the month, and the frequency of the event in month(s). (e.g., The 2nd Friday of every 1 month(s))

Yearly – Select to run the event on a yearly basis. Select the month / day and the frequency of the event in year(s). (e.g., January 1st of every 1 year(s)); or select a day of the week, the **1st**, **2nd**, **3rd**, **4th**, or **last** week of the month, the month, and the frequency of the event in year(s). (e.g., The 2nd Friday of January every 2 year(s))

- Click **OK** to save settings.
- Click **Cancel** to discard settings.

Microlog Upload Complete

Performs an action when a Microlog upload completes (as soon as the data has been processed into the hierarchy).

- The **Scheduler** feature is user specific and may only be applied to data uploaded by the current user.

- Click the **Settings** button to filter the event based on the ROUTE being uploaded. The **Upload Schedule Settings** dialog appears.

This dialog allows you to specify that the action should only occur if the data being uploaded from the Microlog belongs to a specific ROUTE.

All Uploads – Leave this option enabled if you do not wish to filter on data source.

ROUTE – Select this option if you only want the action to run when incoming data is from specified ROUTEs. Enable the check boxes next to the ROUTEs that should trigger the action. If data is uploaded from a ROUTE that is not selected, the event will not run.

Scheduler Actions

Display a message

Select the “display message” action to display your specified message text when the associated event occurs.

- Click the **Settings** button to enter your message text.

The **Display Message Action Settings** dialog appears.

- Type in the desired text.
- Click the **OK** button to save.
- Click the **Cancel** button to discard changes.

Generate Report

Select the **Generate Report** action to generate a specified report type when the associated event occurs.

To select report type:

- Select **Generate Report** from the dialog’s **Select an action** area.
- Click the **Settings** button. The **Generate Report** dialog appears.

Generate Report Settings

Description – Enter descriptive text to identify this report in the **Scheduler**.

Report – Select the desired report type from the drop down list.

Data Source – Select the data source for the report. This section varies, depending on whether the **Report can specify data sources from multiple hierarchies** option was enabled on the **Report Editor’s General** tab for the selected report.

If **Report can specify data sources from multiple hierarchies** was enabled, all of your @ptitude Analyst hierarchies display. Select multiple hierarchies, groups, and POINTs to include in your report.

If **Report can specify data sources from multiple hierarchies** was not enabled, available options include:

Primary Hierarchy – Use the POINTs from the currently selected primary hierarchy as the report's source.

Last Upload – Use the POINTs last uploaded from the data collector as the report's source.

ROUTEs (all available) – Enable the check box next to each ROUTE you would like to include.

Workspaces (all available) – Enable the check box next to each Workspace you would like to include.

- If the **Data Source** is a Filtered Workspace, the Workspace will not be filtered again before report generation. The report is based on the Workspace in its current state.

Destination – Select the desired report destination from the drop down list. Available options include:

Email – Automatically sends an email of the report in HTML and PDF format to selected email recipients. Click the **Select** button to display the **Recipient Selection** dialog and select one or more contacts or groups of contacts.

HTML – Save to the subdirectory as an HTML file.

Open Window – Window opens automatically, displaying the report.

Printer / Landscape – Automatically prints in landscape mode.

Printer / Portrait – Automatically prints in portrait mode.

- The **Destination** selection is not used if the report is delegated to the Transaction Server. In this case, the report is always generated to HTML.
- Click **OK** to save report settings.
- Refer to the **SKF @ptitude Analyst Introduction and Global Features User Manual, Chapter 2, Getting Around in @ptitude Analyst / Contact Information** section for details on how to set up contacts and groups.

Measurement Management / Archive

Select the **Measurement Management / Archive** action to schedule the **Monitor** application to perform measurement management and archiving. This action checks the measurements in the current hierarchy, and either archives old data to the short term or long term status, or deletes old data from the hierarchy. This action is performed on measurements in the current hierarchy only. Refer to **your SKF @ptitude Analyst Introduction and Global Features User Manual, Chapter 3 - SKF Machine Monitor Application** for more information on the **Monitor's** functions, including archiving data.

Send Message

Select the **Send message** action to send an email or text message to selected recipients when the associated event occurs.

- Click the **Settings** button to configure your message settings.

The **Send Message Settings** dialog appears.

- In the **Subject** text box, type the subject of the event's email message.
- In the **Message text** area, type the event's message to be sent as email and/or text messages.
 - Text messages are often limited to a maximum number of characters. Check with the recipient's service provider to understand text message limitations.
- Click the **Select** button to display the **Recipient Selection** dialog and select one or more recipients from the list of available contacts and groups.
 - Refer to the **SKF @ptitude Analyst Introduction and Global Features User Manual, Chapter 2, Getting Around in @ptitude Analyst / Contact Information** section for details on how to set up contacts and groups.
- If you wish to include an HTML file with your email message, use the **Browse** button next to the **HTML content** text box and select an HTML file to include.
 - HTML content is not supported by text messaging.
- If you wish to include any other type of attachment with your email message, select the **Browse** button next to the **Attachments** text box to select the file you wish to include.
 - Attachments are not supported by text messaging.
- Enable the **Allow content from triggering event** check box to allow the default alarm message to override the **Message text** message when a triggering event occurs.
- Enable the **Send email** check box to send the message to the selected recipients as an email.
- Enable the **Send text to phone** check box to send the message to the selected recipients as a text message.
 - Texting limitations depend on the recipient's service provider.
- Click the **OK** button to save the message settings.
- Click the **Cancel** button to discard changes.

Customize / Database Operations

The **Database** screen allows you to create custom group types and to define filter keys, coded notes, and operator names.

Creating Custom Group Types

Use the powerful **Customize / Database** screen's **Group Types** tab to create custom Group Types to conveniently organize your machines, SETs, and POINTs to fit your application.

To create a custom Group Type:

- Select the **Customize** menu's **Database** option. The **Database** screen displays.
- Select the **Group Types** tab.

The screenshot shows the 'Database' window with the 'Group Types' tab selected. The window has a title bar 'Database' and a close button. Below the title bar are four tabs: 'Operators', 'Operator Settings', 'Messages', and 'Group Types' (which is active). Under the 'Group Types' tab, there are four sub-tabs: 'Group Types', 'Filter Keys', 'Coded Notes', and 'Compliance'. The 'Group Types' sub-tab is active. It contains a 'Group type:' dropdown menu with 'Equipment Inspection (Belt)' selected. Below this is a 'Properties' section with a 'Name:' text box containing 'Equipment Inspection (Belt)' and a 'Base on:' dropdown menu with 'Machine' selected. Below the properties is an 'Optional data fields' section with five text boxes: 'Field #1:' (Motor Number), 'Field #2:' (Equipment Number), 'Field #3:' (Belt Number), 'Field #4:' (Belt Size), and 'Field #5:' (Stores Number). At the bottom right of the 'Optional data fields' section are 'Add' and 'Remove' buttons. At the very bottom of the window are 'Close' and 'Help' buttons.

Figure 2 - 56.
The **Database** Screen's **Group Types** Tab.

- Click the **Group Types** tab's **Add** button. The tab enters edit mode.
- Specify appropriate information into the following fields:

Group Type – This field is unavailable if you are adding a new Group Type. In the **Group type properties** area, the following fields are available:

Name – Specify a name to define your custom group type. For example, you may want to create a custom Group type named “pumps,” for easy organization of all pump machinery.

Base on – Select a type to base the new group type on (SET or Machine).

- Once a Group Type has been “based on” a SET or Machine, the setting cannot be edited.

Once defined, the new Group Type will be available as a selection in the **Group Properties** screen's **Type** list.

Optional data - Provides up to five fields to enter titles for additional data. Text entered in these fields appears as prompts for data entry when new Groups are created. This feature allows you to store detailed information with your Groups.

- Specify prompt titles that will appear in the **Group Properties / Details** tab.
 - Examples are “serial number,” “manufacturer,” “operator name,” etc.
- Click the **Save** button to save the new Group Type and add it to the available types.
- Click the **Undo** button to undo changes.
- Click **Remove** to remove the current Group Type.
 - Group types currently in use cannot be removed.

Creating Filter Keys

Custom filter keys can be assigned to POINTs and/or Machines or SETs.

To add a new filter key:

- Select the **Customize** menu's **Database** option. The **Database** screen displays.
- Select the **Filter Keys** tab.

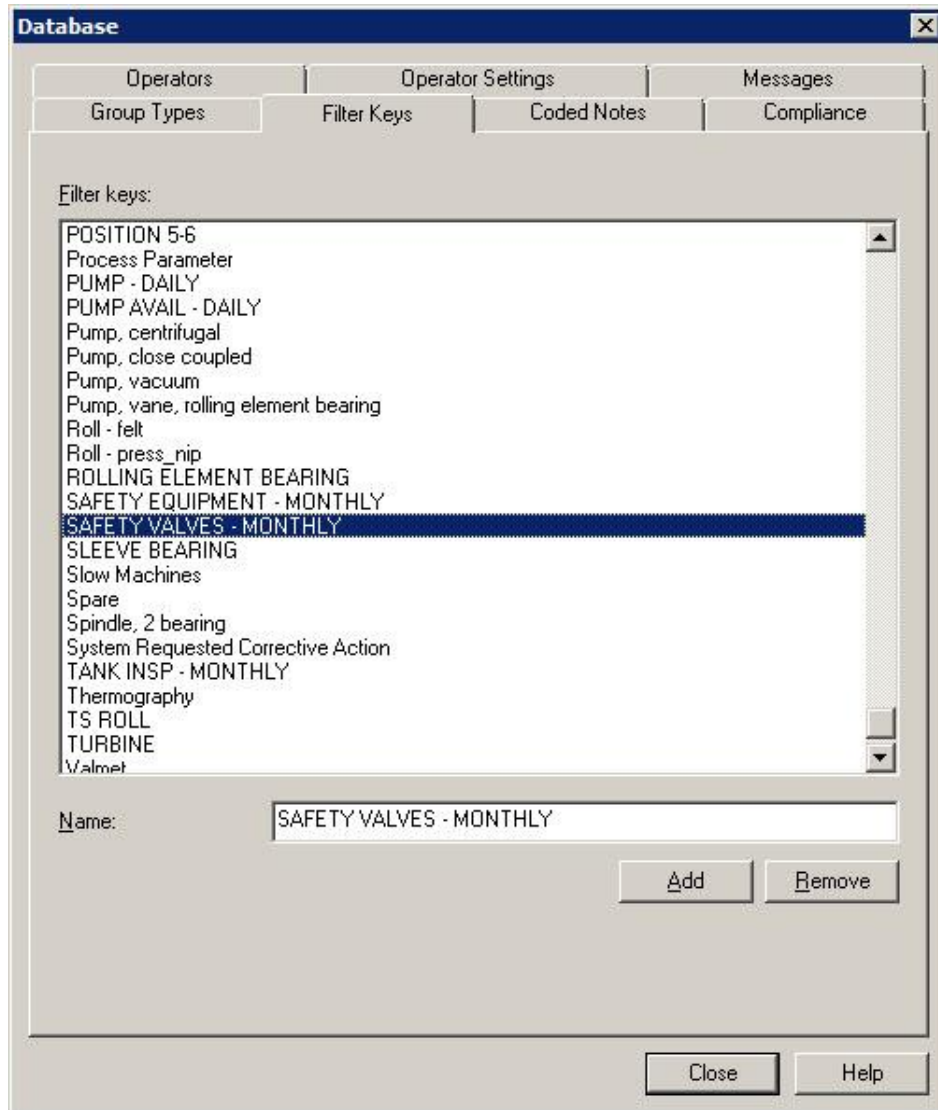


Figure 2 - 57.
The **Database** Screen's **Filter Key** Tab.

- Click the tab's **Add** button. The dialog enters edit mode.
Fields include:
Filter keys – Displays all previously defined filter keys.
Name – Specify filter key text.
- Click the **Save** button. The new filter key is now available for assignment.

Coded Notes

Coded notes are notes created and stored in @ptitude Analyst and automatically transferred from the software to the DAD. Create coded notes in the **Customize / Database** screen's **Coded Notes** tab.

All previously defined coded notes appear in the tab's **Coded notes** area.

To add a new coded note:

- Click the **Add** button.

Fields include:

Coded notes – Displays all previously defined coded notes.

Note – Enter coded note text.

- Enter your descriptive text in the **Note** field and click the **Save** button.
- To cancel settings, click the **Undo** button.

To remove an existing coded note:

- Select the coded note from the **Notes** area.
- Click the **Remove** button.
 - The coded note, "**Machine Not Operating**," may **not** be removed.
 - If the listing order of the coded notes has changed, you must download the coded notes to *all* DADs to ensure synchronization.

Compliance

Compliance schedules enable you to schedule data collection into a manageable workflow, by allowing you to define a calendar-based data collection time period to specify when a POINT must be collected. The compliance schedule allows data collection any time within the set time period.

For example, if we schedule data collection for 100 POINTs starting at 01-Dec-2011 at 6 AM, with a weekly interval. If all 100 POINTs are collected within the time interval, then the POINTs are "in compliance." POINTs that are not collected within the specified time period are marked as "out of compliance."

Use the **Customize / Database** screen's **Compliance** tab to define, edit, and delete compliance schedules.

All previously defined compliance schedules appear in the **Compliance** drop down list. To edit an existing compliance schedule, select a schedule from the **Compliance** drop down list and make necessary changes to the fields below.

To add a compliance schedule:

- Click **Add** to create a new compliance schedule.
- In the **Properties** area, edit the **Name**, **Start from**, and **Data due every** fields to customize the compliance schedule.

Name – Enter a descriptive name for the compliance schedule.

Start from – Enter the date and time of day the data collection interval is to begin.

Data due every – Enter a numerical value to indicate how often data should be collected and select the appropriate units from list box options (**Hours(s)**, **Day(s)**, **Week(s)**, **Month(s)**, or **Years(s)**).

Operators

Some DADs support operator names to tag measurement data with the corresponding operator's name. You can also create operator sets that group several operators together, making it easier to identify several operators in an associated group. Operator names are downloaded to the DAD.

Operator names are automatically downloaded to the DAD.

- When collecting data, the data collection person logs in using their operator name.

Manage operator names and sets in the **Customize / Database** screen's **Operator** tab. Add or remove Operator names in the **Customize / Database** screen's **Operator** tab.

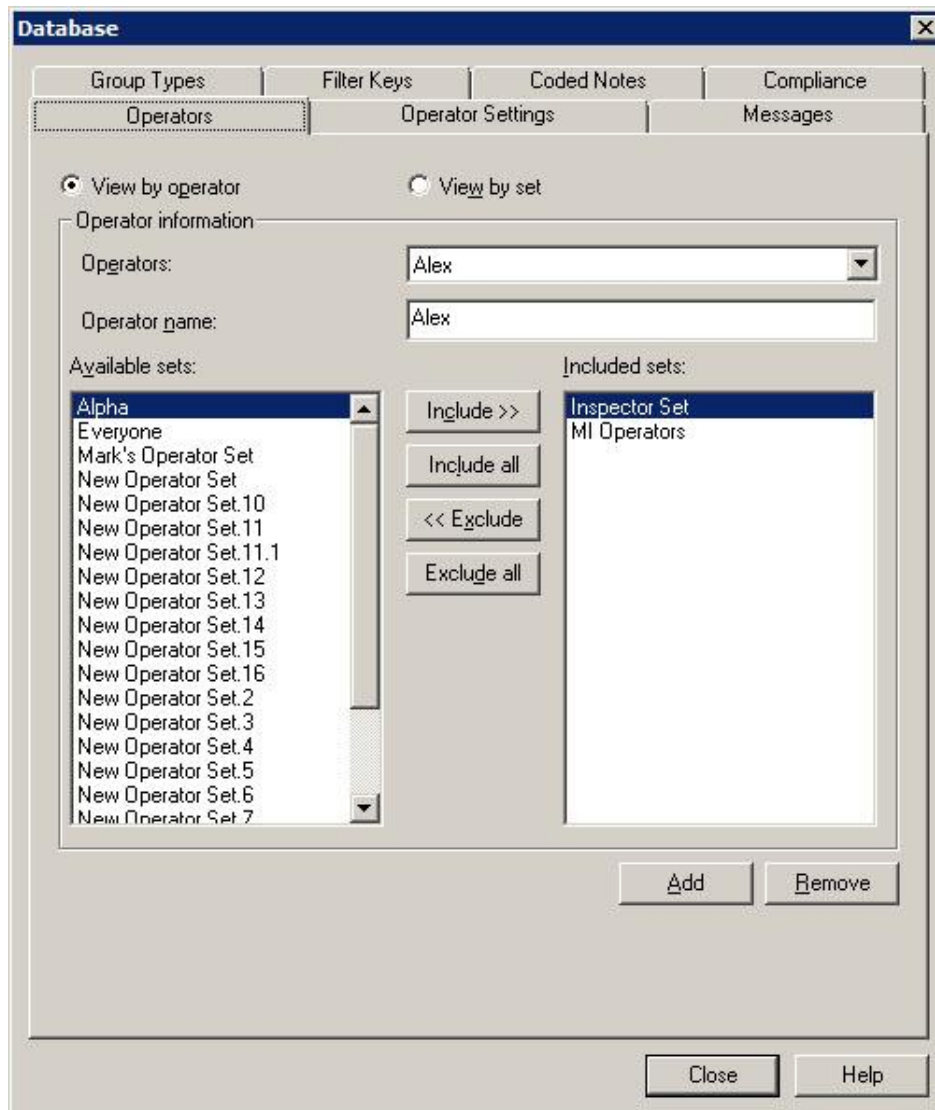


Figure 2 - 58.

The **Database** Screen's **Operators** Tab in View by Operator Mode.

The **Operators** tab has two modes:

View by operator – Select this mode to manage operators organized by operator name.

View by set – Select this mode to manage operators organized by operator set.

View by Operator Mode

In **View by operator** mode, all available operator names display in the **Operators** drop down list. In this mode, you can add or remove operators, and organize your operators into sets. For example, you can add operators to an "early shift" operator set.

To add a new operator:

All previously defined operator names appear in the tab's **Operator Names** area.

To add a new operator name:

- Click the **Add** button.

Fields include:

Operators - Displays all previously defined operator names.

Name - Enter the new operator name.

- Enter the new operator name in the **Name** field and click the **Save** button.

To add an operator to a set:

All previously created sets display in the **Available sets** area. The **Included sets** area displays sets to which the selected operator name is already assigned.

- Select the operator name from the drop down list.
- Select the desired set from the **Available sets** area.
- Click the **Include** button to include the selected operator name with the selected set. Click the **Include All** button to include the selected operator in *all* available sets.
- Click the **Save** button.
- To cancel settings, click the **Undo** button.

To remove an existing operator name:

- Select the operator name from the **Operator Names** window.
- Click the **Remove** button.

View by Set Mode

In **View by set** mode, all previously created operator sets display in the **Operator sets** drop down list. In this mode, you can add or remove sets, and organize your operators into sets. For example, you can create an operator set for the early shift, and include appropriate operators into the set.

To create a new operator set:

- Select **New Set** from the drop down list.
- Enter the new set's name in the **Set name** field and click the **Save** button.

All available operators display in the **Available operators** area. All operators already included in the set display in the **Included Operators** area.

- Use the **Include**, **Include All**, **Exclude**, and **Exclude All** buttons to organize operators into the appropriate sets.
- Click the **Save** button to save you changes.

Messages

Use the **Customize / Database** screen's **Messages** tab to create shared (public) instruction messages to assign to machines and POINTs to automatically display important instructions and information.

All previously defined instruction messages appear in the **Instruction messages** drop down list.

To create a public Message:

- Select the **Customize** menu's **Database** option. The **Database** screen displays.
- Select the **Messages** tab.
- Click the **Messages** tab's **Add** button. The tab enters edit mode.
- Specify appropriate information into the following fields:

Name – Specify a name to define your custom message.

Format – Select the message format from the drop down list. Available options include:

Free form – Allows you to manually type in the summary and content for your message.

Summary – Type in text summarizing your instruction message for easy recognition. For example, if you have a message that details specifics about a group of machinery, your summary may read, "FD Fan Data Collection Information."

Content – Enter your complete instruction message in the content text area. Using the above example, your instruction message content would include detailed data collection information, specific to the current group. For example, your message may read "Ensure sensor is properly mounted before collecting data, etc."

- Click the **Save** button to save the new message and add it to the available public messages.
- Click the **Undo** button to undo changes.
- Click **Remove** to remove the current message.
 - Messages currently in use cannot be removed.

Frequency Sets

Frequency Sets allow you to quickly assign fault frequency markers to a POINT. When the POINT's FFT measurements display in a spectral plot, you may overlay its assigned fault frequency markers to easily determine if spectral peaks appear at anticipated fault frequencies.

Select the **Customize** menu's **POINT Attributes / Frequency Sets** option to display the **Frequency Sets** dialog.

All shared frequency sets appear in the **Frequency sets** area.

Available options include:

Add – Click to add a new frequency set. The **Frequency Sets Editor** screen launches automatically.

Copy – Click to make a copy of an existing shared frequency set. This option is useful when you are creating a new frequency set that is a slight modification of an existing frequency set. The **Frequency Sets Editor** screen launches automatically.

Edit – Click to edit an existing frequency set. The **Frequency Sets Editor** screen launches automatically.

Remove – Remove the selected frequency set.

Frequency Sets Editor

The **Frequency Sets Editor** screen contains three tabs; **General**, **Bearings**, and **Other**. Each tab is detailed below.

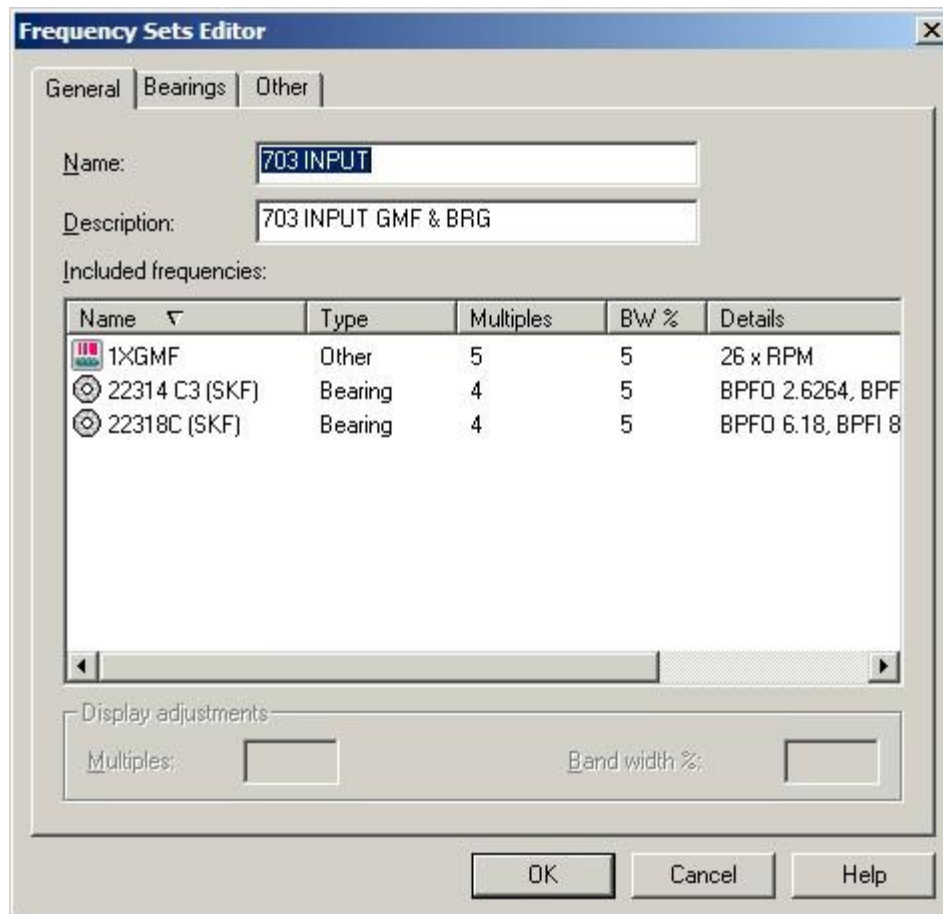


Figure 2 - 59.
The **Frequency Sets Editor** Screen's **General** Tab.

General Tab

Displays the current frequency set's name and description. Included frequencies appear with their Name, Type, Multiples, Bandwidth%, and Details.

Name - Displays current frequency set name.

Description - Displays current frequency set description.

Included frequencies - Displays all frequencies included in the current frequency set, with their:

Name – Displays the frequency name.

Type – Displays the type of frequency.

Multiples – Displays the multiple of frequency markers to display on the plot.

Bandwidth % - Displays the frequency range boundaries used by the frequency marker to locate a peak.

Details – Displays fault frequency settings for the bearing's components.

- Click on a frequency to select it.

Display Adjustments – Allows you to edit the **Multiples** and **Bandwidth%** settings for the selected frequency.

- Click **OK** to save changes.
- Click **Cancel** to close dialog without saving changes.

Bearings Tab

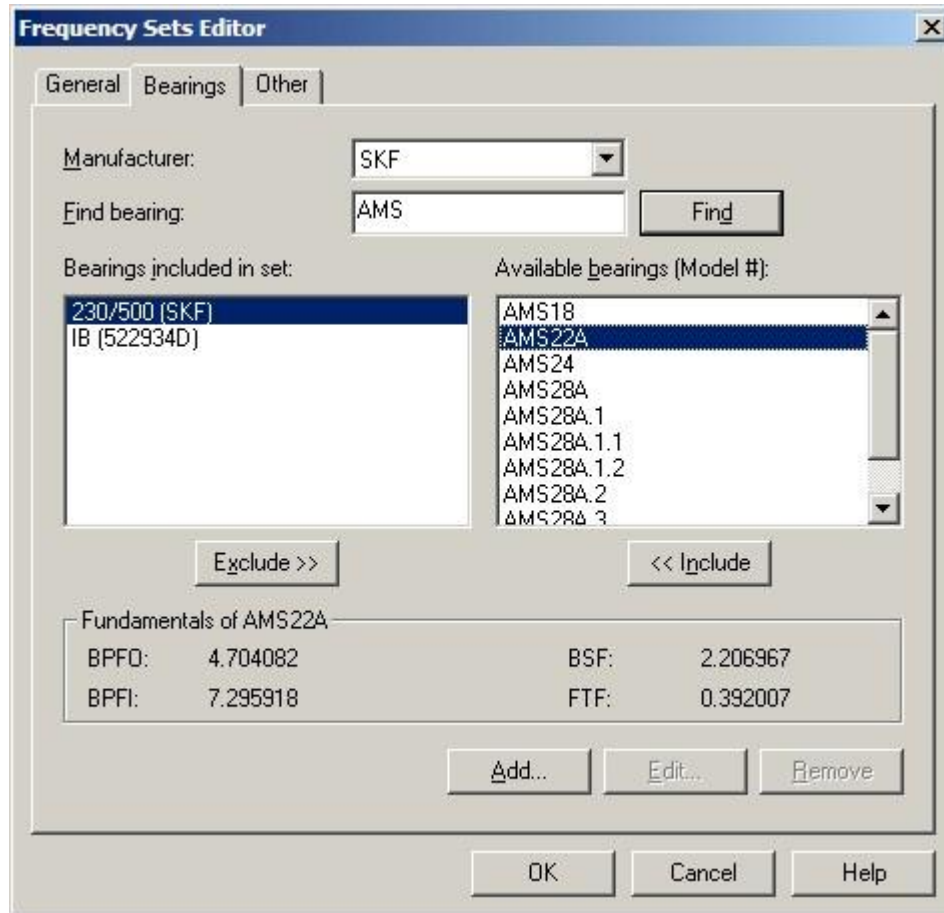


Figure 2 - 60.
The **Frequency Sets Editor** Screen's **Bearings** Tab.

The **Frequency Sets Editor / Bearings** tab allows selection and/or de-selection of bearings included in the current set.

Select manufacturer - Use the drop down list to select the desired bearing manufacturer.

Find bearing - Specify the bearing name and click the **Find** button. @ptitude Analyst locates bearings matching your entry, and displays them in the **Available bearings (Model #)** window.

Bearings included in set - Displays bearings currently included in the frequency set.

Available bearings (Model #) - Displays bearings from the selected manufacturer that match the entered criteria.

- Use the **<< Include** button to *include* the selected bearing(s) in the frequency set (move selected bearing(s) from the **Available bearings (Model)#** column to the **Bearings included in set** column).
- Use the **Exclude >>** button to *exclude* the selected bearing(s) from the frequency set (move selected bearing(s) from the **Bearings included in set** column to the **Available bearings (Model #)** column).

Fundamentals of – Displays the fault frequency settings for the selected bearing's components.

- Click **Add** to add bearings to the hierarchy, or **Edit** to modify an existing bearing. The **Bearing Editor** screen displays in both cases.
- Click **Remove** to remove a bearing from the bearing hierarchy.

Bearing Editor

- The **Bearing Editor** screen displays in either “edit” or “add” mode, depending on your previous selection in the **Frequency Sets Editor**.

The screenshot shows the 'Bearing Editor' window with the following data:

Identity	
Bearing model #:	Bearing1
Manufacturer:	SKF
Description:	

Dimensions	
Number of balls:	7
Pitch diameter:	0.625
Ball diameter:	0.156
Contact angle:	0

Fundamentals	
BPFD:	4.704082
BSF:	2.206967
BPF:	7.295918
FIF:	0.392007

Figure 2 - 61.
The **Bearing Editor** Screen.

The **Bearing model #** and **Manufacturer** fields in the screen's **Identity** area cannot be modified when in “edit” mode.

Bearing Editor fields include:

Identity area - Enter the identification characteristics in the following fields:

Bearing model #: - Displays the model number. Cannot be modified in “edit” mode.

Manufacturer: - Displays the bearing’s manufacturer. Cannot be modified in “edit” mode.

Description - Specify up to 32 characters that identify the new bearing.

Dimensions - Specify the appropriate values in the following fields:

Number of balls

Ball diameter

Pitch diameter

Contact angle

- Click the **Calculate** button. @ptitude Analyst automatically calculates and enters the **Fundamentals** values.

Fundamentals – Manually specify appropriate values in the available fields:

BPFO: (Ball Pass Freq. Outer race)

BPFI: (Ball Pass Freq. Inner race)

BSF: (Ball Spin Freq.)

FTF: (Fundamental Train Freq. / Cage Freq.)

- Click **OK** to save changes.
- Click **Cancel** to close screen without saving changes.

Other Tab

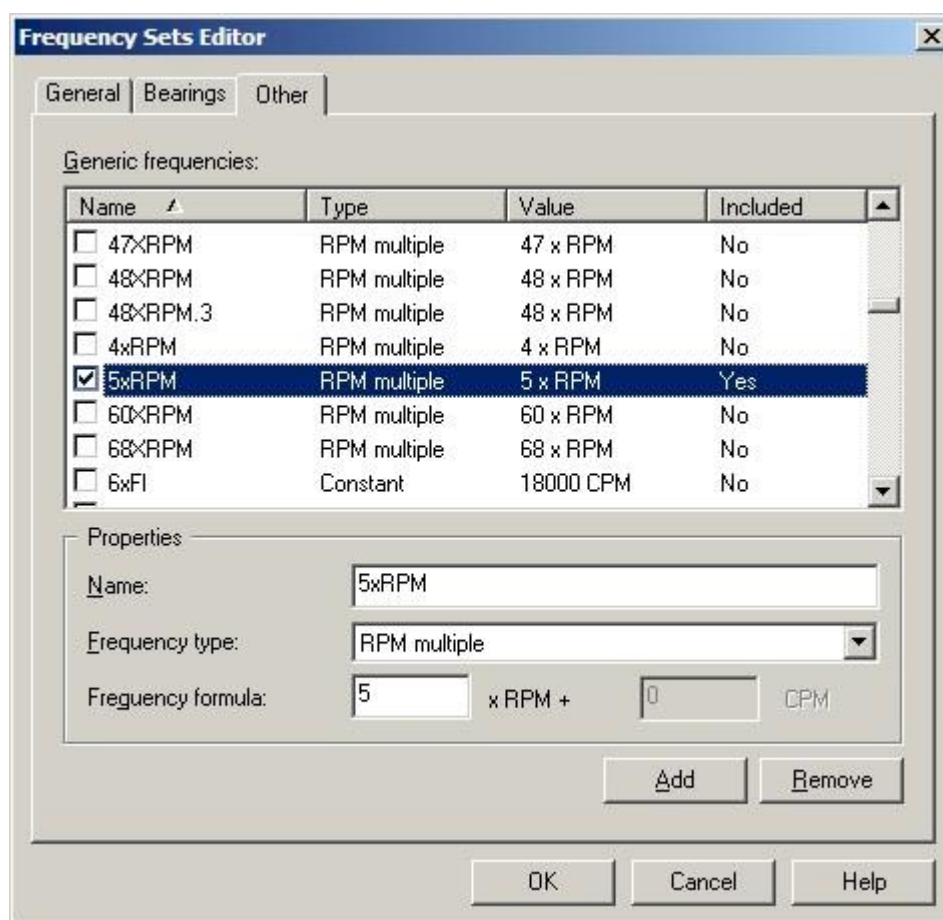


Figure 2 - 62.
The **Frequency Sets Editor** Screen's **Other** Tab.

Use the **Frequency Sets Editor / Other** tab to select a generic frequency to include in the current Frequency Set, or to add, edit, or remove a generic frequency.

The **Other** tab displays all **included generic frequencies**.

To include a frequency in the current frequency set:

- Click the frequency's checkbox in the **Included generic frequencies** area. The checkbox toggles the **Included** status between **Yes** and **No**.

To add a new frequency:

- Click the **Add** button. A new frequency displays with default settings that may be edited.

To remove a frequency:

- Select the desired frequency from the **Included generic frequencies** windows so that the frequency information is visible in the **Properties** area
- Click the **Remove** button.

- You cannot remove a frequency that is currently used within any frequency set. You must remove all associations with frequency sets before you can remove a frequency.

Properties- Displays the selected frequencies attributes. You may edit these attributes:

Name: - The selected frequency's name.

Frequency type: - The selected frequency's frequency type.

Frequency formula: - Specific fields based on the frequency type.

To edit frequency properties:

- Enter a descriptive name (up to 32 characters).
- Select the desired frequency type option from the drop down list.

Frequency type options include:

Constant - Constant frequency value. (Example: 10 Hz)

Offset - Multiple of running speed and offset (+) by constant frequency value. (Example: $4.00 \times \text{RPM} + 10 \text{ Hz}$)

RPM - Multiple of running speed. (Example: $4.00 \times \text{RPM}$)

Sideband - Multiple of running speed and offset (+ and -) by constant frequency value. (Example: $4.00 \times \text{RPM} + / - 10 \text{ Hz}$)

- Edit the applicable **Frequency formula** fields.
 - Specific **Frequency formula** edit options are available according to the current **frequency type** selection. If enabled, the first field is a running speed, or RPM value. The second field is a fixed frequency in Hz or CPM.

For example, with an RPM multiple frequency type, entering a 4 in the first field indicates that the frequency would show up at 4 times the running speed.

- Click the tab's **Save** button to save changes.
- Click **Undo** to undo changes.
- Click the **OK** button to close the tab. You will be prompted to save any unsaved changes.

Alarm Settings

Use the **Alarm Settings** to create alarms that can be assigned to one or more POINTs. Created alarms can be re-assigned and edited.

To access the Alarm Settings screen:

- Select the **Customize** menu's **Alarm Attributes / Alarm Settings** option. The **Alarm Settings** screen displays.

The screenshot shows the 'Alarm Settings' dialog box with the 'Overall' tab selected. The dialog has a title bar with a close button. Below the title bar are tabs: 'Overall', 'Band', 'Speed Alarm', 'Envelope', 'MCD', 'Inspection', and 'Messages'. The 'Overall' tab is active. Inside the tab, there is a section for 'Overall alarms:' with a dropdown menu showing '1'. Below this is a 'Properties' section with a 'Name:' field containing '1'. There are three radio buttons: 'Level' (selected), 'In window', and 'Out of window'. Below the properties is a 'Settings' section. It has two checked checkboxes: 'Danger high' and 'Alert high'. Next to 'Danger high' is a text box with the value '5'. Next to 'Alert high' is a text box with the value '3'. To the right of these settings is a color-coded display showing three horizontal bands: a red band at the top labeled 'Danger high', a yellow band in the middle labeled 'Alert high', and a green band at the bottom labeled 'Clear'. Below the settings section are 'Add' and 'Remove' buttons. At the bottom right of the dialog are 'Close' and 'Help' buttons.

Figure 2 - 63.
The **Alarm Settings** Screen's **Overall** Tab.

Alarm Settings - Overall

Existing alarms may be edited or removed from the hierarchy. The **Overall** tab allows you to create, edit, or remove shared Overall alarms.

To create a new alarm:

- Click the tab's **Add** button. The **Overall alarms** field displays “**New Overall Alarm**” to indicate that you have created a new alarm.
- In the **Name** field, assign the new alarm a unique name.
 - Once the editing process begins, the **Overall alarms** field is no longer accessible. You must complete and **Save** your edits or cancel them by clicking the **Undo** button.
- Click **Save**. The **Overall alarms** field now displays the new alarm name you specified.

You can also adjust the alarm's **Properties** and **Settings** in this tab. The current settings graphically display in the tab's **Settings** area.

To edit or create Overall Alarm Properties and Settings:

Properties – Select the type of Overall Alarm by clicking the desired option button. Choose from:

Level - Measurements *exceeding* the specified alert and danger **Settings** will result in an alarm condition.

In Window - Measurements *falling within* the specified alert low, danger, and alert high **Settings** will result in an alarm condition.

Out Of Window - Measurements *falling outside* the specified danger low, alert low, alert high, and danger high **Settings** will result in an alarm condition.

Settings – Select the levels you wish to include by clicking each checkbox.

- The availability of the levels, their checkboxes, and their text fields is based on the type of Overall Alarm selected in the **Properties** area.
- Enter the desired values for each available alarm level.
- Click the **Save** button to save your alarm settings.

To remove an existing alarm from the database:

- Select the desired alarm from the drop down list.
- Click the **Remove** button. A confirmation dialog displays.
- Confirm removal. The selected alarm is permanently removed from the hierarchy.
 - An alarm cannot be removed if it is currently assigned to one or more POINT. A warning dialog displays if you attempt to remove a currently assigned alarm.

Alarm Settings – Band

Band Alarms provide alert and danger alarms on both peak and spectral values within a defined frequency band. Use the **Band** tab to edit and/or specify POINTs' bands and to manage shared band alarms.

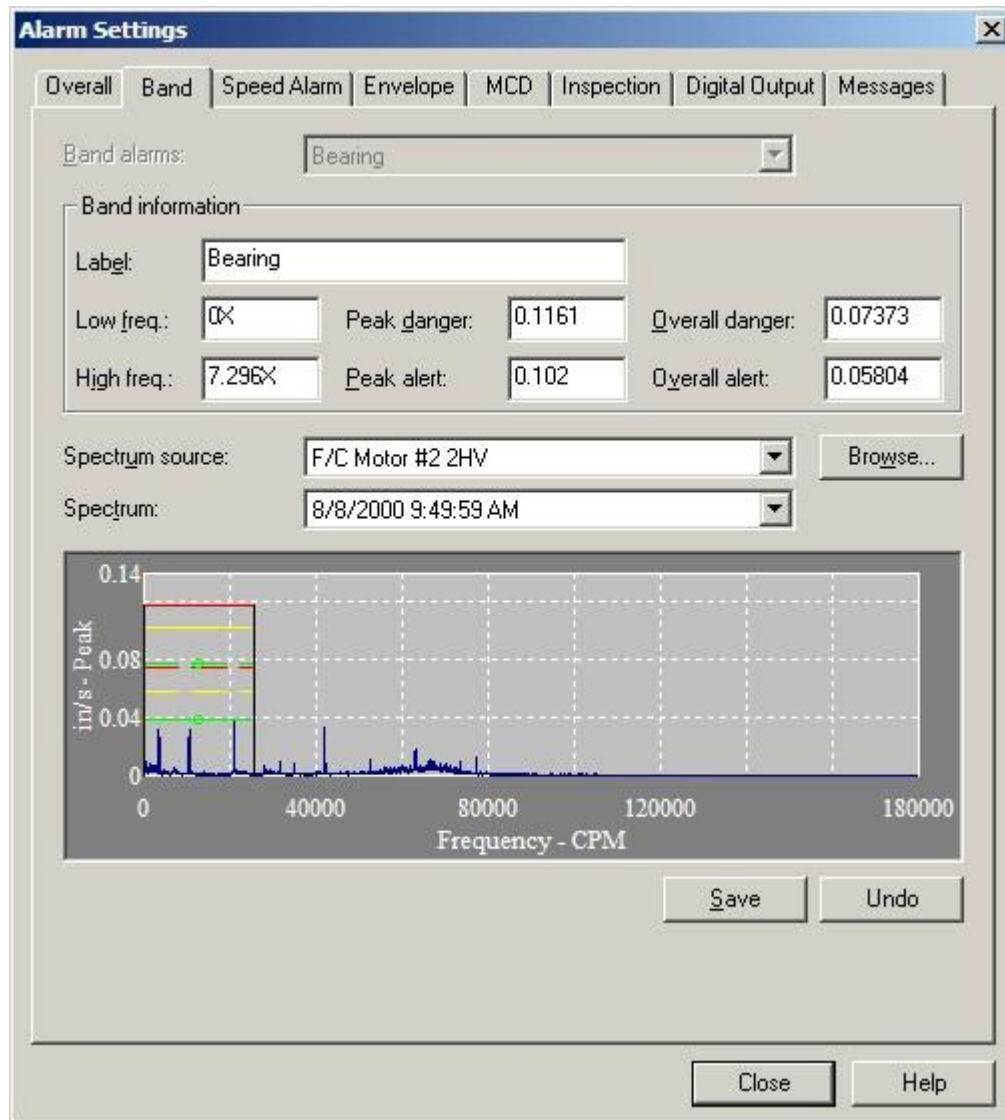


Figure 2 - 64.
The **Alarm Settings** Screen's **Band** Tab.

Band alarms – Displays the current band alarm. All available band alarms list in the drop down list.

Band information – Edit and view alarm values.

The following fields are available for viewing set values or editing:

Label – Displays the band name.

Low freq – View or edit the low frequency value or multiple of running speed.

High freq – View or edit the high frequency value or multiple of running speed.

- To make the value a multiple of running speed, add an "x" to the end of the entered number. For example, enter "1.5x" for 1.5 times running speed.

Peak danger – View or edit the peak danger value or % Full Scale value.

Peak alert – View or edit the peak alert danger value or % Full Scale value.

Overall danger – View or edit the overall danger value or % Full Scale value.

Overall alert – View or edit the overall alert value or % Full Scale value.

- To make the value a percentage of the full scale, add a "%" to the end of the entered number. For example, enter "10%" for 10 percent of the full scale value at the time the band is used.
- The tab's spectrum graphic display automatically updates as edits are made.

The **Spectrum source** field displays the source of the spectrum if two or more POINTs are currently active.

The **Spectrum** field displays all available spectra for the active POINT in a drop down list. The current spectrum displays graphically below.

- The tab's spectrum graphic display automatically updates as edits are made

Browse – Click to select a POINT to use as the source of the spectrum readings viewed while editing the band alarm. The **POINT Selection** dialog displays. Select a POINT to use to define a shared alarm. The hierarchy displays. Select the desired POINT and click **OK**.

- Bands defined in the **Alarm Settings** are **not** assigned to the POINTs used to create them.

Edits may be made on the tab's spectrum graphic display.

To edit the band graphically:

- Click on the portions of the graphic band to edit. Notice the mouse cursor changes when over a portion of the band.
- Drag the band piece to a new position. The value in the edit field updates.
 - When editing, you may **Save** or **Undo** changes for the current alarm.
- Click **Add** to create a new band alarm.
- Click **Remove** to remove the current band alarm. A confirmation dialog displays.
- Confirm action. The band alarm is deleted.
 - A band alarm may not be removed if it is currently assigned.

Alarm Settings – Speed Alarm

Speed alarms allow you to customize overall and band alarm levels based on machine speed. Use the **Speed Alarm** tab to edit and/or specify the POINTs' alarm adjustments for each speed region.

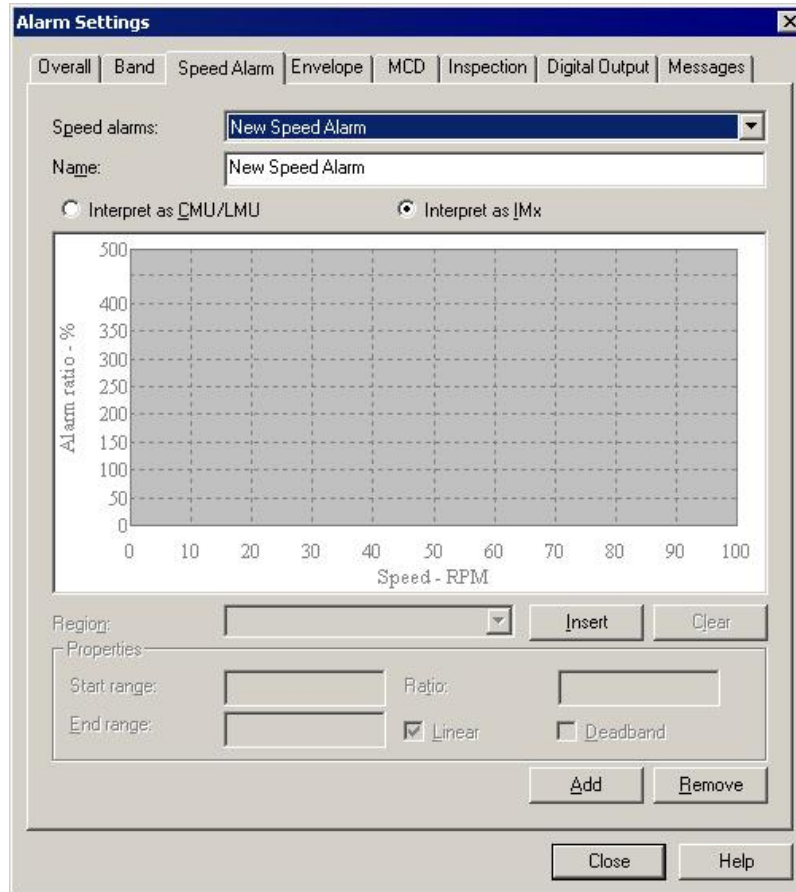


Figure 2 - 65.
The Alarm Settings / Speed Alarm tab.

Speed alarm – Displays the current speed alarm. All available speed alarms list in the drop down list.

Name – Displays the speed alarm name. **Range** – Select the speed regions for which the **Properties** settings will apply. You may select the region from the **Range** drop down list, or by clicking on the specific region on the speed alarm display. The values in the **Properties** fields update to reflect the specified speed region.

- Click **Insert** to add a new region to the speed alarm.
- Click **Clear** to remove the selected speed region.

Properties – Edit and view alarm values.

The following fields are available for viewing set values or editing:

Start / End Range – Enter each region's starting and stopping RPMs (i.e., 0 to 1000, 1000 to 2000, 2000 to 3000, etc.).

Ratio - Enter the adjustment to overall and band alarm levels. The normal running speed region's ratio will be 100. If the next higher speed range is expected to produce vibration levels 10% higher than the nominal running speed, then the next speed range ratio would be set to 110.

Linear - This option allows for either a flat, rectangular definition of the adjustment (if disabled, the entire region will have the same ratio), or a more linear definition of the ratio (if enabled, the ratio will start from the level defined in the previous speed region and rise throughout the region until it reaches the next speed region's level). **Deadband** - When enabled, no alarm processing will occur for this region. This is mainly to be used when the machine reaches its resonant speed, at which vibration will be indeterminately high. When enabled, **Ratio** and **Linear** fields are disabled.

- The tab's spectrum graphic display automatically updates as edits are made.
- Click **Add** to create a new speed alarm.
- Click **Remove** to remove the current speed alarm. A confirmation dialog displays.
- Confirm action. The speed alarm is deleted.
- A speed alarm may not be removed if it is currently assigned.

Alarm Settings – Envelope

Use the **Envelope** tab to manage and edit shared envelope alarms. All available envelope alarms display in the **Envelope alarms** drop down list.

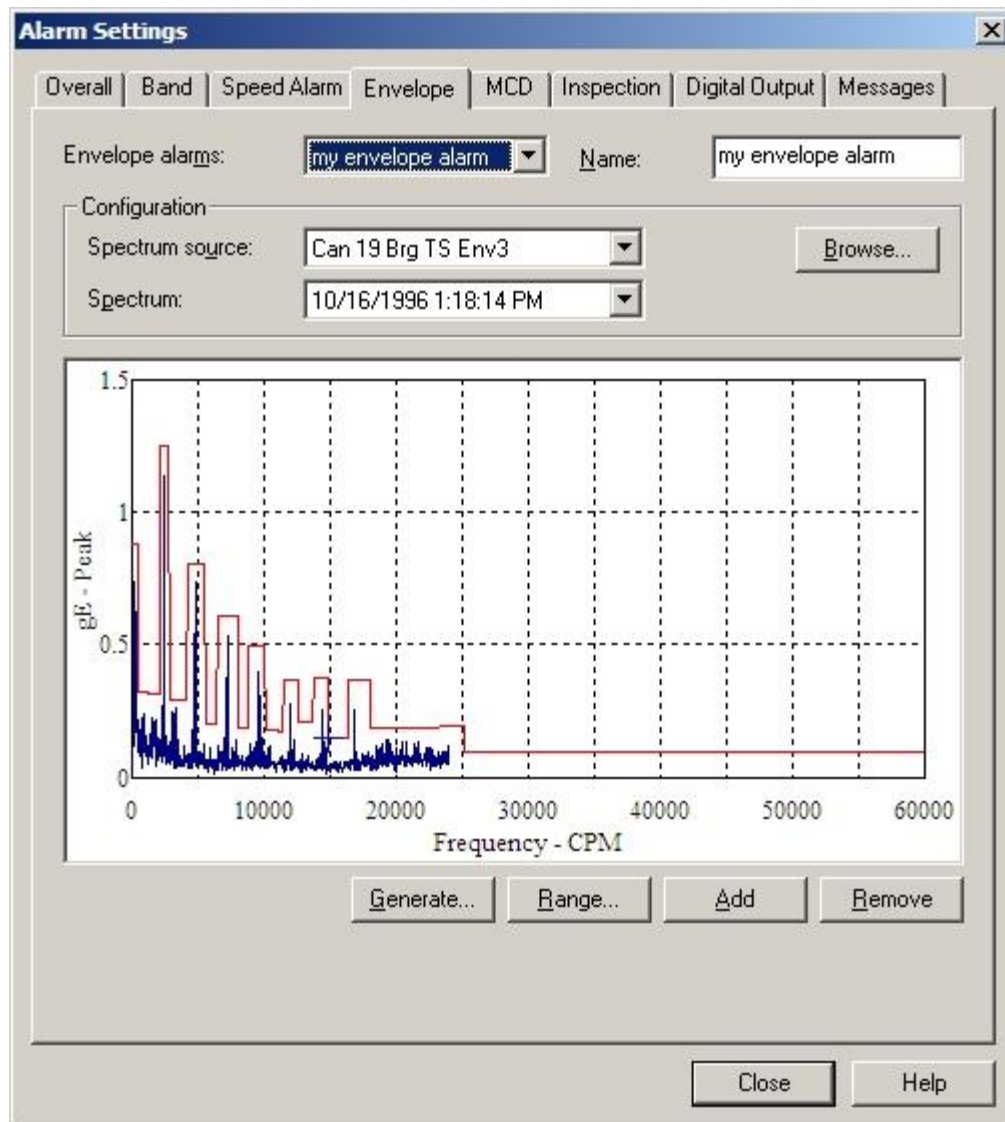


Figure 2 - 66.
The **Alarm Settings** Screen's **Envelope** Tab.

All available envelope **alarms** display in the Envelope alarm drop down list, or you may Generate a new envelope alarm.

Shared envelope alarms may not be edited from this tab (use the Customize menu's Alarm Database option to edit "shared" alarm parameters).

- First, select the FFT spectrum to which the envelope alarm will conform, using:

Spectrum source – specifies from which POINT to graphically display the spectrum if two or more POINTs are currently active.

Spectrum – displays all available time record measurements for the active POINT (typically the baseline measurement) in a drop down list. The current spectrum displays graphically below.

To assign a "shared" envelope alarm to the POINT:

- On the **Envelope** tab, select the desired shared envelope alarm's name from the **Envelope Alarms** drop down list, the tab fields display the specified alarm's settings and the specified envelope appears on the displayed spectrum.

To Generate a new envelope alarm for the POINT:

- Select the **Envelope Alarms** drop down list's **<Custom envelope>** option.
- Click the **Generate** button. The **Generate Envelope Alarm** dialog displays.

Use the **Generate Envelope Alarm** Dialog to create an envelope alarm based on your entered values.

% Overdrive – Enter the percent of the POINT's full scale value to determine the height of the envelope alarm above the spectral peak. The smaller the number specified, the tighter the comparison envelope conforms to the designated spectrum.

Spreading %– Enter percent of full scale (or center frequency) to increase the width of the envelope alarm around spectral peaks. The smaller the number specified, the tighter the envelope conforms to the sides of the peaks in the specified spectrum.

Spreading Type – (either **Center Frequency** or **Full Scale**). If **Center Freq.** is selected, the bandwidth about each center frequency increases with higher frequencies. If **Full Scale** is selected, the bandwidth about each center frequency is constant, based on a percent of the full scale frequency.

Threshold – Enter % of the POINT's full scale value, or an absolute value. The threshold value provides an opportunity to eliminate false alarms due to vibration "noise." It also establishes the envelope alarm's low amplitude "threshold" on the displayed spectrum. The envelope alarm conforms around all peaks whose amplitudes are higher than the established threshold as per the **Overdrive %**, **Spreading %**, and **Spreading Type** settings. All peaks below the established threshold are ignored by the envelope alarm. The **Threshold %** default value is set using the **Customize** menu's **Preferences / Plot** tab.

- Click **OK** to generate an envelope alarm based on your entries. Click **Cancel** to close the dialog without creating an envelope alarm.

Editing the Envelope Alarm

After you have generated an envelope alarm, you can edit it graphically using your mouse, or enter numeric envelope parameters using the **Set Frequency Range** dialog.

To graphically edit the envelope alarm:

- Click anywhere inside the **Envelope** tab's spectrum window. The cursor appears as an up arrow.
- Click the mouse on the portion of the envelope alarm line to be edited. A square icon identifies where the line will be drawn.
- Drag the mouse to draw the line to create the new envelope alarm.
- Click the tab's **OK** button to save your changes.

Tip – You can use your keyboard's **Insert** key to begin drawing the envelope alarm line. Then, use the arrow keys to move the line, and the **Insert** key again to stop drawing the

line. Refer to **Section 1, Appendix B SKF @ptitude Analyst Keyboard Support** for more information on using your keyboard to edit your envelope alarm.

To edit the envelope alarm using numeric frequency ranges:

- Click the **Set Range** button. The **Set Frequency Range** dialog displays.
- Use the **Set Frequency Range** dialog to enter low frequency, high frequency, and level values to edit an existing envelope alarm.

To numerically edit an envelope alarm:

- Enter the desired low frequency, high frequency, and level value.
- Click **OK**. The displayed envelope alarm automatically conforms to your entries.

Messages

Use the **Customize / Alarm Settings** screen's **Messages** tab to create shared (public) alarm messages to assign to machines and POINTs to automatically display important alarm information.

All previously defined alarm messages appear in the **Alarm messages** drop down list.

To create a public Message:

- Select the **Customize** menu's **Alarm Attributes / Alarm Settings** option. The **Alarm Settings** screen displays.
- Select the **Messages** tab.
- Click the **Messages** tab's **Add** button. The tab enters edit mode.
- Specify appropriate information into the following fields:

Name – Specify a name to define your custom message.

Format – Select the message format from the drop down list. Available options include:

Free form – Allows you to manually type in the summary and content for your message.

Summary – Type in text summarizing your alarm message for easy recognition. For example, if you have an alarm message that details shut down instructions in the case of an overall danger high alarm level, your summary may read, "Emergency Shut Down Instructions."

Content – Enter your complete alarm message in the content text area. Using the above example, your alarm message content would include detailed shut down instructions, and any other pertinent information required in the case of the triggered alarm type.

- Click the **Save** button to save the new message and add it to the available public messages.
- Click the **Undo** button to undo changes.
- Click **Remove** to remove the current message.
 - Messages currently in use cannot be removed.

Speed Tag

Speed Tag Overview

Speed tagging allows you to link multiple POINTs (Microlog dynamic data POINTs) to a specific Microlog DAD dynamic or manual input speed reference POINT. Data collected for these linked POINTs reflect the rotating speed of their associated speed reference POINT.

Speed Tag Dialog

The **Speed Tag** dialog allows you to select or clear speed tags specified *for POINTs selected in the hierarchy list*.

To set speed tag:

- Highlight a POINT and select the **Edit** menu's **Properties** option. The **POINT Properties** screen displays.
 - You may also access the **POINT Properties** screen by right clicking while the POINT is selected, or by using the toolbar button.
- Select the **Setup** tab.
- Click the **Select POINT** button in the tab's **Speed tag reference** area. The **Speed Tag** dialog displays.

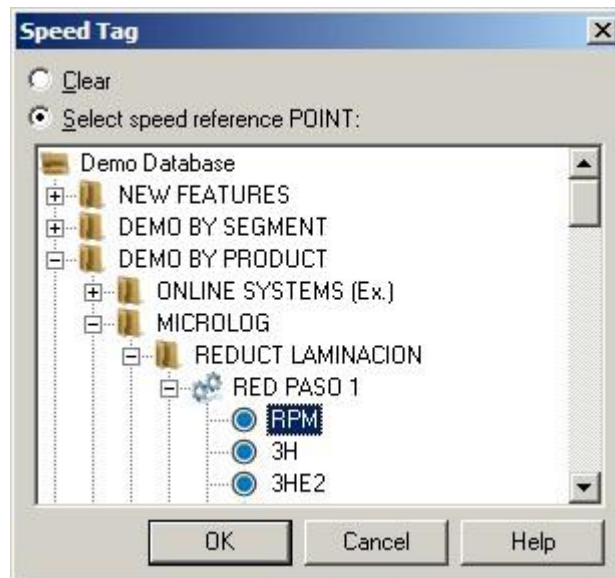


Figure 2 - 67.
The **Speed Tag** Dialog.

- Click the **Select speed reference POINT** option button.
- Select the desired speed reference POINT from the hierarchical display.

To clear speed tag:

- Click the **Clear** button in the **Speed Tag** dialog. The speed tag is cleared for the selected POINT.
- Click **OK** to save changes.
- Click **Cancel** to undo settings.

Statistical Alarms Wizard

Statistical Overall Alarms Wizard

Overview

For POINTs in a **Workspace** window, the **Statistical Overall Alarms Wizard** guides you through a process that automatically generates accurate overall alarm settings based upon historical measurement data.

- The Statistical Overall Alarms Wizard only operates on an active Workspace window.

To initiate the wizard:

- Open the desired Workspace window.
- Select the **Customize** menu's **Alarm Attributes / Statistical Overall...** option. The wizard's Introduction screen displays.

Introduction

The **Introduction** screen is the first screen in the **Statistical Overall Alarms Wizard**. The measurement data used to generate the alarm values is generated from the POINTs included in the selected Workspace (identified in the **Workspace** field).

- From the **Workspace** drop down list, select the Workspace from which you would like to use to generate the alarm values.
- From the **Full scale units** drop down list, select a measurement unit. The **Full scale units** drop down list displays a list of the full scale units for POINTs in the selected workspace. Only POINTs with the selected measurement unit are used to generate alarm values.
- Click the Save processing details to "Statistical Overall Alarms.log" check box to create and save a log file.
- Click **Next** to continue.

Alarm Assignment

Select the calculation method to use to determine alarm values.

Individual POINTs – Select to use each POINT's readings to generate a unique set of alarm values for the POINT. The resulting values are assigned to each POINT as a *private* alarm.

- This operation generates and assigns a private alarm for **each** POINT.

Across all POINTs – Select to use the readings for all the POINTs to generate one set of alarm values that is assigned to each POINT included in the calculation. The resulting values are saved as a *shared* alarm.

- If **Across all POINTs** is selected, a **Review** screen displays before alarms are applied, allowing verification and confirmation.

- Click **Next** to continue.
- Click **Back** to return to the previous screen.
- Click **Cancel** to exit the wizard.

Measurement Selection

Determine the method for selecting the measurement data to generate overall alarm values.

All measurements – Select to use all measurement data to generate the overall alarm values.

Measurements in this date range – Select and enter a date range to use all measurements in the indicated date range to generate the overall alarm values.

Last fixed number of measurements – Select and enter number of measurements to use the specified number of measurements to generate overall alarm values.

Limits – Allow you to filter abnormal measurements from the calculation:

Max. Amplitude– Enter the maximum amplitude of the overall value to include in calculation.

Min. Amplitude – Enter the minimum amplitude of the overall value to include in calculation.

Min Measurements – Enter the minimum number of the POINT's measurements to be included in calculation.

- Only POINTs that have the number of indicated minimum measurements (or more) are included in the calculation.
- Min. Measurements field is not available if measurement selection is "**Last fixed number of measurements.**"

Channel – Enter the channel number of multi-channel POINTs to included in the calculation.

Enable outlier removal – An "outlier" refers to data that is not typical, or is outside a specified data measurement range. When the **Enable outlier removal** check box is enabled, measurement values that fall outside the outlier range are excluded from the calculation.

- Outlier detection only occurs if the number of measurements is greater than or equal to the **Min Measurements** specification.

Outlier threshold factor – Enter a threshold factor (1.0 to 5.0) to calculate the lower and upper limits of the outlier range (outlier threshold). The threshold factor is multiplied by the standard deviation to calculate the outlier threshold. The default threshold factor is 3.0.

- Click **Next** to continue.
- Click **Back** to return to the previous screen.
- Click **Cancel** to exit the wizard.

Alarm Type

Select the type of overall alarm to generate:

Level – Provides two alarm levels (**Alert High** and **Danger High**). An appropriate alarm registers if the measured value is greater than either of the alarm levels.

Out of Window – Provides four alarm levels (**Danger High**, **Alert High**, **Alert Low**, **Danger Low**). An appropriate alarm registers if the measured value progresses out of the alarm window (does not fall between the alert high and alert low alarm settings).

- Click **Next** to continue.
- Click **Back** to return to the previous screen.
- Click **Cancel** to exit the wizard.

Generation Parameters

The screenshot shows a dialog box titled "Statistical Overall Alarms" with a close button (X) in the top right corner. Inside the dialog, there is a text box with the following text: "Choose the type of overall alarm ('Level' or 'Out of window') to be generated and enter the factor for each alarm level in the standard deviation factors. Alarm levels are calculated using the equation Value = Mean +/- (n * Standard Deviation) where n represents the factor for the level being calculated. The + is used for high levels and - is used for low levels." Below this text, there are two radio buttons: "Level" (which is selected) and "Out of window". Underneath the radio buttons, there is a section titled "Standard deviation factors" which contains four input fields arranged in a 2x2 grid. The top row has "Danger high:" with a value of 3 and "Alert low:" with a value of 2. The bottom row has "Alert high:" with a value of 2 and "Danger low:" with a value of 3. At the bottom of the dialog, there are five buttons: "Cancel", "< Back", "Next >", "Finish", and "Help".

Figure 2 - 68.

The **Statistical Overall Alarms Wizard**'s Generation Parameters Screen.

Note that you need not perform the standard deviation math. The wizard's default values have been selected to produce overall alarms that work well for most situations. However, if you wish to conform the overall alarms closer, enter smaller numbers. To conform the overall alarms further away, enter higher numbers. After completing the wizard, view your trend plots and make adjustments as necessary.

- If necessary, edit the standard deviation information to be used in the overall alarm calculations.

Standard deviation factors

Danger High – Value to be multiplied by the standard deviation to establish the danger high level.

Alert High – Value to be multiplied by the standard deviation to establish the alert high level.

Alert Low – Value to be multiplied by the standard deviation to establish the alert low level.

Danger Low – Value to be multiplied by the standard deviation to establish the danger low level.

- Click **Next** to continue.
- Click **Back** to return to the previous screen.
- Click **Cancel** to exit the wizard.

Minimum Alarm Values

Set the minimum alarm values to be used in the calculation. If the standard deviation is small, the minimum alarm values allow you to set a wider range, minimizing the chance for bad alarms to occur.

Enter the minimum values for **Danger High**, **Alert High**, **Alert Low**, and **Danger Low**.

- Click **Next** to continue.
- Click **Back** to return to the previous screen.
- Click **Cancel** to exit the wizard.

Process

Click the **Next** button to begin the overall alarm calculations. Process progress displays along with the number of POINTs processed.

- Click **Next** to continue.
- Click **Back** to return to the previous screen.
- Click **Cancel** to exit the wizard.

Review

- This screen only displays if **Across all POINTs** was selected on the wizard's **Alarm Assignment** screen.

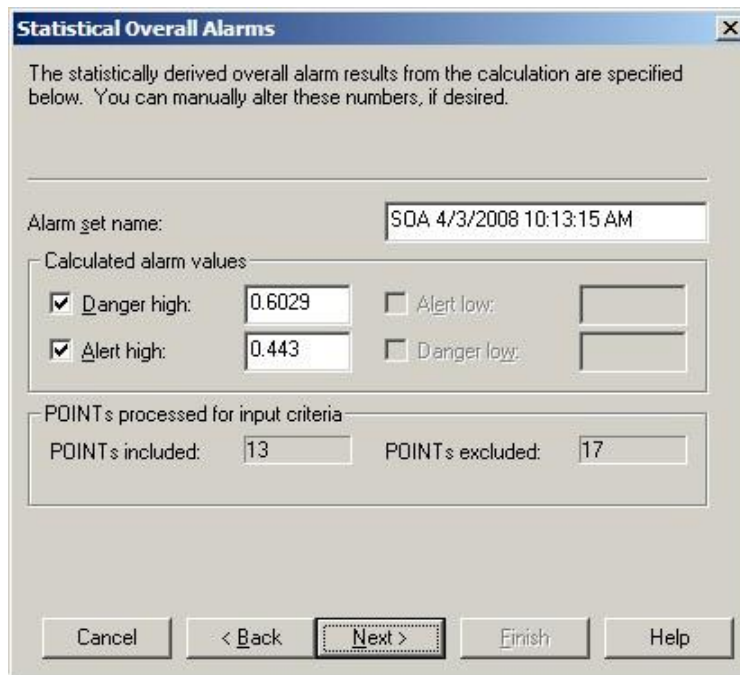


Figure 2 - 69.

The **Statistical Overall Alarms Wizard**'s Review Screen.

The statistically derived overall alarm results display on this screen. These numbers may be edited, if necessary.

Fields include:

Alarm set name – Specify a unique name for the alarm.

Calculated alarm values – Edit values as needed.

- **Calculated alarm values** fields are available based on overall alarm type selection.

POINTs processed for input criteria – Number of POINTs selected as candidates for processing.

POINTs included – Number of included POINTs.

POINTs excluded – Number of excluded POINTs.

- Alarms are still applied to the POINTs excluded from calculation functions.
- Click **Next** to continue.
- Click **Back** to return to the previous screen.
- Click **Cancel** to exit the wizard.

Finish

- Click the **Finish** button to assign the statistically derived overall alarm to all POINTs in the specified workspace.

Process progress displays on the screen.

- Click **Back** to return to the previous screen.
- Click **Cancel** to stop the operation without changing the POINTs.

Templates

Templates save time, contribute to consistent organization, and allow you to make bulk entries. For example, you can quickly set the machine speed for all POINTs beneath a machine with a template. Templates allow you to define custom organizational structures for repeated use when building or defining your hierarchy.

- The same template may be used across many different hierarchies.

Managing Templates

To add a new template:

- Select the **Customize** menu's **Template** option. The **Template** screen displays.

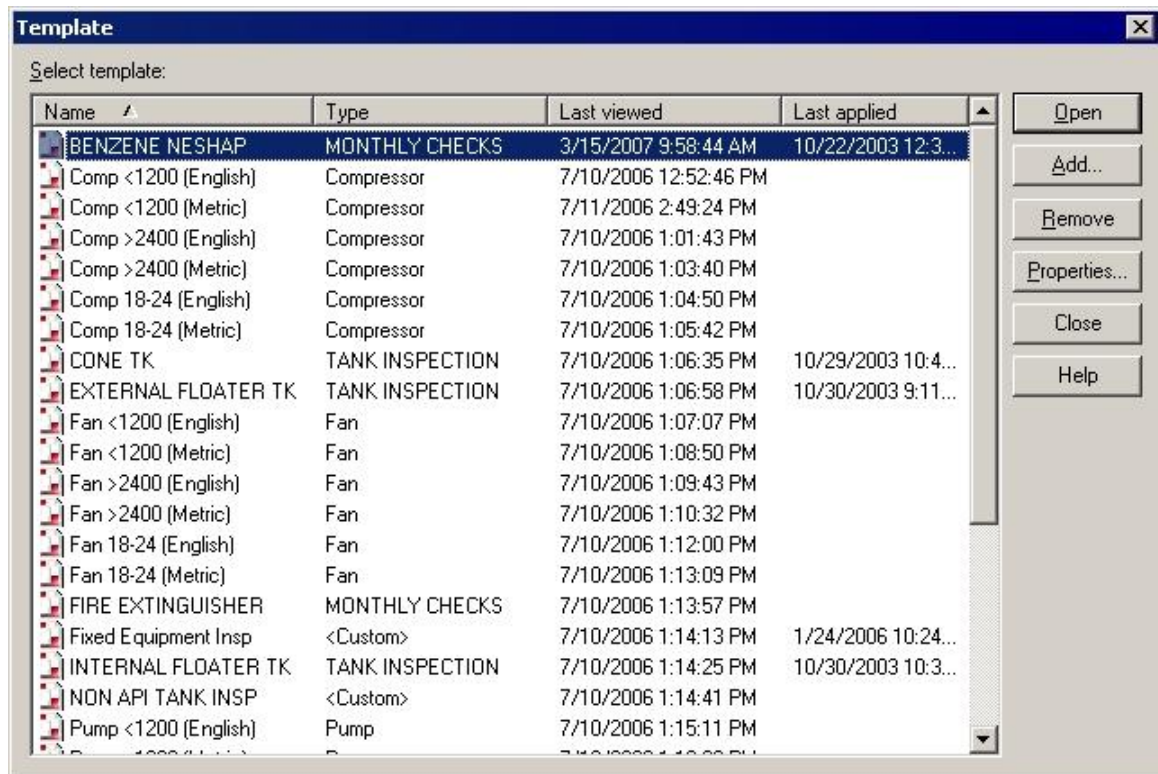


Figure 2 - 70.
The **Template** Screen.

- Click the screen's **Add** button. The **Template Properties** dialog displays.
 - Enter the new template's **Name** and **Description**.
 - Select the template's **Type** from the drop down list. Select a previously created template or **<Custom>**.
 - If you need a new template that is only slightly different from a previously created template, you can select a previous template as your **Type** and then edit only the necessary items.
 - Click the dialog's **OK** button. The new template window displays.
- In the template window, insert new Groups and POINTs to build the new template's hierarchy structure.
- Using the **Insert** menu, insert desired structure elements (groups and POINTs) in the desired configuration into the template window.
 - You may also use **Copy**, **Paste**, and **Paste Multiple** to build your template's structure.

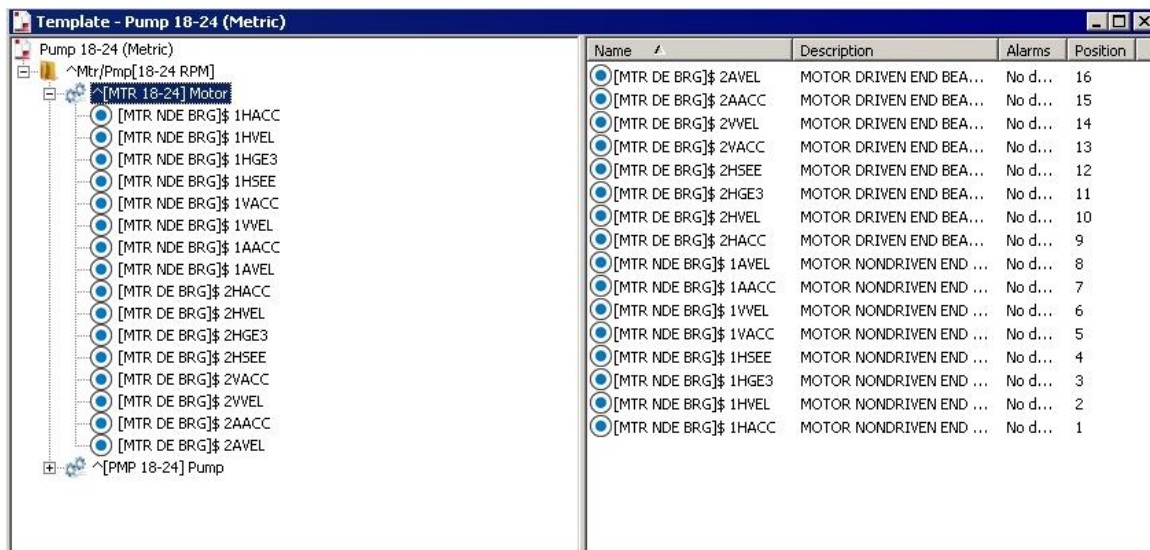


Figure 2 - 71.
Template Window With Custom Structure.

When building your template structure, you may also set up custom names using “special” characters in the name fields.

When applying a template, the template wizard assists with naming hierarchy items whose template name includes “special” characters

Custom Names

Templates hierarchy items may be inserted in your hierarchy :

- With the name specified in the template, or
- With the Template wizard prompting you to enter a name for items inserted in your hierarchy, or

- With custom names created by the Template wizard that are based upon your existing hierarchy.

The last two options are accomplished by special characters within your template hierarchy names.

- When a new item is inserted into the Template, its **Properties** dialog displays.
 - You may also access the **Properties** dialog by right-clicking to access the context menu, or using the **Properties** toolbar button.

You can configure the custom naming feature to prompt you to input a unique name for the specified item as the template is applied. You can also set up your template to automatically name structure items based on your entered parameters.

To set up name prompt:

- In the Properties dialog's **Name** field, enter a "^" as the first character. During the application of the template, the template wizard will prompt you to either accept the item's name as it appears after the "^", or enter a new name for the hierarchy item as the template is being processed.

Use of special characters enables automatic naming during template application. Based on your entries, the new items take their name from the portions of the parent item's name.

To set up automatic naming:

- In the **Properties** dialog's **Name** field, use a "\$" to cause the inserted template item (child) to use a portion of the target hierarchy parent's name. Each "\$" in the template item's name is replaced by a sequential word from the target hierarchy parent's name. Use as many "\$"s as necessary. For example, if the parent item's name is "Dryer Section," you might apply a template item named "\$ \$ Felts." This will insert the template item (child) and name it "Dryer Section Felts."
- Also, square brackets ("[]") may be used to strip items from the final name. This allows you to use "[]"s and "\$"s together to use some portions of the parent's name while skipping others. For example, if the parent's name is "FD Fan", and you wish to remove the "FD" prefix, place "[]"s around the dollar sign representing the "FD" ([\$]\$). The inserted item will be named "Fan." You can also use "[]"s to include comments that are visible when viewing the template and as the template is applied. The comment text does not appear in the final name. To do so, enter your auto-naming characters followed by your comment text enclosed in brackets. For example, using the earlier "FD Fan" example, the entry "[\$]\$[left env] would result in the item being named "Fan." The comment text, "left env" is visible to you when you view the template, and as the template is applied, but is deleted from the item's name in the hierarchy list.-

To open an existing template:

- In the **Template** screen, select the template to open.
- Click the screen's **Open** button. The selected template window displays.

To remove an existing template:

- In the **Template** screen, select the template to remove.

- Click the screen's **Remove** button. When prompted, confirm action.

The selected template is removed.

To add a Template Type:

- In the **Template** screen, click **Add**, or select an existing template and click **Edit**. The **Template Properties** dialog displays.
- In the **General** tab's **Type** field, place your cursor in the drop down list and enter the new type name.
- Click **OK** to save the new template type and apply it to the current template.

Applying Templates

To apply a template:

- In your target **Hierarchy**, select the item under which you wish the template items to branch.
- Select the **Insert** menu's **Apply Template** option. The **Apply Template** dialog displays.

The **Apply Template** dialog lists all available templates.

- Select desired template and click **Apply** to launch the **Apply Template Wizard**.

Introduction Screen

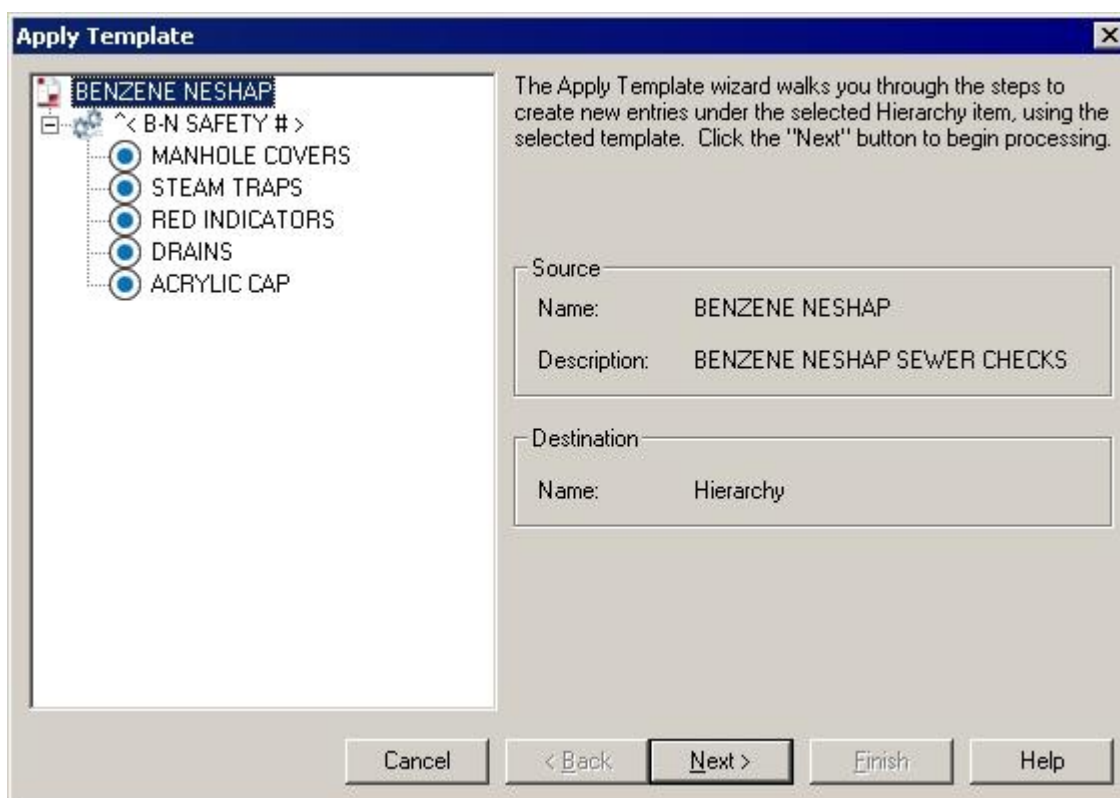


Figure 2 - 72.
The **Apply Template Wizard** Screen.

The **Apply Template Wizard** guides you through the required steps to create new entries under the selected hierarchy item, using the selected template.

The introduction screen displays the following information about the selected template:

Name – Displays the name of the template being applied.

Description – Displays the description provided for the template.

Destination – Displays the location in the hierarchy to which the template will be applied.

Before continuing, ensure the template name is correct, and ensure the destination is accurate.

- Click **Next** to continue.

Configuration Screen

The template application process begins on the **Configuration** screen. This screen walks through the template, gathering information as needed:

Name - If necessary, you will be prompted to specify the name of the item being processed.

Running speed - Specify the machine speeds for the highlighted machine. This speed will be used to set the speed of each POINT beneath the machine.

- The processing stops to allow you to enter necessary information.

Custom Naming

- You will be prompted to enter a name if you set your template up using the special name-prompt character “^.” Your structure elements will be automatically named if you set up your template using auto-name characters.

- Click **Next** to continue.

When the template processing is complete, click **Next** to continue to the build screen.

- View the template’s progress in the screen’s progress bar.
- Click **Back** to return to the wizard’s last stopping point.

Build Screen

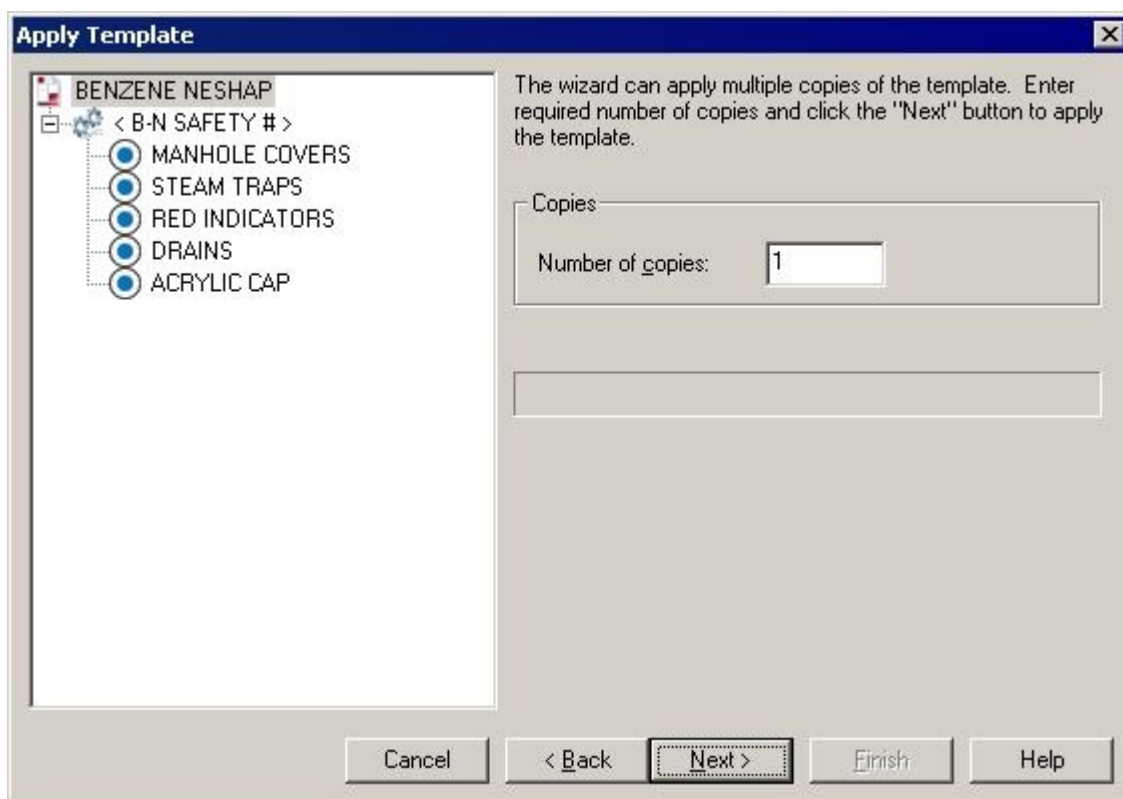


Figure 2 - 73.

The **Apply Template Wizard** Screen.

This screen uses the template to build the template hierarchy items within the specified target hierarchy item.

- The wizard is capable of generating multiple copies of the template.
- Specify the number of copies required.
- Click **Next** to build the hierarchy.
- Click **Finish** to close the wizard.

Working with Filters

Filters allow you to setup and apply filter criteria that determine which POINTs display in a new filtered **Workspace** window. Filtered workspaces group together POINTs and Groups (based on your filter input) in one window for easy comparison and analysis.

Managing Filters

Use the **Customize** menu's **Filters** option to manage (add, copy, edit, and remove) filters. This allows you to define reusable filters.

To add a new filter:

- Select the **Customize** menu's **Filters** option. The **Filters** dialog displays.
- Click the **Add** button. The **Filter Editor** screen displays.

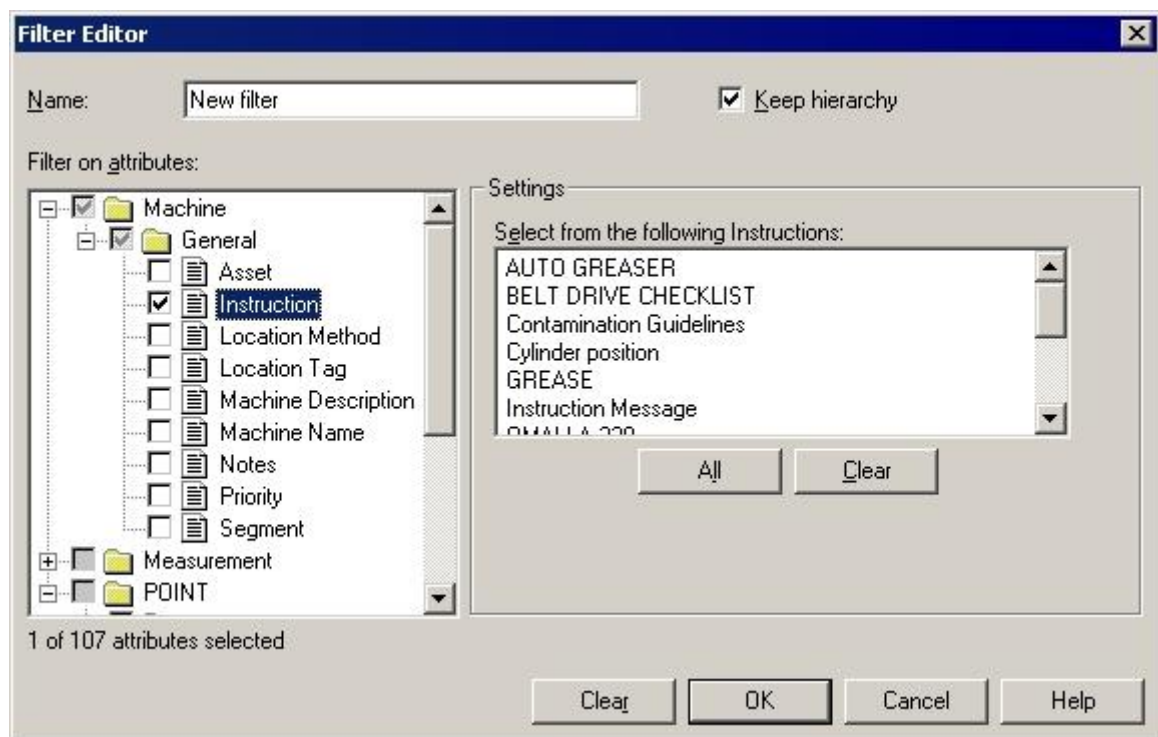


Figure 2 - 74.
The **Filter Editor** Screen.

Name - Specify the new filter's name.

- It is helpful to give the filter a name based on its criteria for easy recognition. For example, if you need to sort Groups based on their priority setting, you may want to create and name a filter specifically for **Priority**.

Keep hierarchy – Click the checkbox to determine whether the hierarchy Groups appear with their filtered POINTs in the filtered workspace, or whether only the filtered POINTs appear in the filtered workspace. If disabled, filtered POINTs appear beneath the

filtered machine without the original hierarchical format. The filtered workspace lists all filtered POINTs under a “Filtered Machine” hierarchy item.

Filter on attributes – Define which attributes to filter on. Attributes are categorized by machine, measurement, POINT, data type, and/or attribute type. Select an attribute group to modify its individual settings.

Settings – Displays current individual attribute settings for the specified attribute category. Use the edit fields to view and/or edit attributes as necessary.

- When one or more attribute within an attribute category is included in the current filter, a checkmark displays next to the attribute category folder.
- Use the **All** and **Clear** buttons to quickly include all or none of the displayed attributes (rather than selecting / de-selecting one by one) for the selected attribute category in your current filter.

Include – Specify whether to filter for POINTs that match *every* attribute setting, or filter for POINTs that match at least *one* attribute setting.

Any Selected – Select to filter for POINTs matching **any** individual attribute of the total included in the filter. Only these POINTs display in the Filtered Workspace

All Selected – Select to filter for POINTs matching **all** attributes included in the filter. Only these POINTs display in the Filtered Workspace.

- The number of attributes selected and the total number of available attributes displays in the screen’s lower left corner.
- Click the **OK** button to create a new workspace based on the defined criteria of the current filter. A progress bar displays, indicating filter process status.
- Click **Cancel** to close screen without performing filter and without saving filter entries.

To create a new filter based on a copy of an existing filter:

If you need a new filter that is only slightly different from a previously created filter, you can select the previous filter and then edit only the necessary items.

- In the **Filters** dialog, select the existing filter you wish to copy and use as a template.
- Click the dialog’s **Copy** button. The **Filters Editor** screen displays.
- Enter the new filter’s name.
 - By default, the new filter is given the same name as the copied filter on which it is based, with a numerical suffix.

Filter on attributes – Select additional individual attributes, or edit the existing attributes. When an existing filter is selected, its existing selected attributes display.

- Click **OK** to apply the new filter.

To edit an existing filter:

- In the **Filters** dialog, select the existing filter you wish to edit.
- Click the dialog's **Edit** button. The **Filters Editor** screen displays.

Filter on attributes – Displays the selected existing filter's selected attributes.

- Perform your edits and click the screen's **OK** button to save the edited filter.

To remove an existing filter.

- In the **Filters** dialog, select the existing filter you wish to remove.
- Click the dialog's **Remove** button. Confirm removal when prompted. The filter is removed.

Applying Filters

You can create and apply private and shared filters using the **Insert** menu's **Apply Filters** screen. When a filter is applied, the resulting items display in a new Workspace window.

To apply a filter:

- Select the **Insert** menu's **Apply Filter** option. The **Apply Filter** screen displays.

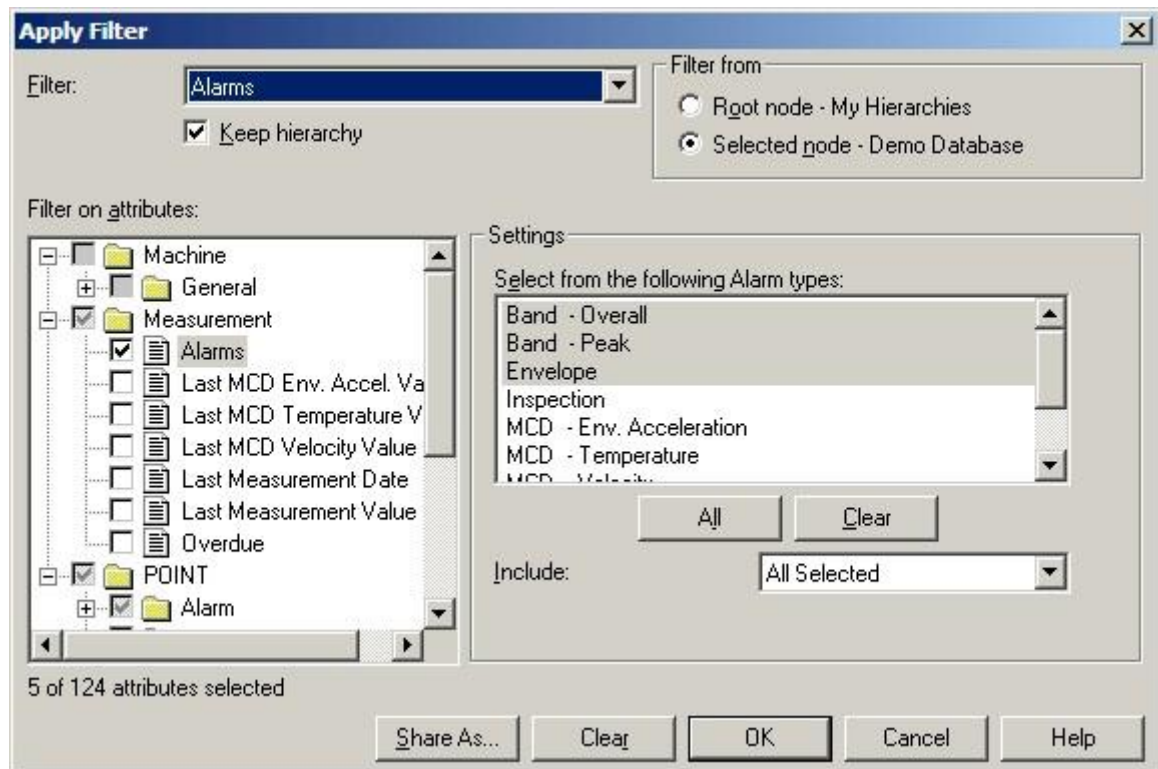


Figure 2 - 75.
The **Apply Filter** Screen.

Filter – Select an existing filter or **<Private Filter>**. This determines what to base your filter on (either a copy of an existing shared filter or to create a new private filter).

Filter on attributes – Displays the selected existing filter's selected attributes.

Keep hierarchy - Click the checkbox to determine whether the hierarchy Groups appear with their filtered POINTs in the filtered workspace, or whether only the filtered POINTs appear in the filtered workspace. If disabled, filtered POINTs appear beneath the filtered machine without the original hierarchical format. The filtered workspace lists all filtered POINTs under a "Filtered Machine" hierarchy item.

- In the screen's **Filter from** area, select **Root node – My Hierarchies** to search all open hierarchies for matching POINTs. Select **Selected node** to search from your selected node and below *only*.
- In the screen's **Filter on attributes** area, define which attributes to filter on. Attributes specific to machine, measurement, POINT, data type, and/or attribute type are grouped together. Select an attribute type to include in the filter.
- Attribute settings for the selected attribute group display in the screen's **Settings** area. View and/or edit attributes as necessary in the displayed input fields.
 - Individual attributes are described in detail in the next section.
 - When one or more attribute within an attribute group is included in the current filter, a checkmark displays next to the attribute group folder.

Include – Specify whether to filter for POINTs that match *every* attribute setting, or filter for POINTs that match at least *one* attribute setting.

Any Selected – Select to filter for POINTs matching **any** individual attribute of the total included in the filter. Only these POINTs display in the Filtered Workspace.

All Selected - Select to filter for POINTs matching **all** attributes included in the filter. Only these POINTs display in the Filtered Workspace.

- The number of attributes selected and the total number of available attributes displays in the screen's lower left corner.
- Click the screen's **OK** button to apply the filter as a private filter
 - When a filter is applied, the resulting items display in a new Workspace window.

To make the filter a shared filter:

- Click **Share As** to assign the current filter a unique name and make it available as a shared filter. The **Enter Filter Name** dialog displays.
- Enter a unique filter name and click **OK**.
- Click the **Apply Filter** screen's **OK** button to create a workspace based on the defined criteria of the current filter. A progress bar displays, indicating filter process status.
- Click **Cancel** to close screen without performing filter and without saving filter entries.

Individual Filter Attributes

All individual filter attributes are described below.

Asset

This attribute is located under **General / Machine**.

Filters for all POINTs under the selected machine with the indicated asset (the physical machinery occupying the segment).

Edit – Enter the asset in the text field.

- Standard wildcard operations are supported.

Machine Description

This attribute is located under **General / Machine**.

Filters for all POINTs under the selected machine with the indicated description.

Edit – Enter the machine description in text field.

- Standard wildcard operations are supported.

Machine Name

This attribute is located under **General / Machine**.

Filters for all POINTs under the selected machine with the indicated name.

Edit – Enter the machine name in the text field.

- Standard wildcard operations are supported.

Priority

This attribute is located under **General / Machine**.

Filters for all POINTs under the selected machine with the indicated priority assignment.

- **Edit** – Select one or more priority assignment(s).

Segment

This attribute is located under **General / Machine**.

Filters for all POINTs under the selected machine with the indicated segment (physical location of a Group).

Edit – Enter the segment in the text field.

- Standard wildcard operations are supported.

Alarms

This attribute is located under **Measurement**.

Filters for all POINTs with a last measurement in the indicated alarm.

Edit – Select one or more alarms from the settings list. Use the **All** button to select all alarms in the settings list. Use the **Clear** button to clear all selections from the alarms in the settings list. Select **Include All Selected** to include POINTs matching *all* alarm selections. Select **Include Any Selected** to include POINTs matching *at least one* alarm selection.

Last Measurement Date

This attribute is located under **Measurement**.

Filters for all POINTs with a last measurement taken between (and including) the specified dates.

Edit – Enter the dates using standard date selection operation.

Last Measurement Value

This attribute is located under **Measurement**.

Filters for all POINTs with an overall value (Channel 1) between and including specified values.

Edit – Enter values in the edit fields.

Overdue

This attribute is located under **Measurement**.

Filters for all POINTs' schedule condition (**Overdue** or **Not Overdue**).

Edit – Select **Overdue** or **Not Overdue**.

Number of Days – Enter the number of days (from now). Filters for POINTs matching the selected status (**Overdue** or **Not Overdue**) within the entered date range.

Band Alarm

This attribute is located under **POINT / Alarm**.

Filters for all POINTs with the selected shared band alarm.

Edit – Select one or more shared band alarm from the settings list. Use the **All** button to select all shared band alarms in the settings list. Use the **Clear** button to clear all selections from the shared band alarms in the settings list.

Envelope Alarm

This attribute is located under **POINT / Alarm**.

Filters for all POINTs with the selected shared envelope alarm.

Edit – Select one or more shared envelope alarm from the settings list. Use the **All** button to select all shared envelope alarms in the settings list. Use the **Clear** button to clear all selections from the shared envelope alarms in the settings list.

HAL Alarm

This attribute is located under **POINT/Alarm**.

If **HAL Alarm Set** is set to “Yes” for the HAL Alarm filter attribute, then when the filter is applied, the workspace will display only POINTs for which HAL alarms are configured.

If **HAL Alarm Set** is set to “No” for the HAL Alarm filter attribute, then when the filter is applied, the workspace will display only POINTs for which HAL alarms are not configured.

Overall Alarm

This attribute is located under **POINT / Alarm**.

Filters for all POINTs with the selected shared overall alarm.

Edit – Select one or more shared overall alarm from the settings list. Use the **All** button to select all shared overall alarms in the settings list. Use the **Clear** button to clear all selections from the shared overall alarms in the settings list.

Application Type

This attribute is located under **POINT / General**.

Filters for all POINTs configured to collect the indicated application data.

Edit – Select one or more application type from the settings list. Use the **All** button to select all application types in the settings list. Use the **Clear** button to clear all selections from the application types in the settings list.

DAD Type

This attribute is located under **POINT / General**.

Filters for all POINTs with the indicated DAD type.

Edit – Select one or more DAD type from the settings list. Use the **All** button to select all DAD types in the settings list. Use the **Clear** button to clear all selections from the DAD types in the settings list.

Enable / Disable

This attribute is located under **POINT / General**.

Filters for all POINTs enabled or disabled for download.

Edit – Select **Enable** or **Disable**.

Filter Keys

This attribute is located under **POINT / General**.

Filters for all POINTs with the indicated filter key(s).

Edit – Select one or more filter key from the settings list. Use the **All** button to select all filter keys in the settings list. Use the **Clear** button to clear all selections from the filter keys in the settings list. Select **Include All Selected** to include POINTs matching *all* filter key selections. Select **Include Any Selected** to include POINTs matching *at least one* filter key selection.

Frequency Sets

This attribute is located under **POINT / General**.

Filters for all POINTs with the selected shared frequency set.

Edit – Select one or more shared frequency set from the settings list. Use the **All** button to select all shared frequency sets in the settings list. Use the **Clear** button to clear all selections from the shared frequency sets in the settings list.

POINT Description

This attribute is located under **POINT / General**.

Filters for all POINTs with the indicated description.

Edit – Enter POINT description in **POINT Description** field.

POINT Name

This attribute is located under **POINT / General**.

Filters for all POINTs with the indicated name.

Edit – Enter POINT name in **POINT Name** field.

- Wildcard characters are available for use.

Sensor Type

This attribute is located under **POINT / General**.

Filters for all POINTs with the indicated sensor type.

Edit – Select one or more sensor type from the settings list.

Evaluation Time

This attribute is located under **POINT / Derived**.

Filters for all derived POINTs with the indicated evaluation time.

Edit – Enter the evaluation **Units**, and **Minimum** and **Maximum** values in the appropriate fields.

Expression

This attribute is located under **POINTs / Derived**.

Filters for all POINTs with the selected shared expression.

Edit – Select one or more expressions from the settings list. Use the **All** button to select all expressions in the settings list. Use the **Clear** button to clear all selections from the settings list.

Compliance

This attribute is located under **POINT / Schedule**.

Filters for all POINTs with the indicated compliance schedule setting (as configured in **POINT Properties / Compliance**).

Edit – Select units from the drop down list. Enter minimum and maximum number of selected units.

- Units are automatically evaluated for compatibility. For example, an entry of 24 hours will include a POINT with a DAD schedule set to 1 day.

Keep Current Data

This attribute is located under **POINT / Schedule**.

Filters for all POINTs matching the indicated **Keep Current Data** units (as configured in **POINT Properties / Schedule**).

Edit – Select units from the drop down list. Enter minimum and maximum number of selected units.

Keep Unscheduled Data

This attribute is located under **POINT / Schedule**.

Filters for all POINTs matching indicated **Keep Unscheduled Data** units (as configured in **POINT Properties / Schedule**).

Edit – Select units from the drop down list. Enter minimum and maximum number of selected units.

Long Term Archive Keep Data

This attribute is located under **POINT / Schedule**.

Filters for all POINTs matching the indicated **Long Term Archive Keep Data** units (as configured in **POINT Properties / Schedule**).

Edit – Select units from the drop down list. Enter minimum and maximum number of selected units.

Long Term Archive Take Data

This attribute is located under **POINT / Schedule**.

Filters for all POINTs matching the indicated **Long Term Archive Take Data** units (as configured in **POINT Properties / Schedule**).

Edit – Select units from the drop down list. Enter minimum and maximum number of selected units.

Short Term Archive Keep Data

This attribute is located under **POINT / Schedule**.

Filters for all POINTs matching the indicated **Short Term Archive Keep Data** units (as configured in **POINT Properties / Schedule**).

Edit – Select units from the drop down list. Enter minimum and maximum number of selected units.

Short Term Archive Take Data

This attribute is located under **POINT / Schedule**.

Filters for all POINTs matching the indicated **Short Term Archive Take Data** units (as configured in **POINT Properties / Schedule**).

Edit – Select units from the drop down list. Enter minimum and maximum number of selected units.

Unscheduled

This attribute is located under **POINT / Schedule**.

Filters for all POINTs without a configured compliance schedule.

Autocapture

This attribute is located under **POINT / Setup**.

Filters for POINTs matching the indicated autocapture setting.

Edit – Select the autocapture setting from the settings list. Use the **All** button to select all autocapture settings in the settings list. Use the **Clear** button to clear all selections from the autocapture setting in the settings list.

Averages

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the specified number of averages (as configured in **POINT Properties**).

Edit – Enter minimum and maximum number of averages in edit fields.

Averaging

This attribute is located under **POINT / Setup**.

Filters for all POINTs matching the indicated **Averaging Type** (**Average**, **Off**, **Peak Hold**, or **Synchronous Time**)

Edit – Select one or more average types from the settings list. Use the **All** button to select all average types in the settings list. Use the **Clear** button to clear all selections from the average types list.

Detection

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the specified detection setting.

Edit - Select detection setting from the settings list. Use the **All** button to select all detection settings in the settings list. Use the **Clear** button to clear all selections from the detection setting in the settings list.

FFT Frequency

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated frequency settings.

Edit - Specify **Fixed span** or **Order track**. Enter the minimum / maximum start (freq or orders) and the minimum / maximum end (freq or orders).

- Enter Minimum and maximum values in frequency or orders, as indicated in **Freq. Type** selection.

Full Scale

This attribute is located under **POINT / Setup**.

Filters for all POINTs whose Full Scale setting falls within the indicated full scale value range.

Edit - Select unit types from the settings list. Use the **All** button to select all unit types in the settings list. Use the **Clear** button to clear all selections from the settings list.

Full Scale Units

This attribute is located under **POINT / Setup**.

Filters for all POINTs matching the indicated **Full Scale Units** type.

Edit - Select full scale unit types from the settings list. Use the **All** button to select all full scale unit types in the settings list. Use the **Clear** button to clear all selections from the full scale units settings list.

Input Filter Range

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated input filter range settings.

Edit - Select input filter range(s) from the settings list. Use the **All** button to select all input filter ranges in the settings list. Use the **Clear** button to clear all selections from the settings list.

Input mV / EU

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated mV / EU settings.

Edit - Enter minimum and maximum mV / EU values in edit fields.

Lines

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated lines setting.

Edit – Select line(s) from the settings list. Use the **All** button to select all lines in the settings list. Use the **Clear** button to clear all selections from the settings list.

Linear Factor

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated linear factor value (as indicated in **POINT Properties / Setup**).

Edit – Enter the minimum and maximum linear factor values.

Linear Speed Units

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated linear speed units (as configured in **POINT Properties / Setup**).

Edit – Select one or more linear speed units type from the settings list. Use the **All** button to select all linear speed units in the settings list. Use the **Clear** button to clear all selections from the linear speed units settings list.

Location

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated location setting.

Edit – Select location(s) from the settings list. Use the **All** button to select all locations in the settings list. Use the **Clear** button to clear all selections from the settings list.

Low Frequency Cutoff

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated low frequency cutoff.

Edit – Enter minimum and maximum frequency values in edit fields.

- Units display in either **CPM** or **Hz**, based on frequency units preference setting (**Preferences / General**).

Orientation

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated orientation.

Edit – Select orientation(s) from the settings list. Use the **All** button to select all orientations in the settings list. Use the **Clear** button to clear all selections from the settings list.

Pulses / Rev

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated minimum and maximum pulses / rev setting (as configured in **POINT Properties / Setup**).

Edit – Enter **Minimum** and **Maximum** pulses / rev values.

Save Data

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated save data setting.

Edit - Select save data setting from the settings list. Use the **All** button to select all save data settings in the settings list. Use the **Clear** button to clear all selections from the settings list.

Speed

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated speed settings.

Edit – Enter minimum and maximum speed values in edit fields.

Speed Ratio

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated speed ratio.

Edit – Enter minimum and maximum speed ratio values in edit fields.

Speed Tag Reference

This attribute is located under **POINT / Setup**.

Filters for all POINTs with common indicated speed tag reference POINT.

Edit - Select the speed tag reference POINT(s) from the settings list. Use the **All** button to select all speed tag reference POINTs in the settings list. Use the **Clear** button to clear all selections from the settings list.

Window

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated window setting.

Edit - Select window setting(s) from the settings list. Use the **All** button to select all window settings in the settings list. Use the **Clear** button to clear all selections from the settings list.

Zero Offset

This attribute is located under **POINT / Setup**.

Filters for all POINTs with the indicated zero offset.

Edit – Enter the minimum and maximum zero offset values in edit fields.

Clear Alarm Non Collection

This attribute is located under **POINT / General**.

Filters for all POINTs with **Clear Alarms for Non-collection last measurements** enabled or disabled.

Edit – Select Enable or Disable.

Exclude Non-Collection From Report

This attribute is located under **POINT / General**.

Filters for all POINTs with **Exclude from reports if last measurement is a Non-collection event** enabled or disabled.

Edit – Select Enable or Disable.

Command Line Parameters

You can use command line parameters to further customize @ptitude Analyst. Command line parameters are entries you type in when creating your @ptitude Analyst shortcut to automate certain preferences. Enter the following characters after the path (in the **Run** dialog or in the shortcut **Properties' Target** field) to enable the desired feature.

- For more information on creating shortcuts, refer to your Microsoft Windows User's Guide.

-u:"username"	Analyst starts up displaying the specified user name in the Log In screen.
-u:"username,password"	Analyst starts up displaying the specified user name and password in the Log In screen.
-fastexit	Disables the exit confirmation prompt (" Are you sure you want to exit the application? ").
-d"database"	Analyst opens the specified database on start up.
-connect:"sid"	Analyst opens the specified "sid" (database service identity) on start up.

Customize / Derived POINTs

The **Derived POINTs** screen allows you to customize shared expressions, create new expressions, and to edit variables, constants, and the expression formula.

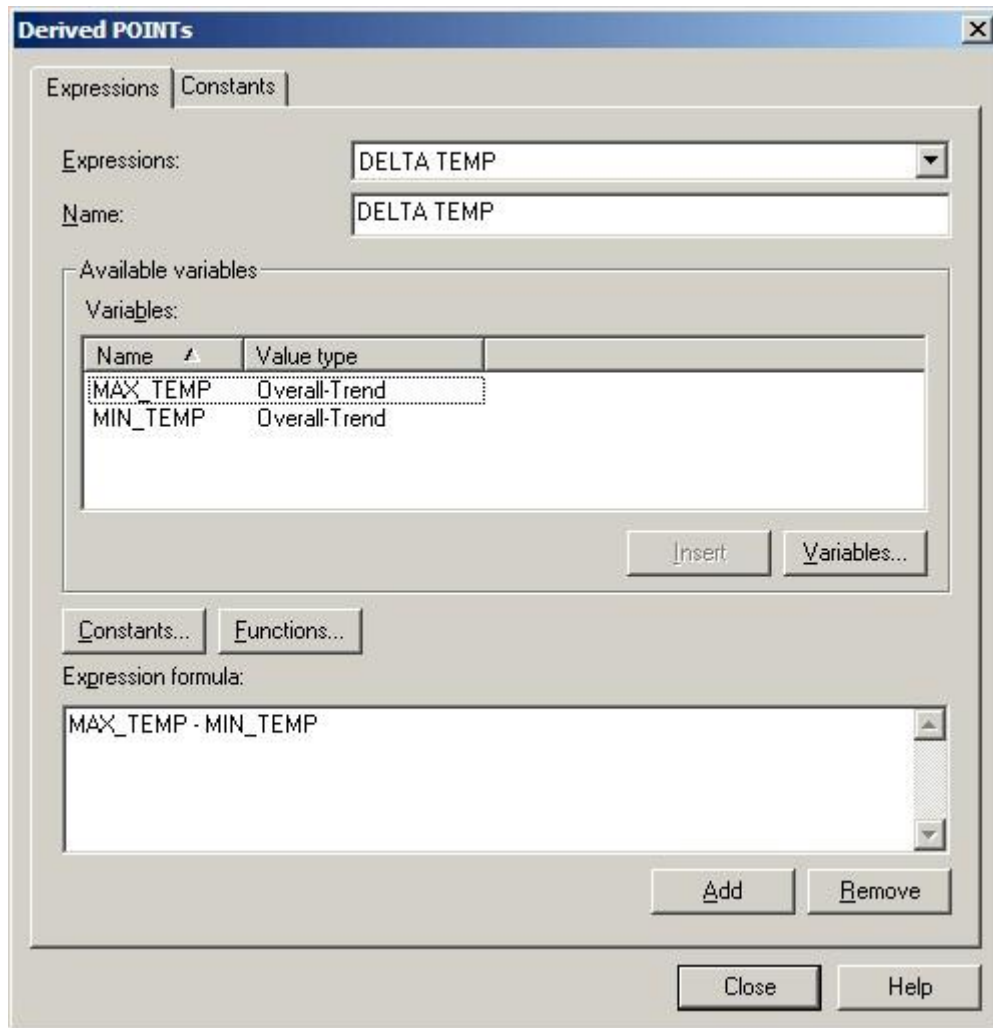


Figure 2 - 76.

The **Customize** menu's **Derived POINTs** Expressions tab.

To customize a shared expression:

- Select the expression you wish to edit from the **Expressions** drop down list.

Important - Any changes made to a shared expression affect all other POINTs sharing that expression, and overwrites the currently selected expression

- You may rename the shared expression in the **Name** entry box.
- Click the **Variables** button to edit, add, or remove variables.
 - You cannot assign POINTs to the variables from the **Customize / Derived POINTs** screen. Refer to the **POINT Properties /**

Expressions tab section earlier in this chapter for details on assigning POINTs to variables.

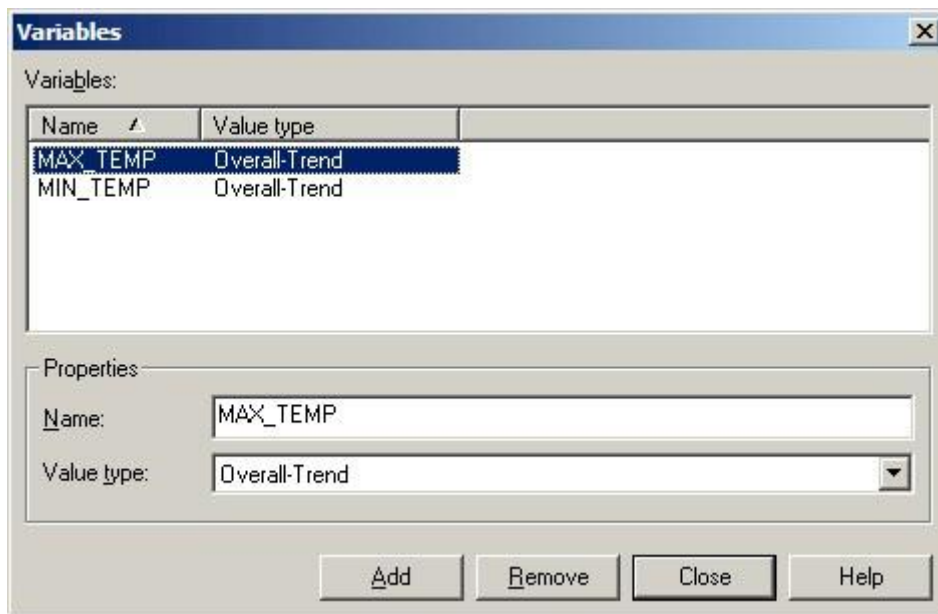


Figure 2 - 77.
The **Variables** Screen.

- Edit the expression formula by inserting variables, constants, or formulas.
 - To add a new expression, click the **Add** button, and enter settings as previously described in this chapter's **POINT Properties / Expression Tab** section.

To edit constants:

There are two ways to edit shared constants. You can edit constants using the **Expressions** tab's **Constants** button, or by using the **Constants** tab. Both methods are described below.

- From the **Expressions** tab, click the **Constants** button to add a new constant to the **Constants** list. In the **Constants** dialog, click the **Add** button.

Or

- Click the **Constants** tab to add or remove a constant, or to edit pre-existing constants.
- Click the **Add** button to create a new constant, or select a constant from the **Constants** list and edit the **Name** and **Value** in the **Constant properties** area.
- Click the **Remove** button to remove the selected constant from the **Constants** list.

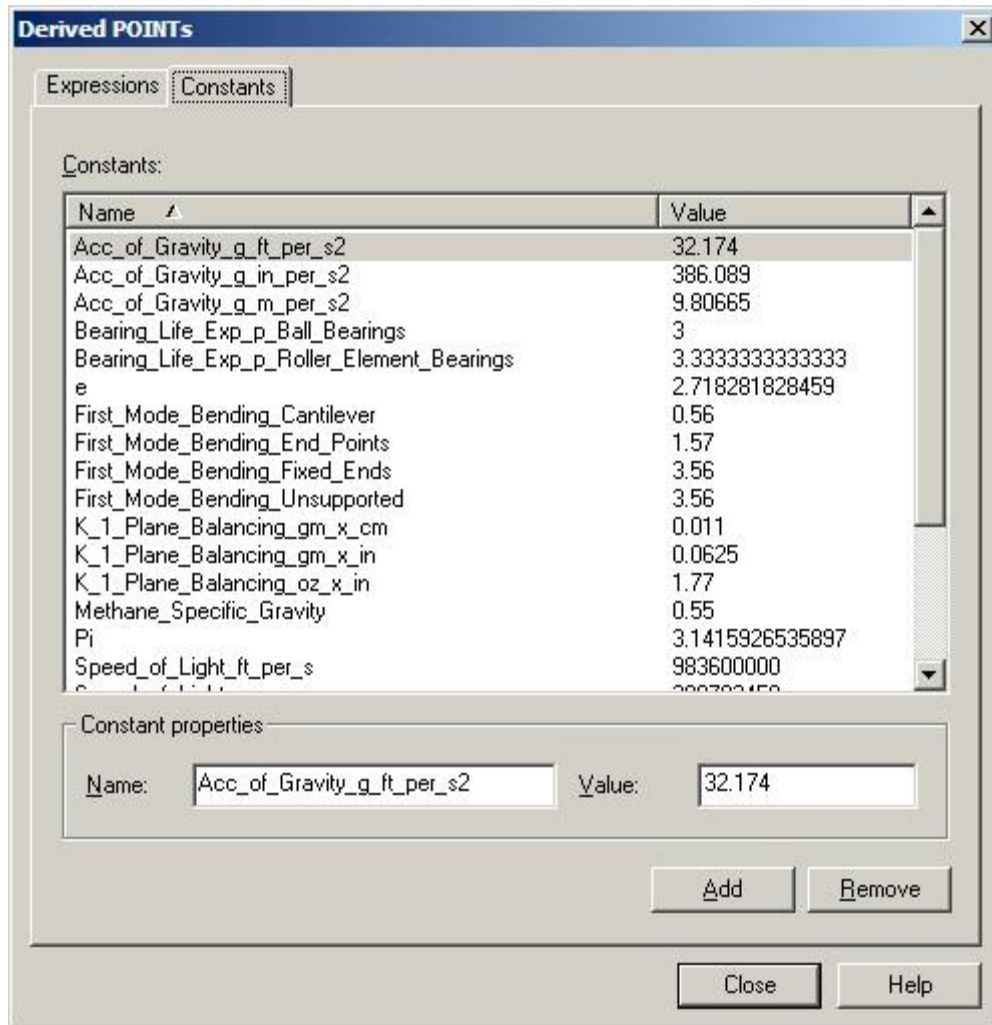


Figure 2 - 78.
The **Customize** menu's **Derived POINTs Constants** tab.

Important – After editing a derived POINT, you must manually calculate the derived POINT to update the POINT's existing data records. Reference the Calculating Derived POINTs section later in this chapter for details.

Data Collection ROUTEs and Other Data Transfer Operations

Overview

After establishing your hierarchy's POINTs, you are ready to create your collection ROUTEs.

- It is not imperative that you create @ptitude Analyst ROUTEs to download POINTs to the data acquisition device. Downloading directly from a plant hierarchy list is discussed later in this chapter.

A ROUTE is a measurement POINT collection sequence. ROUTEs are downloaded to a DAD to provide orderly collection of measurement data on a timely basis.

ROUTEs are first created on paper. You simply walk through your facility and list (in a logical, efficient collection sequence) the equipment and pre-defined POINTs you plan to collect at a given time. For example, list the measurements you plan to perform weekly (e.g., every Tuesday) as "Tuesday's ROUTE", and/or list the measurements you plan to perform monthly as the "monthly ROUTE."

Take time to organize your collection ROUTE paper copy thoroughly. A complete and organized paper copy collection ROUTE makes building @ptitude Analyst ROUTEs much easier.

After establishing your paper copy ROUTE(s), your next task is to use your paper copy ROUTE to create a @ptitude Analyst ROUTE.

How To Build ROUTEs

@ptitude Analyst's method for creating ROUTEs is simple.

Using your paper copy ROUTE, open the Hierarchy, ROUTE, or Workspace window for those measurement POINTs you wish to have in the ROUTE, and copy selected items (machines with their POINTs, SETs with their machines and POINTs, Custom Groups with their machines and POINTs, or the entire hierarchy) from the open **Hierarchy** window to the new **ROUTE** window, creating the new ROUTE's hierarchy list.

You may also insert (**Insert** menu) Groups directly into a ROUTE window, then select POINTs from a **Hierarchy**, **ROUTE**, or **Workspace** window, and copy them to your new **ROUTE**, organized beneath your newly inserted Groups.

If necessary, move hierarchy items in the **ROUTE** window to match the most efficient collection sequence (detailed on your paper copy ROUTE).

With MARLIN data collectors, you can also configure your ROUTE to keep ROUTE statistics by designating it as a Structured ROUTE. *Currently, only the MARLIN DAD supports structured ROUTEs.*

If a ROUTE has been designated as a structured ROUTE, then ROUTE statistics, such as collection time duration, start and stop times, and operator ID are recorded with the ROUTE. A structured ROUTE also requires that data be collected in the order in which the POINTs are listed in the ROUTE.

- Statistical ROUTE information can provide valuable information to assist in managing your ROUTEs. **IMPORTANT** - When moving hierarchy items to create the most efficient collection sequence, note that *in a ROUTE list, parental hierarchy items always remain attached to their measurement POINTs.*
- **IMPORTANT** - In a ROUTE window, changes to a POINT's placement in the list, and POINT deletions do not affect the Hierarchy window. *However, changes to individual POINT setup settings (POINT Properties) **do apply** to the hierarchy and reflect in Hierarchy window.*

Changes to Group item Properties *do not* affect the Hierarchy window.

To open an existing ROUTE:

- Select the **View** menu's **ROUTE** command. The **ROUTE** dialog displays.
- Select an existing ROUTE and click the **Open** button. The selected ROUTE window opens.

To add a new ROUTE:

- Click the **ROUTE** dialog's **Add** button. The **ROUTE Properties** screen displays.

ROUTE Properties / General

The screenshot shows a dialog box titled "ROUTE Properties" with three tabs: "General", "Schedule", and "Notes". The "General" tab is selected. It contains the following fields and options:

- Name:** A text box containing "Afternoon Shift".
- Description:** An empty text box.
- Structured ROUTE:** A checked checkbox.
- ROUTE statistics:** A group box containing three radio button options:
 - Keep all historical records:** Selected.
 - Keep fixed number of historical records:** An option with a text box containing "1000".
 - Keep records for:** An option with a text box containing "1" and a dropdown menu set to "Years".
- Number of POINTs:** A label followed by the value "0".
- Buttons:** "OK", "Cancel", and "Help" at the bottom right.

Figure 3 - 1.
The **ROUTE Properties** Screen's **General** Tab.

ROUTE Properties / General fields include:

Name – Enter a new ROUTE name.

Description – Enter a new description.

The **ROUTE Statistics** area allows you to make your ROUTE a structured ROUTE, and determine the type of historical information to keep. If historical record settings are entered, then ROUTE statistics, such as collection time duration, start and stop times, and operator ID, are recorded with the ROUTE. If the ROUTE is designated as a structured ROUTE, then data must be collected in the order in which the POINTs are listed in the ROUTE. **To create a structured ROUTE:**

- Click the **Structured ROUTE** checkbox to designate the selected ROUTE as a structured ROUTE.

To enter ROUTE statistic settings:

- Click an option button to specify the amount of historical records to keep. Included in each historical record are the ROUTE's collection time duration, start and stop times, and Operator ID. Options include:

Keep all historical records – Saves all historical ROUTE collection statistics for the selected ROUTE.

Keep fixed number of historical records – Enter the number of historical records to save for the selected ROUTE.

Keep records for – Enter a time duration value for storing historical records. For example, enter **6** in the text box and select **weeks** from the drop down list to save historical records for 6 weeks.

The number of POINTs included in the selected ROUTE display at the bottom of the tab.

ROUTE Properties / Schedule

The **ROUTE Properties / Schedule** tab allows you to specify a time period for when the ROUTE is to be collected. If the ROUTE is not collected during the specified time period, the ROUTE will appear as overdue in the ROUTE Statistics report, in the **ROUTE** dialog, and in the **Transfer** dialog's **Download to DAD / Route View**.

The screenshot shows the 'ROUTE Properties' dialog box with the 'Schedule' tab selected. The 'General' tab is also visible. The 'Enable schedule' checkbox is checked. Under 'Schedule type', 'Interval-based' is selected with a radio button, and 'Calendar-based' is unselected. Under 'Collection time', there are three rows of input fields: 'Schedule:' with a text box containing '30' and a dropdown menu set to 'Days'; 'Next ROUTE due:' with a date dropdown set to '1/ 4/2008' and a time dropdown set to '12:00:00 AM'; and 'First shift starts at:' with a time dropdown set to '8:00:00 AM'. At the bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons.

Figure 3 - 2.
The **ROUTE Properties** Screen's **Schedule** Tab – **Interval-based**.

On the **ROUTE Properties / Schedule** tab, click the **Enable collection schedule** checkbox to configure the ROUTE's collection schedule.

ROUTE Properties / Schedule has schedule types; **Interval-based** – select interval-based if you wish to schedule data collection at a set time interval and **Calendar-based** – select calendar-based if you wish to schedule data collection based on a calendar date and time.

Interval-Based

An interval-based collection schedule allows you to schedule data collection at a set time interval. For example, if data is scheduled to be collected for a ROUTE every seven days, the ROUTE must be collected within seven days of the last time data was collected for the ROUTE. If data is not collected within the set time interval, the ROUTE is considered **Overdue** in the ROUTE Statistics report, the **ROUTE** dialog, and in the **Transfer** dialog's **Download to DAD / Route View**.

Interval-based fields include:

Schedule – Enter the ROUTE's collection interval (in days or hours, starting from the **Next ROUTE Due** entry).

Next ROUTE due – Enter the beginning collection date for the ROUTE. Together, the **Next ROUTE Due** and **Schedule** fields establish the ROUTE's collection schedule.

First shift starts at – Enter the time the first shift begins. This field is only available if the **Schedule** entry is in hours.

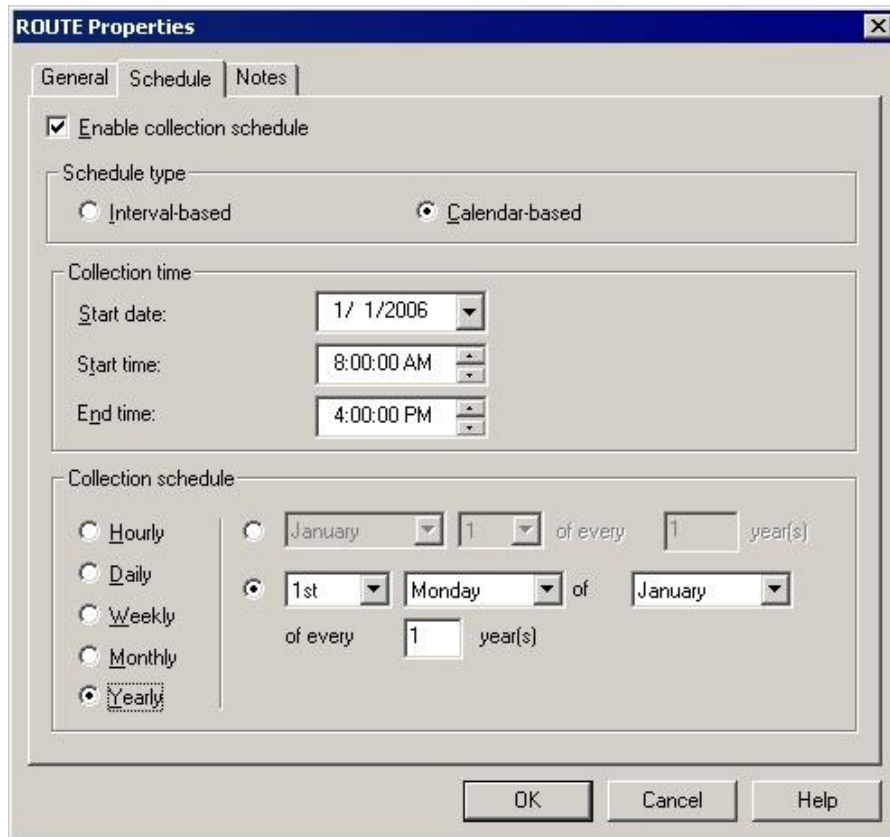


Figure 3 - 3.

The **ROUTE Properties** Screen's **Schedule** Tab – **Calendar-based**.

Calendar-Based

A calendar-based collection schedule allows you to schedule data collection starting from a specified calendar date and time, at a specified calendar interval (hours, days, weeks, etc.). If, for such a ROUTE, data is not collected within the time period, the ROUTE is tagged as **Overdue** when included in generated reports and ROUTE dialogs.

Calendar-based fields include:

- Use the **Collection time** area to set the data collection boundaries, and the **Collection Schedule** area to specify the data collection frequency.

Collection Time Area

Start date – Select the initial start date of when the data collection time period is to begin. Note that, depending on settings in the **Collection schedule** area, data collection may not actually occur on the specified Start date. This date only specifies that data collection must take place from this date forward.

Start time – Together, the Start time and End time settings specify the time period in which data collection must be completed. Select the time at which data collection should begin, according to the specified collection schedule.

End time – Select the time at which data collection should end, according to the specified collection schedule.

- Does not apply when collection schedule is set to **Hourly**.

Collection Schedule Area

The left side of the Collection Schedule area displays calendar based options for data collection frequency (e.g., hours, days, weeks, etc.). The right side of the Collection Schedule area updates to apply to the option selected in the left side.

Hourly – Enter the duration of shift in hours. After the specified Start date, data collection must be complete within the specified shift duration.

Daily – Enter the frequency of the collection schedule in days. For example, if the collection schedule is set to **Every 2 day(s)**, then (after the specified Start date) data collection must be completed every other day within the specified start and end times.

Weekly – Enter the frequency of the collection schedule in weeks, and select the day of the week that data collection must occur. For example, if the collection schedule is set to **Every 1 week(s) on Monday**, then the ROUTE's data must be collected the first Monday after the specified Start date and every Monday thereafter, within the specified start and end times.

Monthly – Provides two methods to select monthly data collection time periods. You may select the day of the month (1-31) and the frequency of the collection schedule in months; or you may select a day of the week and the **1st**, **2nd**, **3rd**, **4th**, or **last** week of the month, and the frequency of the collection schedule in months. For example, with the first method, if you specify **Day 25 of every 1 month(s)**, then data collection must occur (after the specified Start date) every month on the 25th. With the second method, if the collection schedule is set to **The 1st Monday of every 1 month(s)**, then data collection must occur (after the specified Start date) on the first Monday of each month.

Yearly – Provides two methods to select yearly data collection time periods. You may select the month / day and the frequency of data collection in years; or you may select a day of the week, the **1st**, **2nd**, **3rd**, **4th**, or **last** week of the month, the month, and the frequency of the collection schedule in years. For example, with the first method, if you specify **January 25 of every 1 year(s)**, then data collection must occur (after the specified Start date) once a year on January 25th. With the second method, if the collection schedule is set to **The 1st Monday of January, every 2 years**, then data collection must occur (after the specified Start date) every other year on the first Monday in January.

ROUTE Properties / Notes

ROUTE Properties / Notes fields include:

ROUTE instruction notes – Allows you to create, edit, and store instructions / notes relating to the ROUTE. ROUTE instructions are downloaded to the data acquisition device along with the ROUTE, and may be viewed on the DAD's LCD panel.

- Enter appropriate ROUTE properties and click **OK**. The new ROUTE's window displays.
- Use drag and drop or copy and paste operations to copy selected Groups and POINTs, from the Hierarchy or Workspace windows into the new ROUTE's window to create the new ROUTE's hierarchy list.

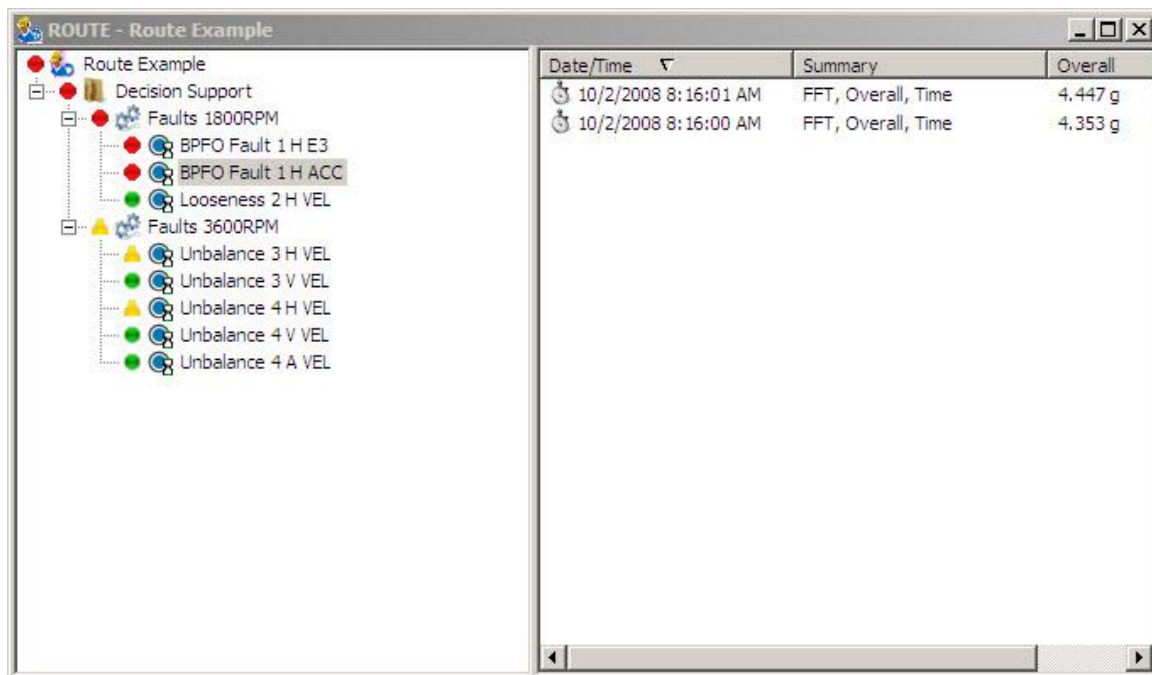


Figure 3 - 4.
The **ROUTE** Window With Copied Items.

To remove an unnecessary ROUTE:

- In the **ROUTE** dialog, select the ROUTE name.
- Click the **Remove** button. Confirm action when prompted. The selected ROUTE is removed.

To set the same measurement speed for multiple FFT measurements:

- Starting from a ROUTE, expand the appropriate machine. Beneath the machine in the hierarchy, right-click on the measurement POINT you wish to use as a reference and select Set Speed (Multiple) from the resulting context menu.

OR

- Starting from a ROUTE, expand the appropriate machine. Beneath the machine in the hierarchy, click on the appropriate measurement POINT to display its measurements in the right panel. Then, right-click on the single measurement you wish to use as a reference and select Set Speed (Multiple) from the resulting context menu.

The Set Speed (Multiple) window appears.

Downloading ROUTEs To the Microlog

Microlog Transfer Overview

The Microlog transfer function allows you to download measurement POINT setups to the Microlog, upload collected data from the Microlog, check the Microlog status, and configure, clear, or reset the Microlog .

The Microlog features three ways to communicate with @ptitude Analyst:

Serial

Modem

USB

It is important to note that some options only transfer when communicating via USB. If you use a serial or modem connection, the following information is *not* transferred:

- Orbit SCL, Triax (3-channel), and 2-channel type POINTs are only transferred to or from the DAD when using the USB connection.
- Multiple-measurement data (i.e., data from a single POINT that produces multiple measurements) is only uploaded to @ptitude Analyst from the DAD using the USB connection.
- You may only transfer data to or from a Microlog AX using the USB connection.
 - POINTs with greater than 6400 lines of resolution or an end frequency greater than 2400 kCPM are only supported on the Microlog AX using the USB connection. If these POINTs are transferred to a non-AX Microlog, the lines and end frequency will be set back to the maximum supported by the unit.

If you have configured any of these POINT types or settings, you must use a USB connection when transferring data to or from the Microlog to include these options.

To Set Up the Microlog for Data Transfer:

- Connect the Microlog to the host computer through the Microlog Support Module. Reference your Microlog User Manual for specifics.
- Turn on the Microlog.
- In @ptitude Analyst, select **Microlog Analyzer** from the **Transfer** menu. The **Microlog Analyzer** screen displays.

- The software automatically checks for a connection between the host computer and the Microlog . An alert dialog displays if there is a connection error.

Important – If the Microlog's internal clock does not match your system clock, @ptitude Analyst will reset your Microlog's clock as soon as communications are established. See the SKF @ptitude Analyst Installation Manual for more details on this configuration.

- This screen appears if the communication settings have not yet been configured, or if prior settings are not currently working. Click **OK** at the message to continue. Refer to the *Communication* heading, later in this section, for instructions on setting up the connection.
 - If you are using a serial connection, the software's auto detection capabilities will alert you of connection status.
 - If you are using a modem connection, you must select the proper modem type.
 - For first time use, you must install the modem in the **Communications** tab of the **Microlog** screen. You need only to install the modem once. The screen opens after initial modem installation and will either automatically dial out (in **Originate mode**), or will wait for the Microlog to dial in (in **Auto Answer Mode**).
 - Appropriate error messages display if the modem connection is not successful.
- Check the screen's **Status** tab to compare the Microlog's current hierarchy to the current @ptitude Analyst hierarchy. If there is a hierarchy discrepancy, an error dialog appears when the download process is initiated.

Download to DAD

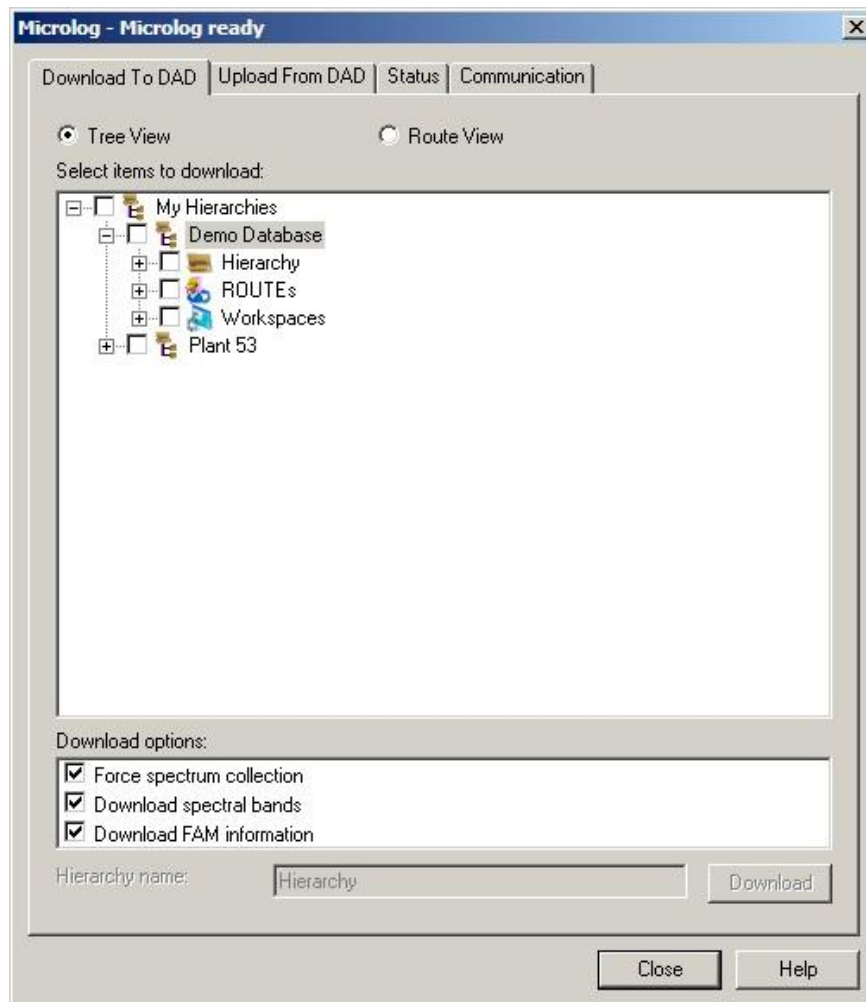


Figure 3 - 5.

The **Microlog** Screen's **Download to DAD** Tab Displaying **Tree View**.

Items available for download appear in the tab's **Select items to download** window. You can download items from the Hierarchy, ROUTEs, and Workspaces directly using **Tree View** or select one or more ROUTEs using **ROUTE View** by clicking the item's check box.

Tree View

Select items to download in Tree View:

- A checkmark in the checkbox indicates *all* items in the Hierarchy, ROUTE, or Workspace are selected.
 - A grey checkmark indicates *some* items are selected.
 - No checkmark indicates *no* items are selected.
- By default, only Hierarchies, ROUTEs, or Workspaces associated with the primary hierarchy display for download in **Tree View**. To

display all Hierarchies, ROUTEs, or Workspaces associated with all open hierarchies, you must enable the **Allow multiple hierarchy support on DADs** option on the **Customize / Preferences / General** tab.

ROUTE View

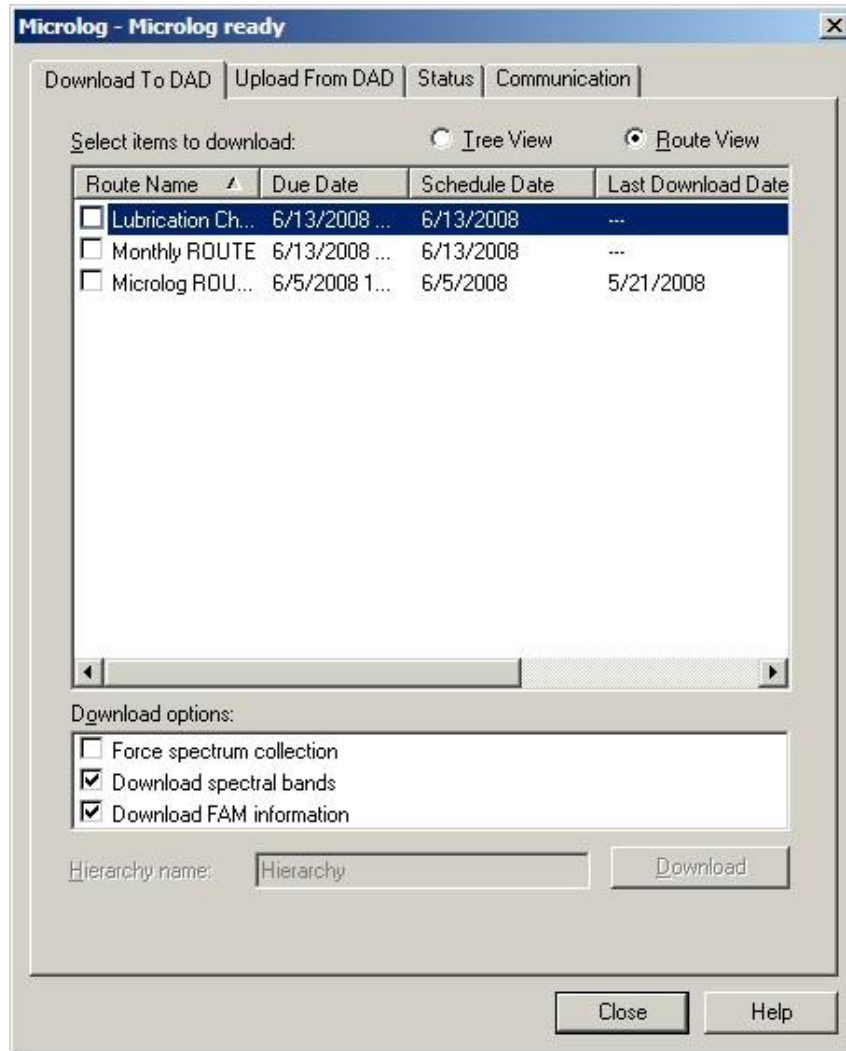


Figure 3 - 6.

The **Microlog** Screen's **Download to DAD** Tab Displaying **ROUTE View**.

ROUTEs are organized into six categories; **ROUTE Name**, **Due Date**, **Schedule Date**, **Last Download Date**, **Overdue Status**, and **Hierarchy**.

- Only complete ROUTEs may be downloaded. To download individual POINTs, select them from **Tree View**.
- By default, only ROUTEs associated with the primary hierarchy display for download in **ROUTE View**. To display all ROUTEs associated with all open hierarchies, you must enable the **Allow multiple hierarchy support on DADs** option on the **Customize / Preferences / General** tab.

Download Options

There are three Download Options:

Force spectrum collection

Forces spectrum collection on every overall measurement. Use for baseline data collection and/or data collection before or after a machine overhaul (when collected spectra are necessary for every POINT).

Download spectral bands

Available only when downloading to a CMVA Series Microlog with firmware version 3.30 or newer, or a Microlog GX or AX. Use this feature to download spectral band alarms for the downloaded POINTs.

Download FAM information

Available when downloading to a CMVA Series Microlog with firmware version 3.80 or newer. Use this feature to download bearing fault frequency information associated with the downloaded POINTs.

- Not applicable to Microlog GX or AX.

Hierarchy Name

If you select items directly from the Hierarchy list, they will appear as a specially named ROUTE in the Microlog.

- Assign a unique name in the **Hierarchy Name** text field for identification purposes.

Download button

- Click to begin the download. The download progress displays in the progress bar.

Upload from DAD

After you have completed collecting data, re-connect the Microlog and establish communications using the same procedure described earlier for downloading.

Important – If the Microlog's internal clock does not match your system clock, @ptitude Analyst will reset your Microlog's clock as soon as communications are established.

The transaction service can also be configured to adjust the dates and times of any measurements being processed, provided those measurements' dates and times fall outside the configured tolerance period. The software can be configured to create a new Event Log record and/or POINT Notes entry reflecting each adjustment.

See the SKF @ptitude Analyst Installation Manual for more details on the configurations mentioned above.

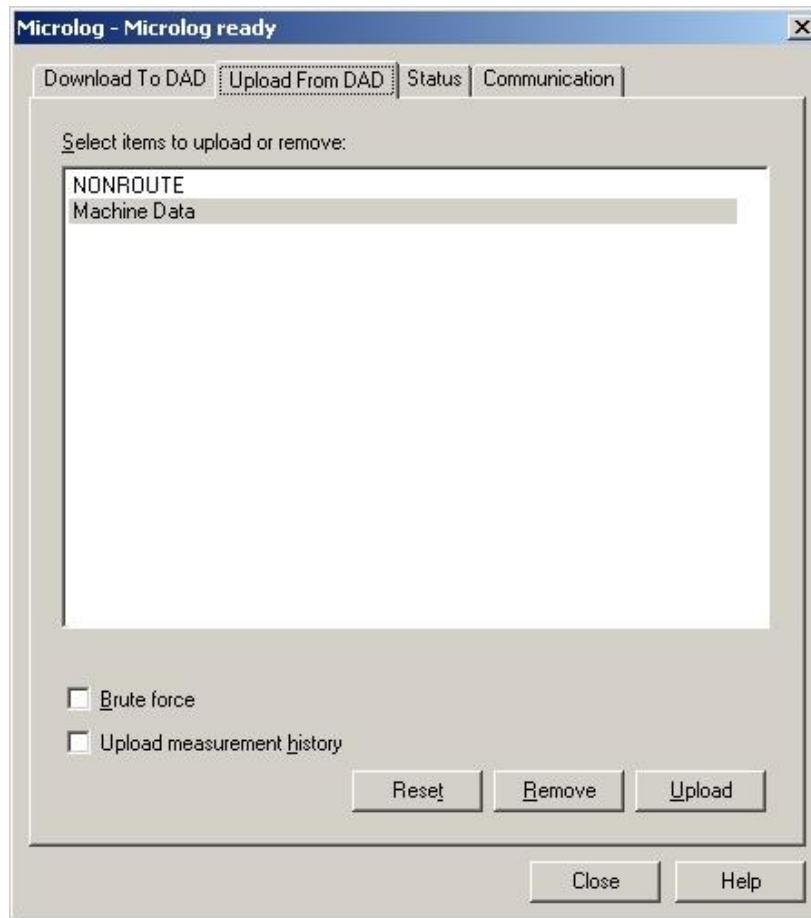


Figure 3 - 7.
The **Microlog** Screen's **Upload from DAD** Tab.

Select items to upload or remove – Displays all ROUTEs currently stored in the connected Microlog .

- Select the ROUTE(s) you wish to upload or remove (multiple selections are allowed).
 - By default, only ROUTEs associated with the primary hierarchy display for upload. To display all ROUTEs associated with all open hierarchies, you must enable the **Allow multiple hierarchy support on DADs** option on the **Customize / Preferences / General** tab.

Brute Force

- After selecting which ROUTEs to upload, use the **Brute Force** check box to select whether to use brute force to create new hierarchy POINTs for the uploaded data.
 - Orbit / SCL, Triax (3-Channel), and 2-Channel POINTs will only be created if you are communicating using a USB connection.

A Brute Force upload creates new POINTs (beneath a Non-ROUTE set in the hierarchy) for all uploaded collector POINTs (even if the uploaded POINTs already exist in the hierarchy) and uploads all data into these new POINTs.

If multiple hierarchy support is disabled, a Brute Force upload overrides this setting and all ROUTEs currently stored on the DAD are uploaded to @ptitude Analyst, even if they are from different hierarchies.

Upload Measurement History - When data is collected on the Microlog for a POINT that already has a stored measurement, there is an option to append the new measurement. If a new measurement is appended, the original measurement is added to an historical data file. Enable this check box to include historical measurements in the upload. Disable it to only upload the most recent measurement for each POINT.

To Upload Data:

- Click the **Upload** button to initiate the upload process. POINTs are automatically processed into the hierarchy after the upload. Process status displays on the status bar.

To Remove ROUTEs from Microlog:

- Select ROUTEs you wish to remove and click the **Remove** button.
 - You may remove ROUTEs from the Microlog if you are using a CMVA series Microlog with firmware version 3.52 or newer, or a Microlog GX or AX.

Reset

- To clear collected data for *selected* **ROUTEs** in the Microlog , select the **ROUTEs** you wish to clear and click the **Reset** button.

Status

The **Status** tab displays the connected Microlog's status, and compares the Microlog's current hierarchy with the current @ptitude Analyst hierarchy. Status information appears in the **Device status information** window.

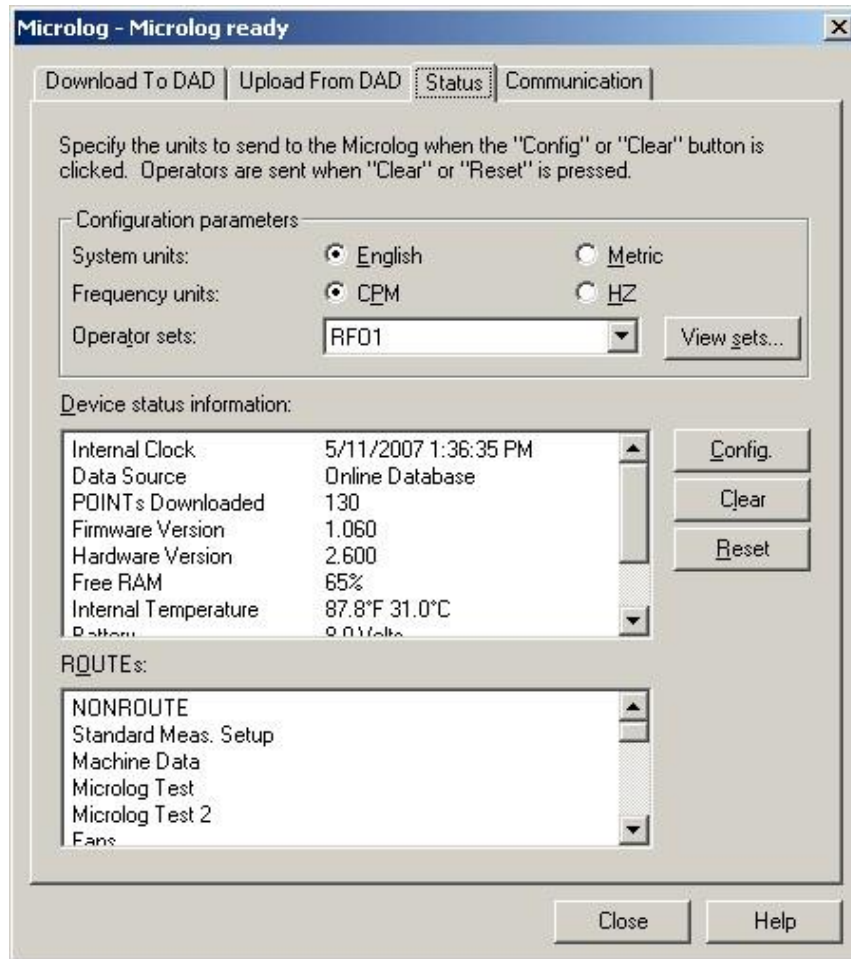


Figure 3 - 8.
The Microlog Screen's **Status** Tab.

The tab's **Configuration Parameters** area provides options to determine the system and frequency units to send to the Microlog when the **Config** or **Clear** buttons are used.

This area also allows you to select operator sets and download them to the DAD using the **Clear** and **Reset** buttons.

System Units – Select English or Metric.

Frequency Units – Select CPM or HZ.

Operator sets – Select an operator set from the drop down list.

- Click the **View Sets** button to view all operators assigned to the selected operator set.

- Select a set from the drop down list. All operators included in the selected set display in the **Operators** area.

Device status information includes:

Internal Clock – Date and time from the Microlog 's clock.

Data Source – The name of the source hierarchy for POINTs currently stored in the Microlog .

POINTs Downloaded – Number of POINTs currently stored in the Microlog .

Version – The Microlog firmware version number.

Free RAM – The percent of the Microlog's memory that is free for storage.

Internal Temperature – The Microlog's internal temperature (CMVA series only).

Battery – The Microlog 's battery voltage level.

Serial Number – Available only with a Microlog GX or AX.

Three command buttons appear in this tab. They are:

Config – Use this option to change hierarchies, or when the Microlog 's internal clock is incorrect. It updates the Microlog 's status information to match those of the host computer.

Clear – Use this option to clear the entire Microlog . It erases all data, SETs, Machines, POINTs, ROUTEs, ROUTE Instructions, non-ROUTE POINTs, coded notes, and operator names stored in the Microlog. All existing operator names are removed and replaced with the operators in the selected operator set. It does not change the Microlog 's menu settings.

Reset – Use this option to clear collected data but leave the downloaded SETs, Machines, and POINTs. It deletes all spectral data, deletes all non-ROUTE POINTs and measurement data, and resets the current measurement data to zero for all POINTs (current values are retained as LAST values). ROUTEs, SETs, Machines, and POINT sequence and measurement instructions are not affected. This allows you to take data for a ROUTE, upload it, reset the data out of the Microlog without losing the ROUTEs, SETs, Machines, or POINTs, and then take data on the same ROUTEs, SETs, Machines, or POINTs again. The reset option also downloads all operator names within the selected operator set to the Microlog.

Communication

Communication options control communication between the software and the Microlog. Configure communication settings in the **Communication** tab.

Connection settings include:

Communication type – Used to specify how the Microlog communicates with the software. Options include:

Serial – for direct, hard-wired connection between the Microlog and the host computer via serial ports.

Modem Originate – Used for modem connections over communication lines between the Microlog and the host computer in attended mode. To make the connection, the host computer operator dials the Microlog via the **Reconnect** button.

Modem Auto Answer – Used for modem connection over communication lines between the Microlog and the host computer in attended mode. To make the connection, the Microlog dials in to the host computer while the host computer's modem is in waiting mode.

Active Sync – Used to communicate using Microsoft's ActiveSync (via USB, serial, or TCP/IP).

- Selecting **ActiveSync** communication type disables the **Port** and **Serial Baud Rate** drop-down lists. Use ActiveSync's **Connection Settings** to configure communication parameters.
- Refer to Microsoft.com for more information about ActiveSync communication.

Port (COM1, COM2, COM3, COM4) – Used with **Serial** and **Modem** communications to specify the host computer's COM port you are using.

Serial Baud Rate – Used with **Serial** and **Modem** communications to set the baud rate for direct, hard-wired communications. This setting must match the Microlog's Baud Rate setting.

Phone number – Used in **Modem Originate** mode to dial a Microlog in a remote location. Enter the phone number of the modem on the Microlog-end of the modem link.

- If you are communicating via modem, click the **Modems** button to launch your computer's modem dialog. The dialog allows you to install a new modem or set up the existing modem on your computer. Refer to your modem manual for instructions on installing the modem.
 - The **Modem** dialog may also be launched from the control panel.
- Click the **Reconnect** button to renew the connection between the Microlog and the host computer using the current settings on the **Communication** tab. If the connection is successful, the title bar in the Microlog dialog in @ptitude Analyst changes to **Microlog Ready**, and the Microlog displays a generic communications indicator on its screen.

- If the title bar of the Microlog dialog displays **Microlog not responding** after clicking **Reconnect**, verify that the DAD is properly connected using the selected **Communication Type** and that all communication settings are correct.
 - Reconnecting is only necessary if you change communications settings. Once the communication options are set, the connection is established as soon as you open the **Microlog** dialog from the **Transfer** menu.
 - The **Reconnect** button is only available when this tab is accessed from the **Microlog** dialog.
- Click **OK** to save changes, or **Cancel** to discard changes.

Coded Notes

Coded notes are a list of common machinery notes automatically transferred from @ptitude Analyst to the DAD to enable quick and easy notation during data collection. Create your coded notes in the **Customize / Database** screen's **Coded Notes** tab.

Previously defined coded notes appear in the tab's **Coded notes** area.

IMPORTANT

Never edit the hierarchy's Coded Notes list unless you intend to immediately re-download to all affected DADs. If coded notes stored in DADs do not sync up with the hierarchy's Coded Notes list, the wrong notes will be uploaded.

To add a new coded note:

- Click the **Add** button.
- Enter descriptive text in the **Note** field and click the **Save** button.

To remove an existing coded note:

- Select the coded note.
 - Click the **Remove** button.
- The coded note, "Machine Not Operating" may not be removed.

Manual Data Entry

Use the **Insert** menu's **Manual Entry** option to manually enter overall measurement values into your @ptitude Analyst hierarchy. This feature allows you to store, trend, and analyze measurements made with the SKF Pens (VibPen Plus, *SEE* Pen, and ThermoPen). Also, other machinery operating conditions such as flow, speed, and pressure can be manually entered and trended. The **Manual Entry** screen allows you to manually type in one overall value per POINT.

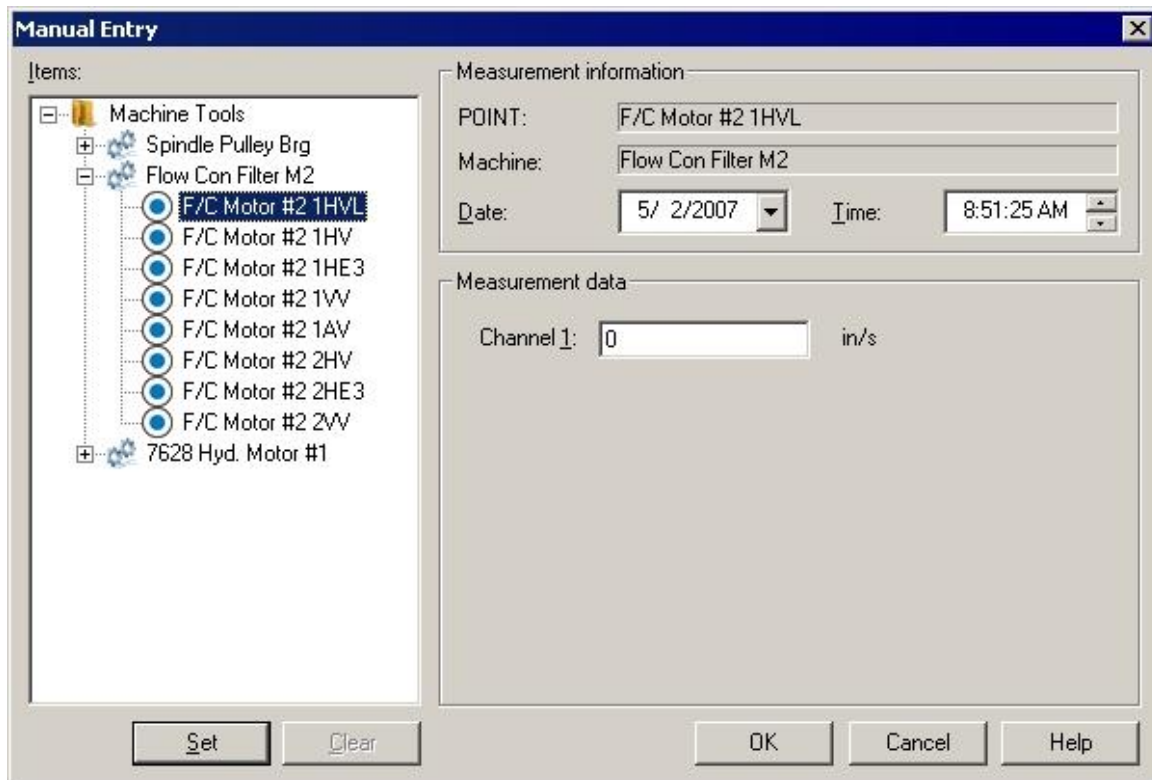


Figure 3 - 9.
The **Manual Entry** Screen.

To manually enter data:

- Select a POINT from the **Items** area.
- Type in the value in the **Measurement data** field(s).
 - The **Measurement data** section varies depending on the type of POINT that is selected.
- Click the **Set** button.
 - By default, the current date / time is applied to the entered POINT value. Select desired date and time from the drop down menus to edit these fields as needed.
 - To quickly enter multiple values that all use the default Date / Time, simply click the **Value** field, type the value and press **Enter**. The value is stored and the pointer moves to the next item's **Value** field.

To clear entered data:

- Select a measurement with a set value and click the **Clear** button.
- Click **OK** to store the specified values and automatically re-process alarms, or **Cancel** to undo settings.

Displaying Graphic Plots

Overview

After uploading your measurement data to @ptitude Analyst, you can easily display the collected measurements in various plot formats for machinery analysis purposes.

Graphic Microlog plot formats include:

- Trend
 - Spectrum
 - Trend/Spectrum
 - Time
 - Trend / Time
 - Trend/Spectrum/Time
 - Spectrum Waterfall
 - Polar Vector
 - Mag/Phase Trend
 - Mag/Speed Spectrum
 - Mag/Speed/Time
 - Orbit
 - Shaft Centerline
 - Band Trend
 - Extracted Trend
 - Extracted Band
 - Contribution/Profile
 - HAL Trend
- Although Nyquist, Bode, Cascade, and Topology plots are also available for Microlog POINTs, they primarily apply to transient data. They are documented in Chapter 8, *Transient Data Analysis*, in the *SKF @ptitude Analyst for SKF Multilog On-Line Systems* manual [PN 32296700].

How To Display Graphic Plots

@ptitude Analyst offers multiple methods for displaying measurement data in plot format. Each method has its advantages. However, regardless of the selected method, the first step in displaying plots is to open any view that contains POINTs (Hierarchy, ROUTE, Workspace, Plot, and Alarms view). The second step is to select the measurement POINT(s) whose data you wish to display in plot form.

Then use one of the following methods for displaying measurement data in graphic plot format.

- The **File** menu's **Print** option may be used at any time to print the contents of the “active” window (including graphic display windows).

Displaying Plots Using Toolbar Buttons

@ptitude Analyst has toolbar buttons for commonly used plots.

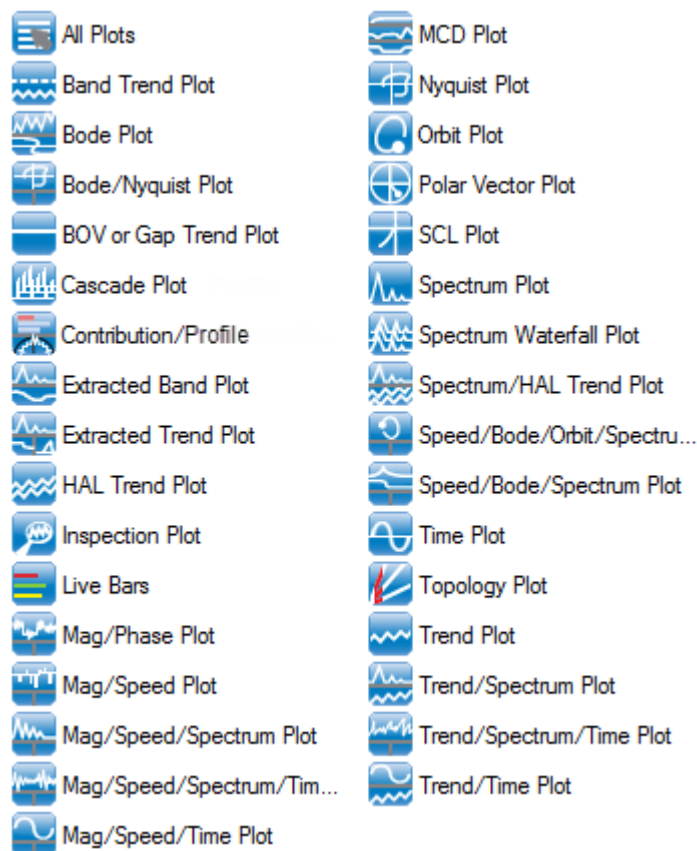


Figure 4 - 1.
Plot Toolbar Buttons (Shown Here as Two Columns).

- To select multiple POINTs for display in a single plot, you must first select the machine in which the POINTs list in the hierarchy's left panel, then select the desired multiple POINTs in the hierarchy's right panel.

- To select POINTs from multiple machines, you must first copy the desired POINTs to a Workspace window.

To display graphic plots using the toolbar:

- Select (highlight) the POINT(s) you wish to display in the Hierarchy, ROUTE, Workspace, or Alarms windows.
- Click one of the toolbar's graphic display buttons to display the selected POINTs or measurement(s) in a specific type of plot.

Click the **All Plots** toolbar button to display the **All Plots** dialog. From this dialog, you may select the plot type to display from all available plots, rather than only the commonly used plot types represented with toolbar buttons.

- Different plot display toolbar buttons may be manually added or removed using the **Customize** menu's **Toolbars** option. Custom toolbars are detailed in **Appendix A, SKF @ptitude Analyst Toolbars**.

Displaying Plots Using the View Menu

View menu graphic display operations are similar to toolbar button graphic display operations. The **View** menu allows you to display every graphic plot type that applies to the selected POINT(s).

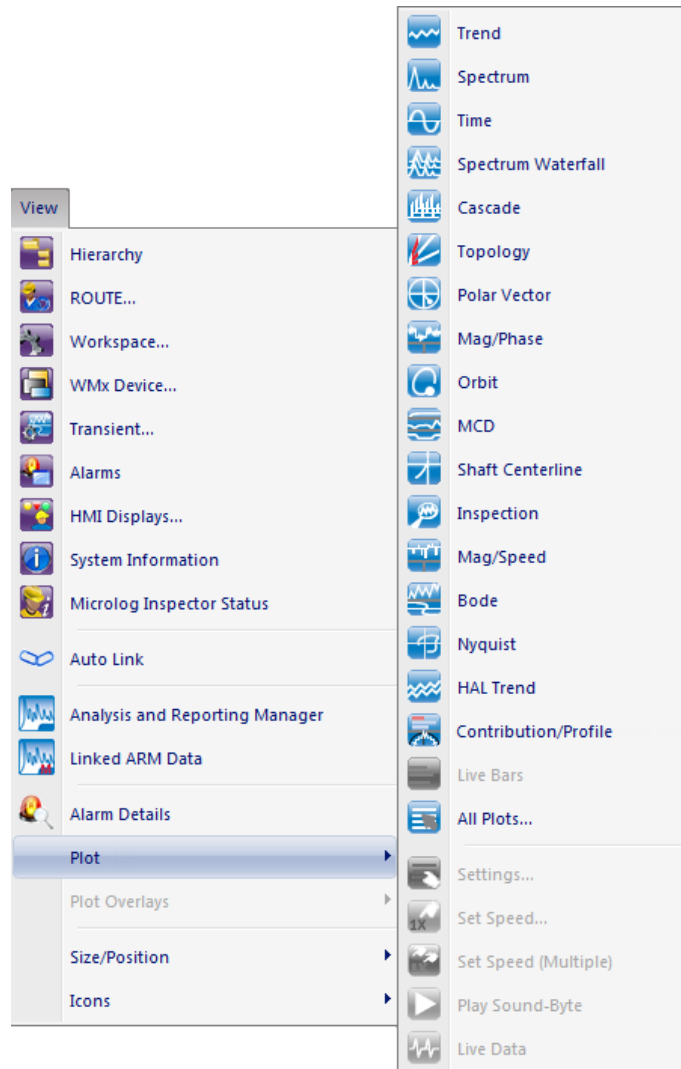


Figure 4 - 2.
The **View** Menu's **Plot** Option.

To display graphic plots using the View menu:

- Highlight the POINT(s) you wish to display in the Hierarchy, ROUTE, Workspace, or Alarms windows.
- Select the **View** menu's **Plot** option. Select one of the visible plot types, or select **All Plots** for more selections. All plot types display in the dialog.

Displaying Plots Using the POINT's Context Menu

You can also display a plot directly from selected single or multiple POINTs using the context menu.

To display a plot using the context menu:

- Select POINT(s) from a Hierarchy, ROUTE, Workspace, or Alarm window.
- Using your mouse, right click to activate the context menu.

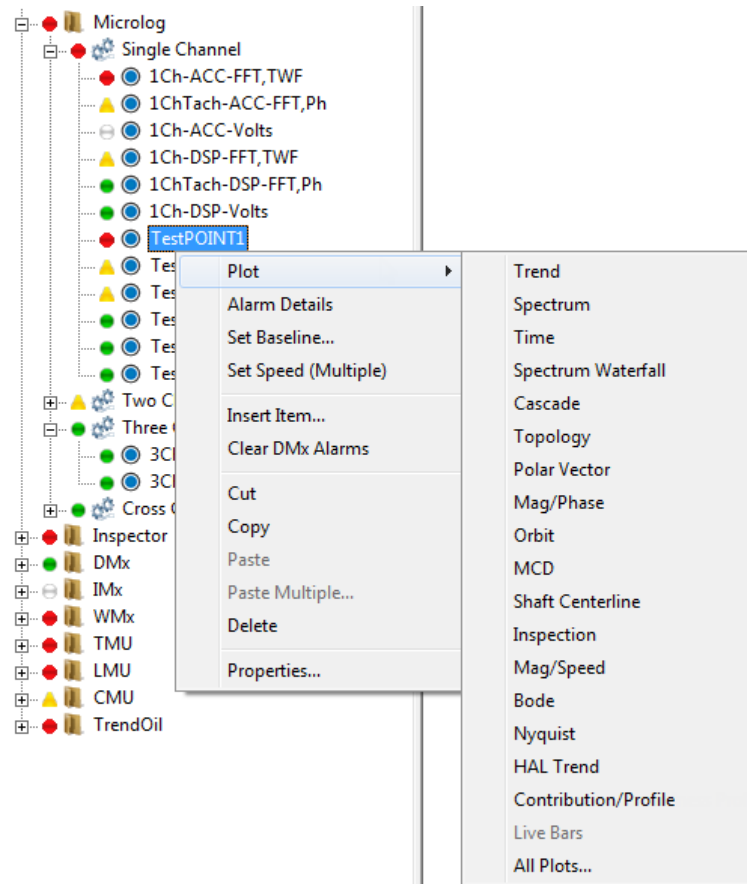


Figure 4 - 3.
The Hierarchy Context Menu's **Plot** Option.

- Select the desired **Plot** type. The selected plot type displays in a plot window for the selected POINT(s).
 - You can also use the right-click context menu to display a plot directly from a selected single measurement data record or multiple measurement data records.

Plot Window

The Plot window displays collected measurements in various graphic plot formats for machinery analysis purposes.

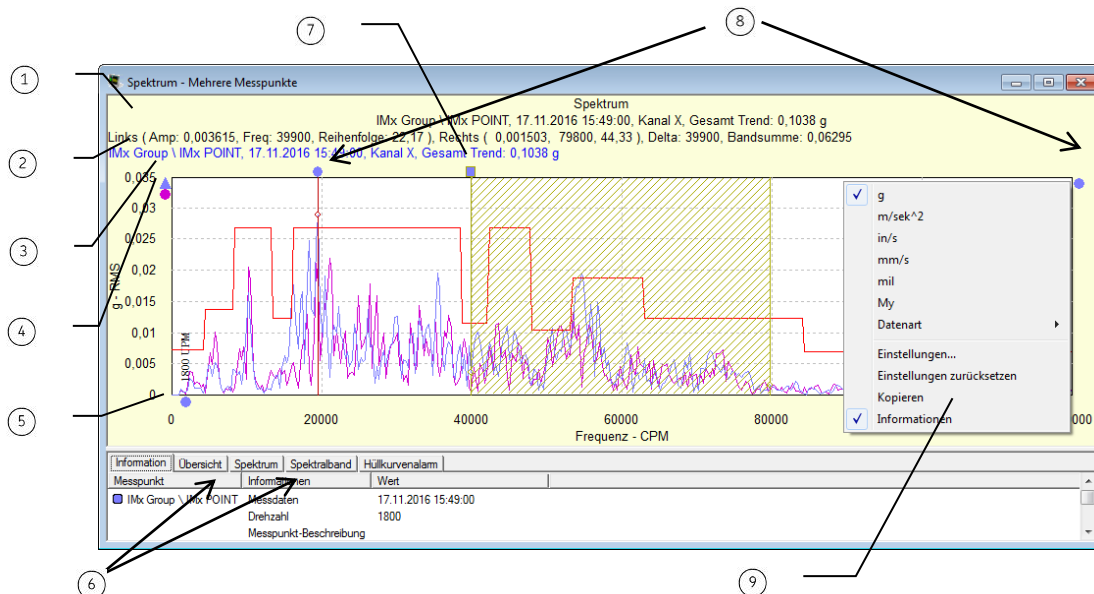


Figure 4 - 4.
Plot Window.

- | | |
|------------------------|----------------------------|
| ① cursor feedback | ⑥ various overlay tabs |
| ② mouse feedback | ⑦ active overlay |
| ③ inactive plot line | ⑧ inactive overlays |
| ④ active plot line | ⑨ right-click context menu |
| ⑤ running speed anchor | |

Plot Window Overview

The **Plot** window's title bar displays the plot type displayed for the current POINT. The **Machine** name (from the hierarchy) corresponding to the POINT displays in front of the POINT name (for a single POINT). The Machine and POINT name display in the plot window's top center area for all plots. The date / time stamp and overall value display for spectrum and time plots. Multiple POINTs are not individually identified.

There are two areas in the Plot window. The top area is the plot area. The lower part is the information area.

- You may re-size the entire Plot window, and/or either of the window's areas, for customized viewing. You may also hide the information area automatically (using **Preferences**) or manually (using the toolbar or context menu).
- The status of the information area affects plot print-out. If a plot is printed when the **Info** tab is displayed, the **Info** tab's information prints along with the plot. If a plot is printed when

the **Info** tab is hidden, the **Info** tab's information *does not* print with the plot.

Plot Window Information Area

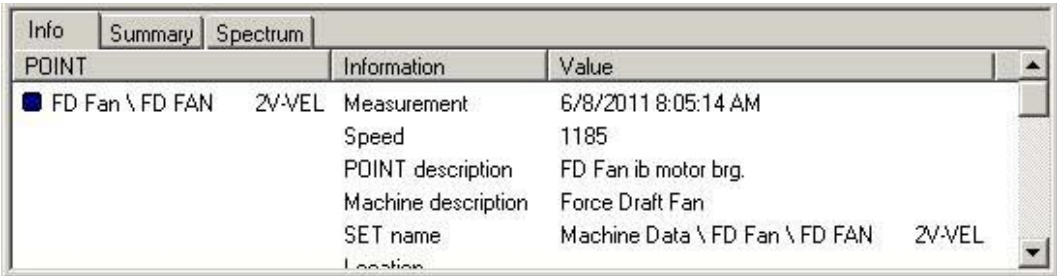


Figure 4 - 5.
The Plot Window Information Area.

The information area's tabs display various plot information for the active plot.

Info tab – Displays general information for the active plot.

Summary tab – Displays measurement summary information for all POINTs displayed on the plot.

Plot type tab (Trend, Spectrum, etc.) – Displays information for each *single* cursor on the active plot.

Other tabs appear in the information area depending on the type(s) of overlay(s) used on the current plot, and display information specific to each overlay type.

Plot Feedback Areas

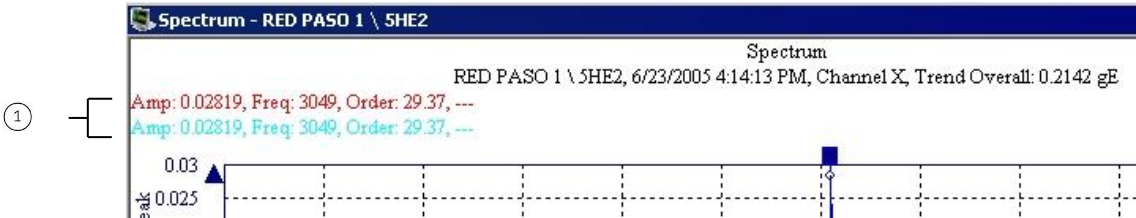


Figure 4 - 6.
Plot Feedback Areas.

① feedback areas

The first line displays information corresponding to the active cursor overlay's current position.

The second line displays information corresponding to the mouse pointer's current position (when positioned over a plot item).

Plot Window Operations

Mouse Operations

There are several ways to work within the Plot window. The mouse can be used to display specific plot information. The mouse's pointer changes to an up arrow (↑) when placed over a plot item. Typical plot items include overlay, plot line (trace), anchor, any object with feedback information, and context menus.

Overlays

Plot "overlays" superimpose cursors, alarms, text annotations, and frequency markers on displayed plots. Each overlay displays an "anchor" which you use to manipulate the overlay.

Anchors

Anchors indicate overlays and plot lines on the active plot. Anchors also identify the active status of an overlay and plot line (trace).

The *Active* plot line anchor is indicated using a **triangle** icon. Plot line anchors display on the plot's left.

The *Active* overlay anchor is indicated using a **square** icon. Active overlay anchors indicate which plot's data is displayed using the plot's color in the overlay's square icon.

Inactive plot line and overlay anchors are indicated using **circle** icons.

- Double-click an overlay's anchor to switch it to another plot.

Some overlay anchors appear at the top of the plot, others appear to the plot's right. Band cursor, harmonic cursor, sideband cursor, and single cursor anchors display across the top of the plot, directly above their respective overlays. Band alarm, envelope alarm, frequencies, curve fit, overall alarm, and peak cursor anchors display on the plot's right. The running speed anchor displays beneath the plot.

Many anchors indicate overlay position in respect to the plot's X and/or Y axis. Anchors provide easy access to the plot item's right-click context menu. For example, to access the settings dialog for your frequencies overlay, right-click on the frequency overlay anchor to launch the frequencies **Settings** dialog.

If two or more traces are displaying on a plot and an overlay is added to the plot, it automatically attaches itself to the *active* plot line (trace).

Text annotations (temporary textual notations) may be placed anywhere on the plot. Text annotations do not have anchors.

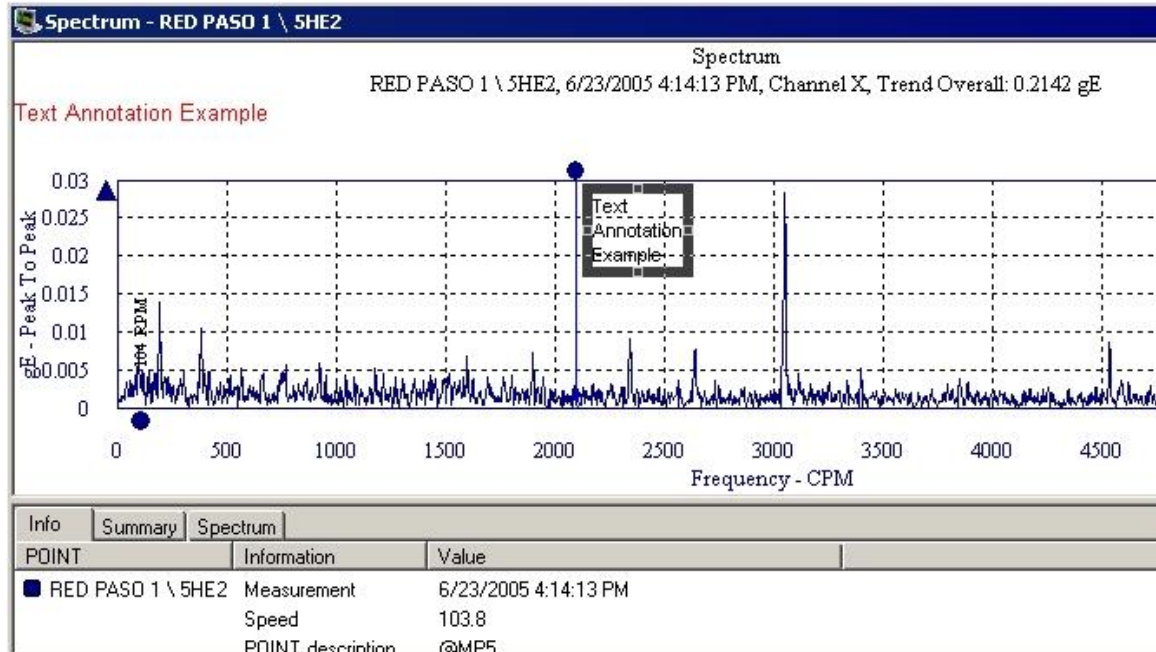


Figure 4 - 7.
Text Annotation Example.

Plot Line (Trace) Right-Click Context Menu

Position the cursor over the plot line and using your mouse, right-click to access the plot line context menu. Menu options include:

Lock Trace – Enable this option to “lock” the selected plot line data so it will remain visible when auto linking is used. This allows you to compare the “locked” plot line data to the new data that is added or removed when autolinking is used.

Remove – Removes trace from plot.

Properties – Displays **POINT Properties** screen for the plot’s active POINT.

Go to Hierarchy – Displays the Hierarchy window with the selected hierarchy item highlighted for easy identification.

Priority – Assign a priority level to the Machine the POINT is under.

Plot Right-Click Context Menu

Position the cursor over the plot background and using your mouse, right-click to access the plot context menu. Menu options include:

Plot Specific Options – Plot options display in the menu’s top area (if available), allowing you to configure the plot’s content. Which options appear (if any) depends upon the current plot type.

For example, you can convert the units in an acceleration, velocity, or displacement spectrum plot. Unit types display in the menu’s top area and are available for selection.

Settings – Launches the **Settings** screen for the current plot type. This screen allows you to change the way the plot displays. For example, use the **Settings** screen to change axis ranges.

Reset Settings – Resets to default plot settings. Use **Reset Settings** to clear all settings you made and reset the plot window based on its current content.

Copy – Copies the plot image to the clipboard.

Info Area – Show / Hide the current plot's information area.

- Square icons on a trend plot line indicate the measurement is included in calculations for mean and standard deviation (as in the **Info** tab) and statistical alarm generation. Use the single cursor's context menu or **Measurement Properties** to change the "include" status.

Overlay Anchor Right-Click Context Menu

The Overlay anchor right-click context menu provides quick access to the overlay's options (e.g. **Remove** the overlay, or if more than one trace is displayed, move the overlay to the **Next Trace**, etc.)

Drag and Drop Operation

Drag and drop operation allows you to easily display plots for different measurements. These measurements can belong to the same POINT, or to different POINTs. By default, when the POINT is selected, the plot is displayed for the POINT's last measurement. The drag and drop feature allows you to override this default setting and display specific measurements on the plot.

You can also drag and drop to view multiple POINTs on the same plot. Simply drag the desired POINT(s) and/or measurement(s) into the open plot window.

- Some plots combine multiple plot types in one window for side-by-side comparison. In most cases, you may only drag and drop into the primary plot (i.e., the top plot area).

Multiple Measurements and Channels in Plots

You may have multiple measurements from one or more POINTs represented in a plot, either by selecting them when opening the plot, or by dragging and dropping additional measurements onto an open plot.

It is also possible to have multiple channels represented on a plot for multi-channel POINTs. When you access a plot from a multi-channel POINT, the Plot Preferences **Channel Number** setting specifies whether all channels open automatically, only channel X opens, or the **Select Channel Number** dialog displays where you may select a single channel or **All Channels**.

- If Auto Link is turned on, this setting is overridden and all channels display.



Figure 4 - 8.
The **Select Channel Number** Dialog.

If all channels open, each channel is treated as a separate measurement on the plot.

Depending on your plot type, multiple measurements may overlay each other (e.g., spectrum and time plots) or may be represented as individual data points on the plot (e.g., waterfall and trend plots).

A plot anchor is located on the left of the plot for each measurement. Depending on the plot type, the anchors are color-coded to match the data.

Inactive plot line and overlay anchors are indicated using **circle** icons.

The *Active* plot line anchor is indicated using a **triangle** icon.

In the case of plots that are designed to display multiple measurements (e.g., waterfall and trend plots), all measurements under the same POINT are included in one plot anchor. Separate plot anchors only appear if you have multiple POINTs or channels represented in the plot.

For combination plots (e.g., Trend / Spectrum), the channel anchors only toggle the channel on the top plot. To toggle the channels on additional plots, click the single cursor overlay anchor.

The active measurement determines the cursor feedback and information window's content and overlay settings. You may toggle between the measurements by clicking on the appropriate anchor.

Zoom Operation

The zoom operation allows you to easily zoom in and out on the plots for a closer look. You may zoom in and out one of two ways:

- Using the zoom buttons on the toolbar
- Using the mouse scroll wheel

To zoom in / out on a plot using the zoom buttons:



Figure 4 - 9.
Zoom Buttons.

- ① activates zoom
- ② zooms out

- Activate the zoom by clicking the left magnifying glass.
- Click and drag across the area of the plot to which you would like to zoom.
- Click the right magnifying glass to zoom out.

To zoom in / out using the mouse scroll wheel:

- Position your cursor over the area of the plot to which you would like to zoom.
- While holding the Ctrl key, roll the mouse scroll wheel up or down. Rolling up causes the plot to zoom in, while rolling down causes the plot to zoom out.

Plot Navigation

While viewing a plot, use the arrow keys on your keyboard to navigate to the next / previous measurement on the plot or to the next / previous POINT's plot.

To navigate to the next / previous measurement on the plot:

- While holding the Ctrl key, press the left arrow to display the previous measurement, or press the right arrow to display the next measurement.

To navigate to the next / previous POINT's plot:

- While holding the Ctrl key, press the up arrow to display the plot for the previous POINT, or press the down arrow to display the plot for the next POINT.

Set Speed (Multiple)

Use the Set Speed (Multiple) feature to set the same measurement speed for multiple FFT measurements.

- Starting from an FFT measurement plot, right-click on the single cursor and select Set Speed (Multiple) from the resulting context menu.

The Set Speed (Multiple) window appears.

Plot Types

Machinery measurements can be displayed in a variety of graphic display formats that aid machinery analysis. Each graphic display type is detailed below.

For each type of graphic display, @ptitude Analyst provides settings to manipulate the plot display and to gain valuable analysis information. These settings dialogs are available from the @ptitude Analyst **View** menu and from the toolbar (which changes according to the active plot display type). Each plot's settings dialogs are also detailed below.

- This section does not document Nyquist, Bode, Cascade, or Topology plots. Although these plots are available for Microlog POINTs, they primarily apply to transient data. They are documented in Chapter 8, *Transient Data Analysis*, in the *SKF @ptitude Analyst for SKF Multilog On-Line Systems* manual.

Trend Plot

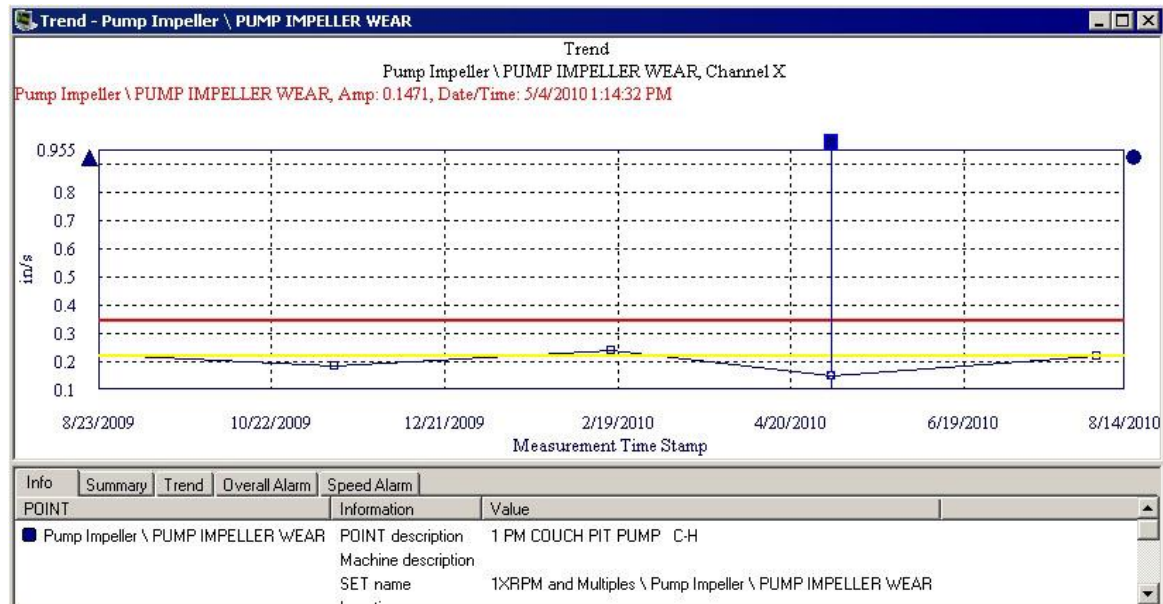


Figure 4 - 10.
Example of a Trend Plot.

Trend plots allow you to easily compare a POINT's most recent reading against its previous readings and its alarm set up, allowing you to see how the POINT is "trending" over time. Trend plots are an easy and accurate method of detecting gradual changes in process conditions and changes that might otherwise be overlooked.

In addition to displaying trend plots for individual POINTs, you can display multiple POINTs' trends (from the same machine or from different machines) in one graphic display window. This allows easy comparison between various POINTs' trends.

In a trend plot, the X axis (horizontal axis) represents time and the Y axis (vertical axis) represents magnitude.

- Square icons on a trend plot indicate the measurement is included in calculations. Use the single cursor's context menu or the **Measurement Properties** screen to change the "include" status.

Trend Settings

To access the Trend Settings Screen:

- With a trend plot displayed, select the **View** menu's **Plot/Settings** option, use the settings toolbar button, or right-click to display the plot's context menu and select the **Settings** option.

Magnitude scale fields include:

Autoscale - Enabling **Autoscale** automatically scales the initial amplitude axis so it is approximately 120% of the largest amplitude. Disabling **Autoscale** displays the spectrum on the same full scale vertical axis used when it was recorded.

% Full Scale - When enabled, the amplitude axis displays as a % value of the POINT's full scale value. Use **% Full Scale** to compare measurements that do not have the same units or the same Full Scale value.

- If you do not select **Autoscale** or **% Full Scale**, you must enter values to determine the plot's magnitude scale (Y-axis scaling).

Magnitude Scale - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Magnitude Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

Date / Time scale fields include:

Date / Time Scale - Enter minimum and maximum date and time.

- With a plot displayed, to reset all settings back to their defaults, click the right-click context menu's "Reset Settings" option.

Adjust date/time range to include latest notes - When enabled, all notes created after the date / time of the last collected measurement display on the plot. Default is enabled.

Spectrum Plot

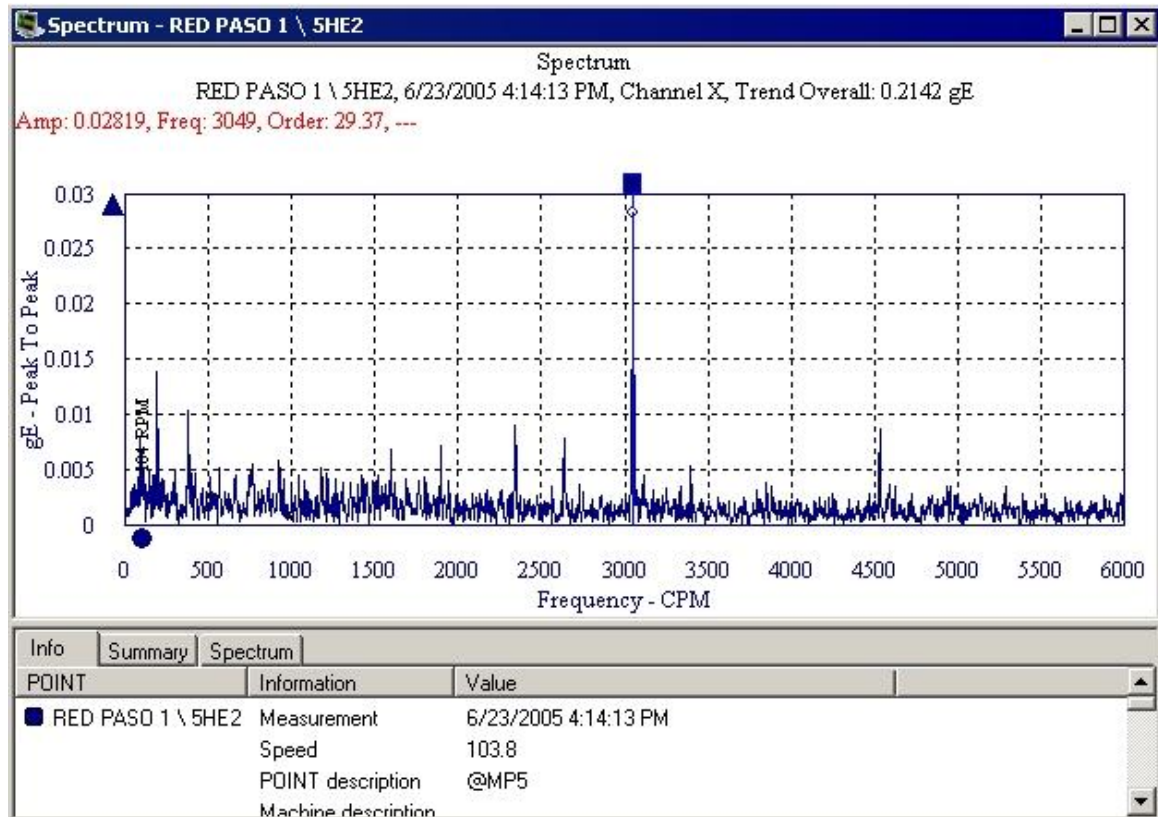


Figure 4 - 11.
Example of a Spectrum Plot.

As different types of machinery problems often occur at different frequencies, it is very useful to analyze measured vibration signals with respect to frequency.

FFT spectrum plots (pl. spectra) display vibration amplitudes at various component frequencies.

- FFT is the abbreviation for Fast Fourier Transform (the mathematical formula that transforms the vibration signal into its component frequencies).

In an FFT spectrum, the X axis (horizontal axis) represents vibration *frequency* in Hz or CPM (or orders of running speed). The Y axis (vertical axis) represents vibration *amplitude*.

FFT spectrum plots are extremely useful machinery analysis tools. FFT spectra provide information that helps determine the location of a problem, the cause of the problem, and with trending, how long until the problem becomes critical.

In addition to single display, you can display multiple POINTs' or measurements' FFT spectra (POINTs may be from the same machine or from different machines). This allows easy comparison between various POINTs' FFT spectra.

Spectrum Settings

To access the Spectrum Settings screen:

- With a spectrum plot displayed, select the **View** menu's **Plot / Settings** option, or use the settings toolbar button.
 - The Settings screen is also available from the spectrum plot's context menu.

View Type fields include:

Combined / Stacked - Determine the plot orientation for multi-channel data. **Stacked** displays each channel as a separate plot. **Combined** shows a single plot overlaid with all channels.

Link - If **View Type** is set to **Stacked**, determine whether cursors and overlays are linked across all plots, or operate independently. If **Link** is enabled, cursors and overlays appear in the same position across all plots. If **Link** is disabled, you may add and move cursors and overlays in each plot independently.

Magnitude scale fields include:

Autoscale - Enable to automatically scale the initial amplitude axis so it is approximately 120% of the largest amplitude. Disable to display the spectrum on the same full scale vertical axis used when it was recorded.

% Full Scale - Enable to display the amplitude axis as a % value of the full scale. Use **% Full Scale** to compare measurements that do not have the same units or the same Full Scale value.

- If you do not select **Autoscale** or **% Full Scale**, you must enter values to determine the plot's magnitude scale (Y-axis scaling).

Magnitude Scale - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Magnitude Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

You must enter values to determine the plot's frequency scale (X-axis scaling)

Frequency scale fields include:

Frequency Scale - Enter the minimum and maximum frequency scale values in the designated text boxes.

Frequency Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

- With a plot displayed, to reset all settings back to their defaults, click the right-click context menu's **Reset Settings** option.

Spectrum Plot – Multi Channel

For two channel and Triax POINTs, you have the option to display spectrum plots in either a *Stacked* or *Combined* view, based on preferences.

- To view multi-channel spectrums in Stacked view, set the **Layout Orientation / Spectrum Plot Preference** to **Stacked**.

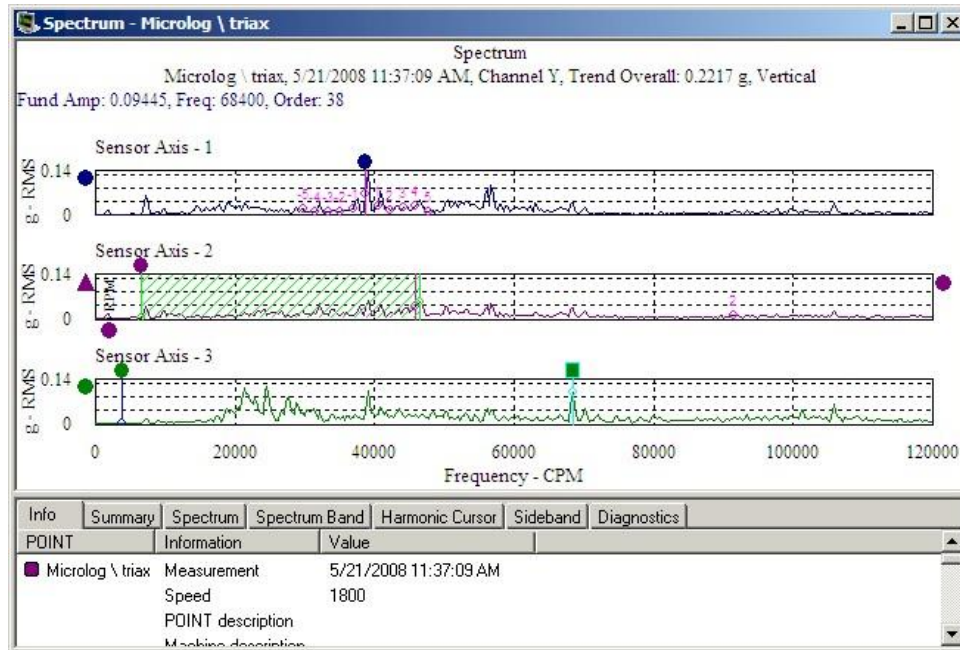


Figure 4 - 12.

Example of a Stacked Spectrum Plot with Unlinked Cursors / Overlays.

In Stacked mode, each channel displays in a separate panel. Depending on your **Stack Mode** plot preference, cursors and overlays on the plot may either be linked or unlinked.

If **Link** is selected, cursors and overlays appear in the same position across all plots. Where applicable, overlay tabs in the information area provide a separate column for each channel (for example, Amp X, Amp Y, and Amp Z).

If **Unlink** is selected, you may add and move cursors and overlays in each plot independently. Where applicable, overlay tabs in the information area list overlay details for each channel on a separate line.

- To view multi-channel spectrums in Combined view, set the **Layout Orientation / Spectrum Plot Preference** to **Combined**.

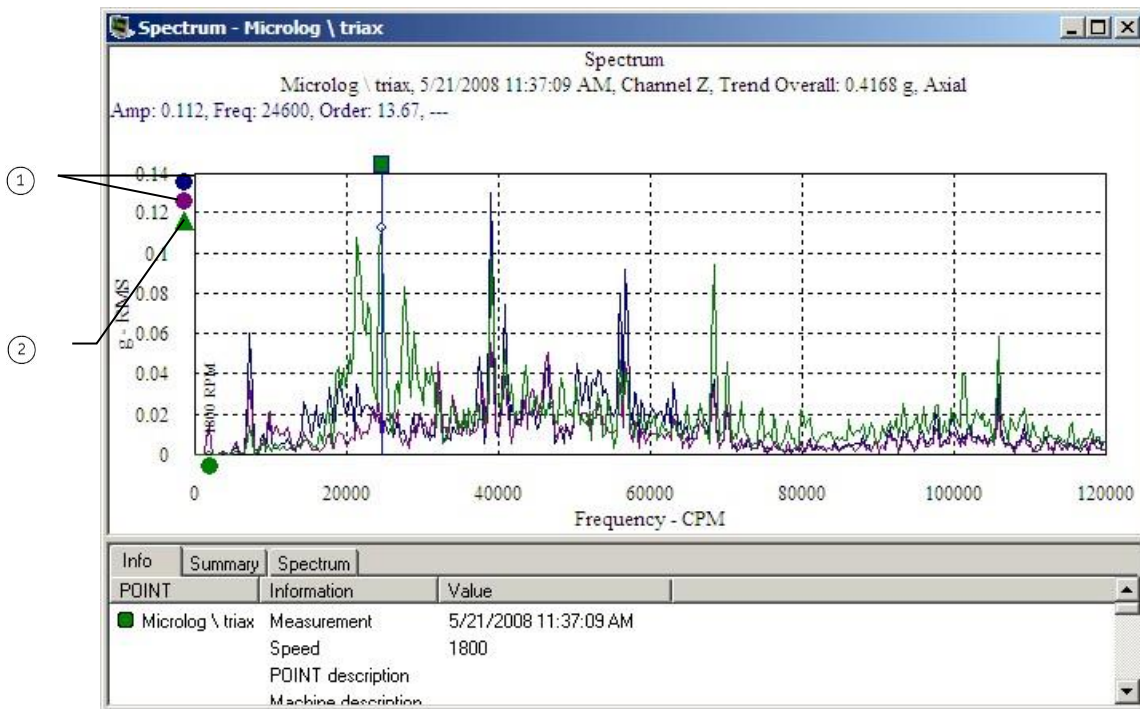


Figure 4 - 13.
Example of a Combined Spectrum Plot.

- ① Inactive channels
- ② Active channel

Combined spectrum plots overlap the data from each channel. The channel indicators on the side of the plot are color-coded to match the spectrum data. The active spectrum is shown as a triangle. Toggle between the channels by clicking on the appropriate indicator. The active channel determines the cursor feedback and information window's content and overlay settings.

Trend / Spectrum Plot

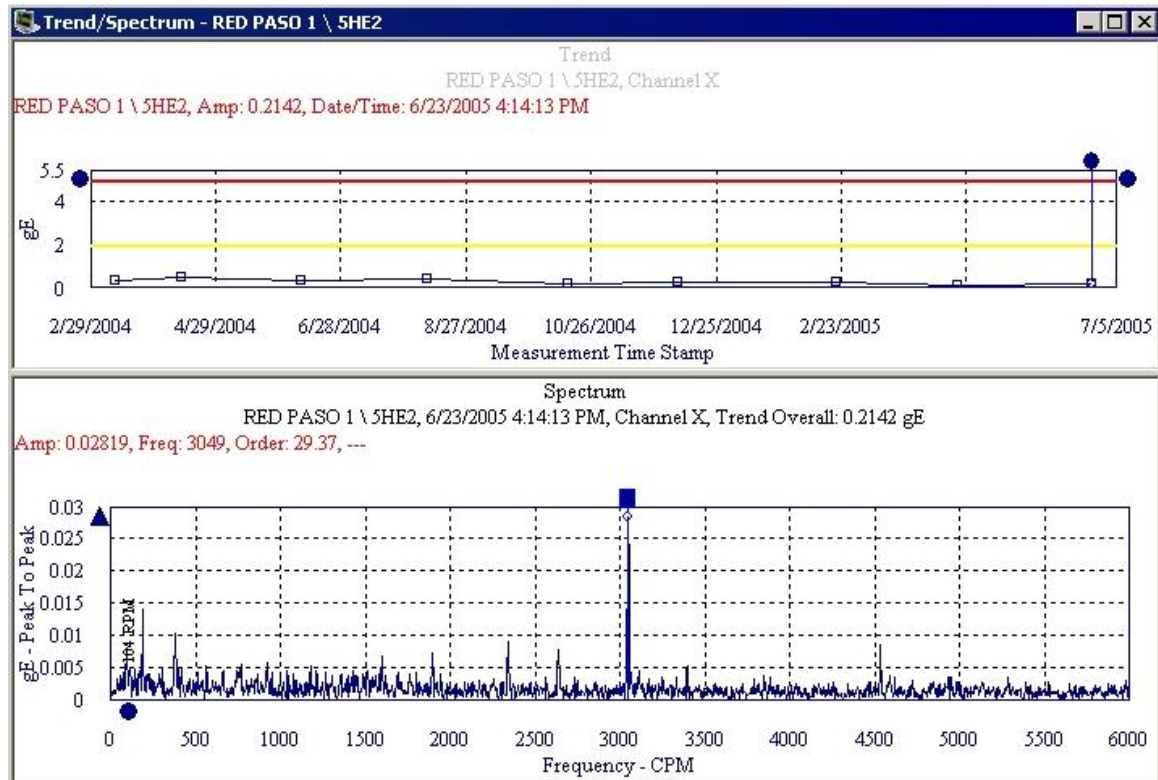


Figure 4 - 14.
Example of a Trend / Spectrum Plot.

Trend/Spectrum Plots display both a trend plot and a spectrum plot for a trend record indicated by the single cursor position.

Each single cursor on the trend plot has a corresponding spectrum data line, *if FFT data is available*. Removing the cursor from the trend also removes the associated spectrum data line.

The active plot (trend or spectrum) determines the information window's content and overlay settings.

All other trend and spectrum operations behave as described previously in the trend and spectrum plot descriptions.

- Right-click on either plot to access the appropriate context menu.
- See Trend Settings and Spectrum Settings for display parameters that can be modified to change the plot display.

Time Plot

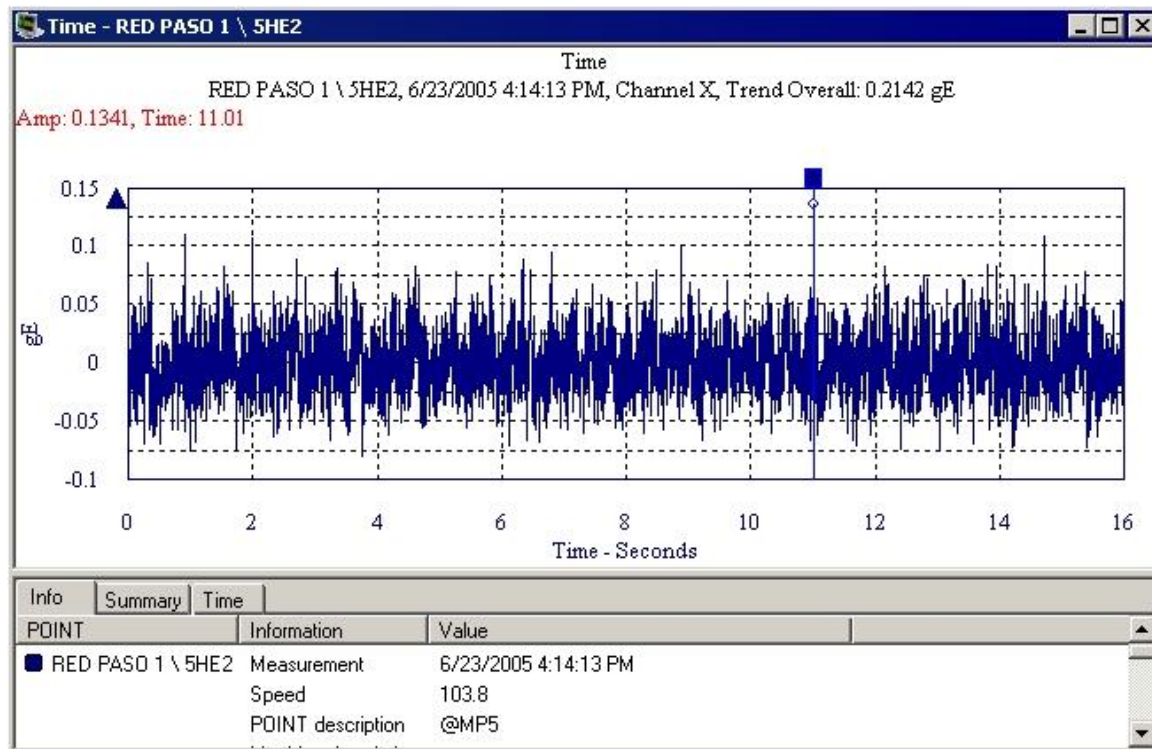


Figure 4 - 15.
Example of a Time Plot.

Time Plots display a short time sample of a raw vibration signal with vibration amplitude plotted over the time scale. Current time plots are compared to past time plots to analyze changes in vibration amplitude or frequency.

Each plot line represents a time waveform measurement for a single POINT. You may configure the X-axis to display time in seconds or milliseconds.

Time Plot Settings

To access the Time Plot Settings screen:

- With a time plot displayed, select the **View** menu's **Plot / Settings** option, or use the settings toolbar button.
 - The **Settings** screen is also available from the time plot's right-click context menu.

Magnitude Scale fields include:

Autoscale - Enabling **autoscale** automatically scales the initial amplitude axis so it is approximately 120% of the largest amplitude. Disabling **autoscale** displays the spectrum on the same full scale vertical axis used when it was recorded.

% Full Scale - When enabled, the amplitude axis displays as a % value of the full scale. Use **% Full Scale** to compare measurements that do not have the same units or the same Full Scale value.

- If you do not select **Autoscale** or **% Full Scale**, you must enter values to determine the plot's magnitude scale (Y-axis scaling).

Magnitude Scale - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Magnitude Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

You must enter values to determine the plot's time scale (X-axis scaling)

Time Scale - Enter the minimum and maximum time scale values in the designated text boxes. Select **Seconds** or **Milliseconds**.

Sound Byte

@ptitude Analyst's Sound Byte utility allows you to listen to sound data waveform through your computer's speakers or connected earphones.

To utilize Sound Byte:

- Select a POINT with saved time data and display its time plot.
 - Click the Sound Byte toolbar button, or select the **Plot** menu's **Play Sound Byte** option. The **Sound Byte** utility launches, providing various playback options.

Sound Byte Controls

Play Time – Controls the play back period length. To change the setting, highlight the displayed play back length value and type in a new value, or use the arrows to increase or decrease play back length. The maximum play time is 10 seconds.

RPM Multiplier – Controls the play back speed. The range is 0.5 – 2, which is equivalent to playing the data back at half the running speed, or double the running speed.

Cursor Update Speed – Controls the cursor update rate so the sound and cursor position are synchronized. Use a lower cursor update speed setting if the cursor is slower than the sound. To change the setting, click the drop down list and select the new cursor update speed.

Volume – Controls the play back sound volume. Click the slider bar and move up or down to increase or decrease the volume.

- Click the **Play** button to generate sound from the vibration data, and listen to the waveform.
- Click the **Save** button to save the sound data into a Windows ".wav" file.
- Click the **Exit** button to exit the Sound Byte utility.

Trend / Time Plot

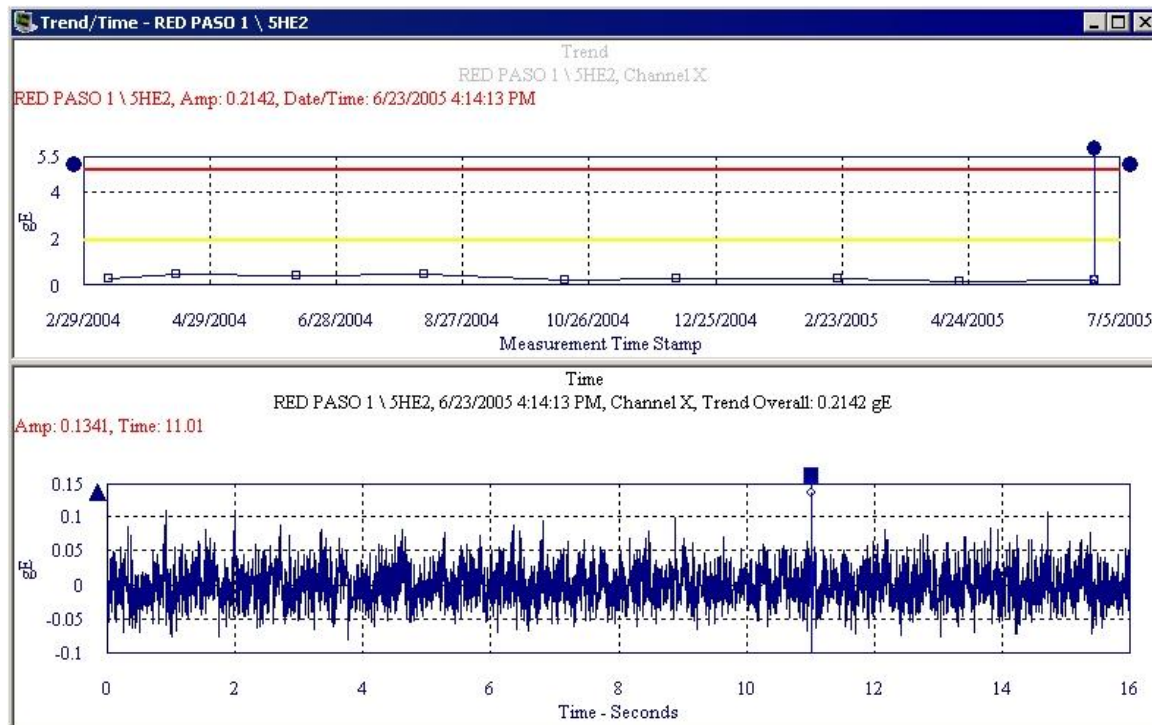


Figure 4 - 16.
Example of a Trend / Time Plot.

Trend / Time Plots display both a trend plot and a time waveform plot for a trend record indicated by the single cursor (if available).

The active plot (trend or time) determines the information window's content and overlay settings. Use a single cursor to view dynamic data for the measurement's date and time. Use multiple cursors to overlay dynamic data to visually display different data values.

All other trend and time plot operations behave as described previously in the single trend and time plot descriptions.

- Right-click on either plot to access the appropriate context menu.
- See **Trend Settings** and **Time Plot Settings** for display parameters that can be modified to change plot display.

Trend / Spectrum / Time Plot

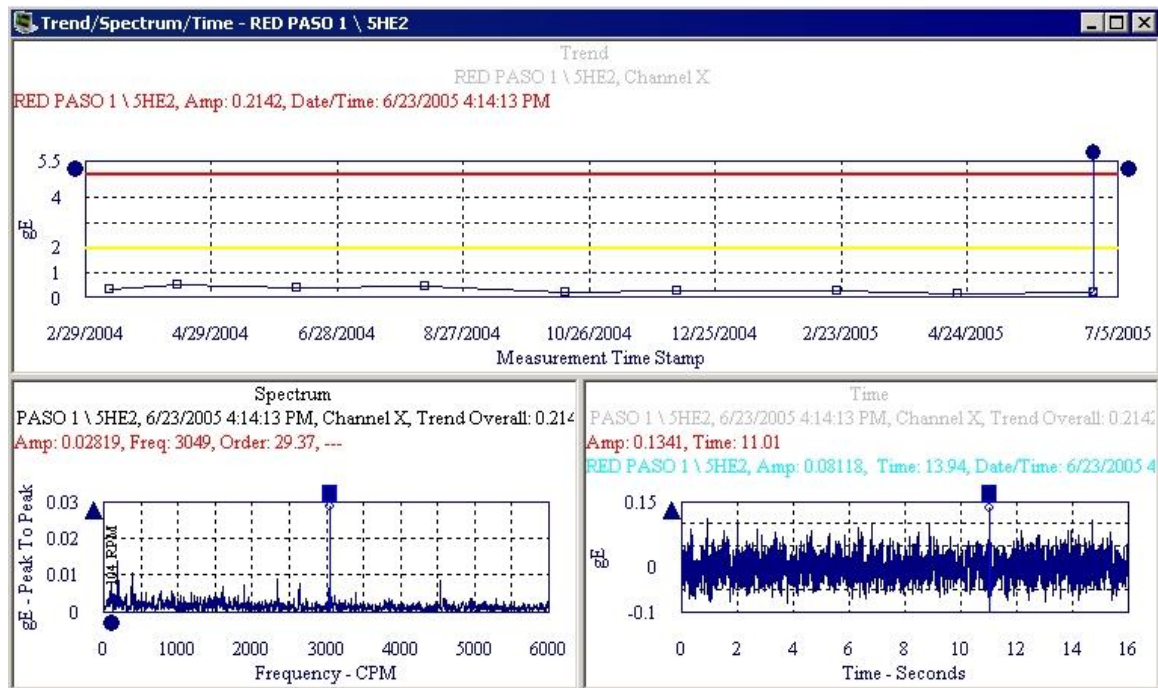


Figure 4 - 17.
Example of a Trend / Spectrum / Time Plot.

Trend / Spectrum / Time plots display a point's trend plot, spectrum plot, and time waveform plot. The three plots display in three different panels. The trend panel is the primary panel of the display.

Use a single cursor to view dynamic data for the measurement's date and time. Use multiple cursors to overlay dynamic data to visually display different data values.

All trend, spectrum, and time plot operations behave as described previously in plot descriptions.

- Right-click on each plot to access its context menu
- See **Trend Settings**, **Spectrum Settings**, and **Time Plot Settings** for display parameters that can be modified to change plot display.

Waterfall Plot

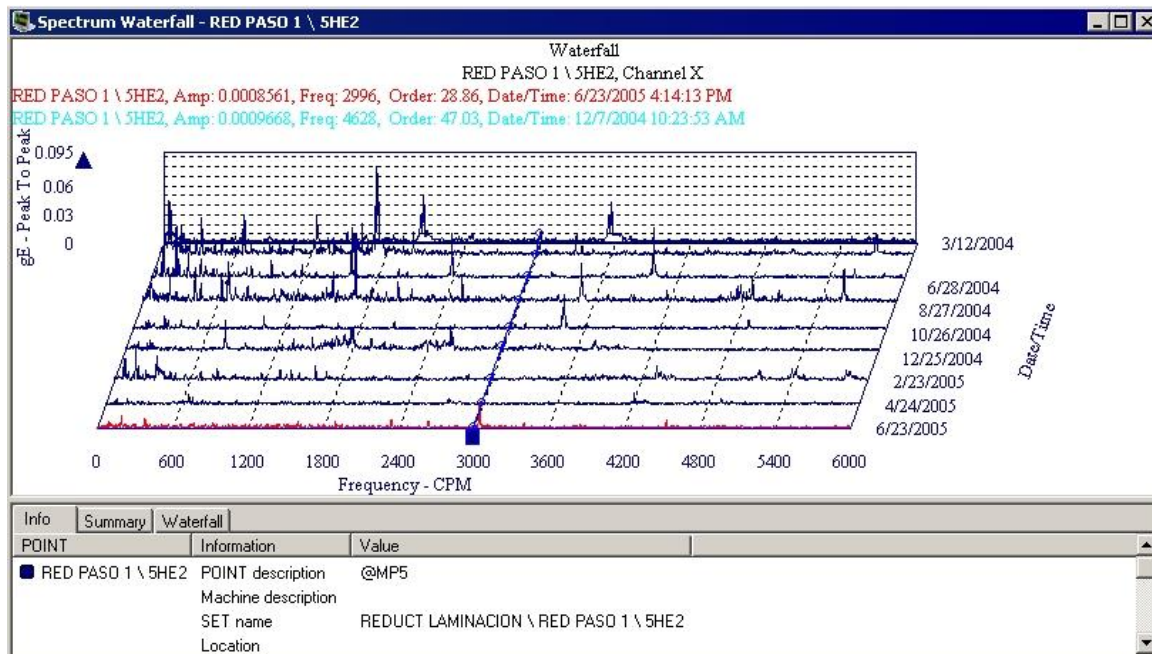


Figure 4 - 18.
Example of a Waterfall Plot.

Three-dimensional Waterfall Plots display POINT's historical spectra collected over time. Historical spectra may be displayed as either a waterfall plot or a palogram plot as configured in **Plot Settings** or **Plot Preferences**.

In a waterfall plot:

X axis = frequency (Hz / CPM, or orders of running speed)

Z axis = date

In a palogram plot:

X axis = date

Z axis = frequency (Hz / CPM, or orders of running speed)

- The slant angle for palogram and waterfall mode may be modified in **Plot Preferences**, allowing further customization of the waterfall plot, including even spacing between spectra regardless of time interval between readings.

Waterfall Settings

To access the Waterfall Plot Settings screen:

- With a waterfall plot displayed, select the **View** menu's **Plot / Settings** option, or use the settings toolbar button.
 - The **Settings** screen is also available from the waterfall plot's right-click context menu.

Waterfall Plot Settings fields include:

View type - Select display configuration, Waterfall or Palogram.

Waterfall - Three dimensional plot displaying a single POINT's historical spectral data collected over time (frequency axis along bottom).

Palogram - Shows a rotated historical spectrum displaying in a three dimensional format, allowing easy observation of trends at each frequency (date / time axis along bottom).

Even Spacing - Enable to retain the date order, but space evenly for simple viewing.

Date / Time Scale - Enter the minimum and maximum date / time scale values in the designated text boxes.

Magnitude Scale - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Magnitude Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

Frequency Scale - Enter the minimum and maximum frequency scale values in the designated text boxes.

Frequency Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

Polar Vector Plot



Figure 4 - 19.
Example of a Polar Vector Plot.

Polar Vector plots show vibration amplitude and phase. Phase is the angular difference between a known mark on a rotating shaft and the shaft's vibration signal. This relationship provides valuable information on shaft orbit and shaft position and is used for analysis, balancing, and shaft orbital analysis.

The newest measurement for the current data line is indicated by an asterisk (*).

- Access the right-click context menu anywhere on the polar vector plot to change order view, copy, reset settings, and turn amplitude labels on or off.

Polar Vector Settings

To access the Polar Vector Settings screen:

- With a polar vector plot displayed, select the **View** menu's **Plot / Settings** option, or use the settings toolbar button.
 - The **Settings** screen is also available from the polar vector plot's context menu

Polar Vector Settings fields include:

Full Scale - Enter full scale amplitude

Order - Select order from drop down menu (1-4).

Mag / Phase Trend

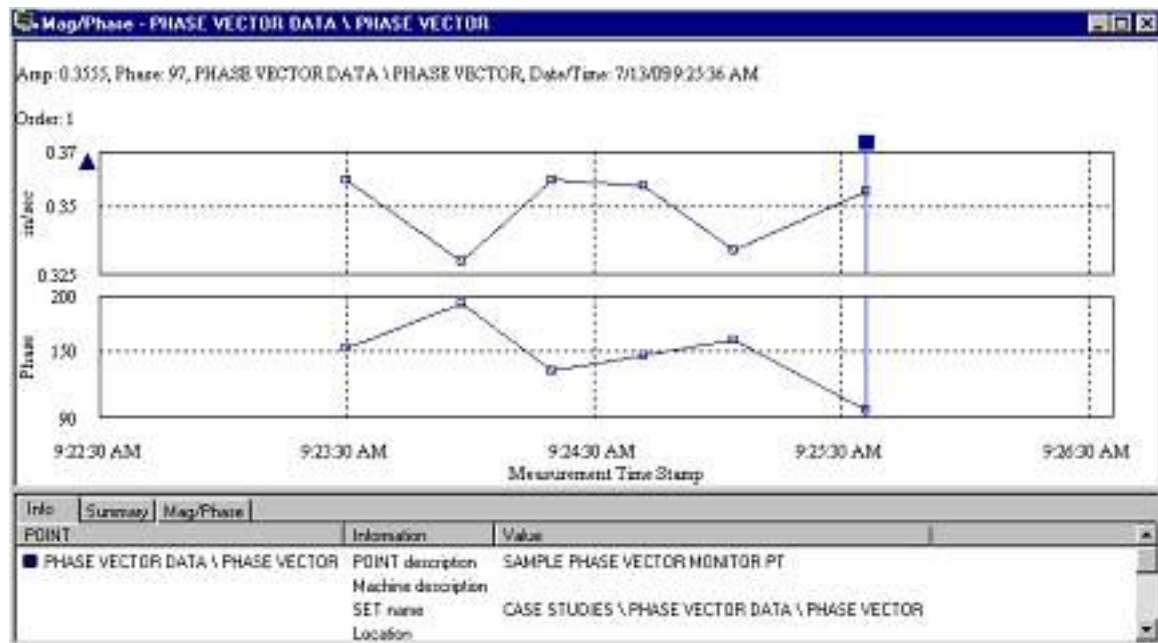


Figure 4 - 20.
Example of a Mag/Phase Trend Plot.

Mag/Phase trends plot the amplitude (top) and phase/angle (bottom) aligned by the measurement date. Mag/Phase trends may be used to determine if a machine's mechanics are changing by analyzing the shifting in phase.

Mag / Phase Settings

To access the Mag / Phase Plot Settings screen:

- With a mag/phase plot displayed, select the **View** menu's **Plot/Settings** option, or use the settings toolbar button.
 - The **Settings** screen is also available from the mag/phase plot's right-click context menu.

Mag / Phase Plot Settings fields include:

Date / Time Scale - Enter the minimum and maximum date / time scale values in the designated text boxes.

Magnitude Scale - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Magnitude Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

Phase Scale - Enter the minimum and maximum phase angles in the designated text boxes.

Order - Determines which frequency order of running speed to display (1X, 2X, 3X, 4X).

Mag / Speed Trend

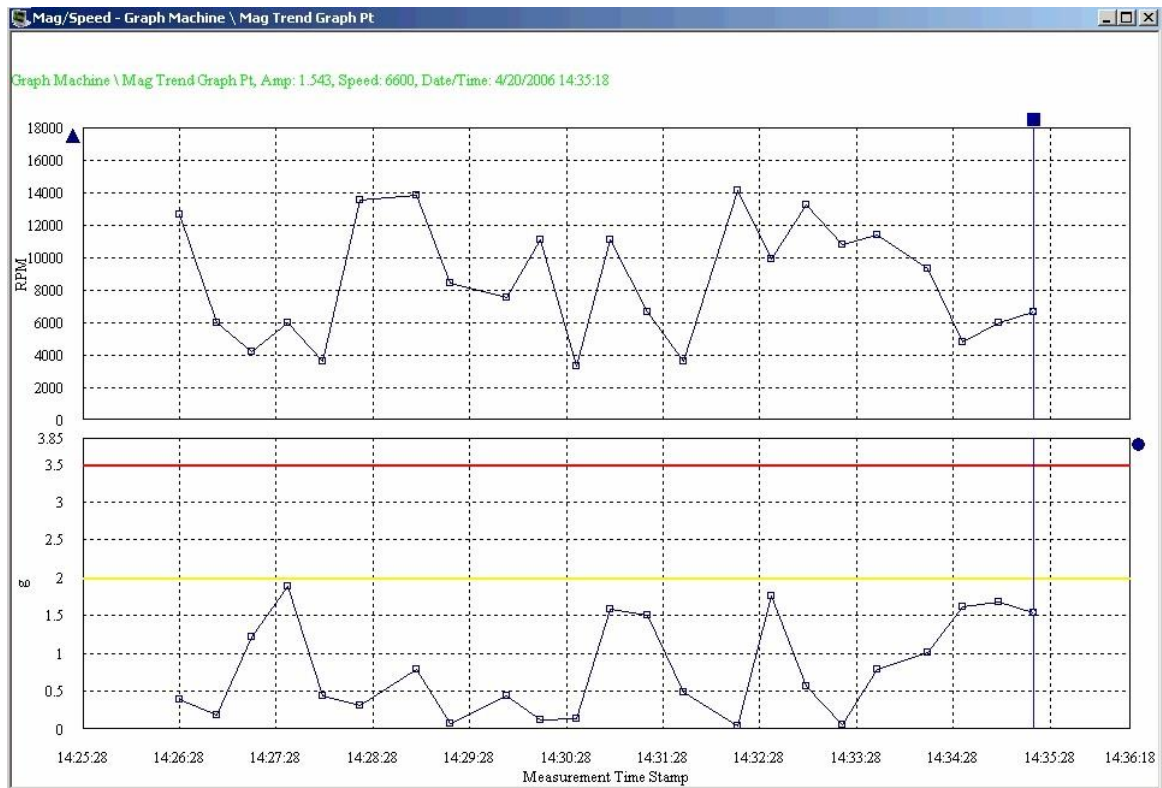


Figure 4 - 21.
Example of a Mag / Speed Trend Plot.

Mag / Speed trends plot the speed (top) and amplitude (bottom) aligned by the measurement date. Mag / Speed trends may be used to determine if a machine's mechanics are changing by analyzing the relationship between vibration amplitude and speed.

- The speed value comes from the dynamic measurement. If only the overall value is stored for a particular date / time, then there will not be a corresponding Mag / Speed trend value.

Mag / Speed Settings

To access the Mag / Speed Plot Settings screen:



- With a mag / speed plot displayed, select the **View** menu's **Plot/Settings** option, or use the settings toolbar button.
 - The **Settings** screen is also available from the mag / speed plot's right-click context menu.

Mag / Speed Plot Settings fields include:

Date / Time Scale- Enter the minimum and maximum date / time scale values in the designated text boxes.

Speed Scale - Enter the minimum and maximum speed scale values in the designated text boxes.

Magnitude Scale - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Magnitude Lin / Log - Select **Linear** scaling to space out data equally. Select **Logarithmic** scaling to emphasize lower values.

Mag / Speed / Spectrum Trend

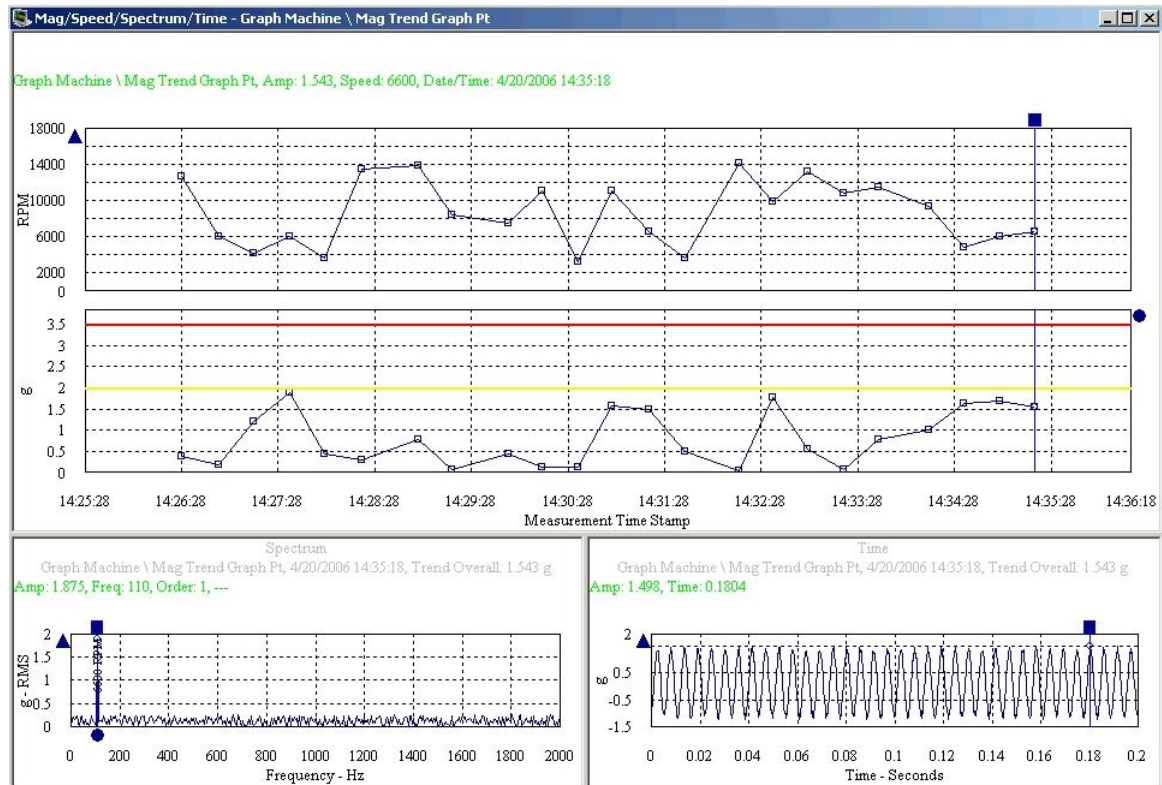


Figure 4 - 22.
Example of a Mag / Speed / Spectrum Trend Plot.

Mag / Speed / Spectrum trends display a POINT's mag / speed plot and spectrum plot. The two plots display in two different panels. The mag / speed panel is the primary panel of the display.

All mag / speed and spectrum plot operations behave as described previously in plot descriptions.

- Right-click on each plot to access its context menu

See **Mag / Speed Settings** and **Spectrum Settings** for display parameters that can be modified to change plot display.

Mag / Speed / Spectrum / Time Trend

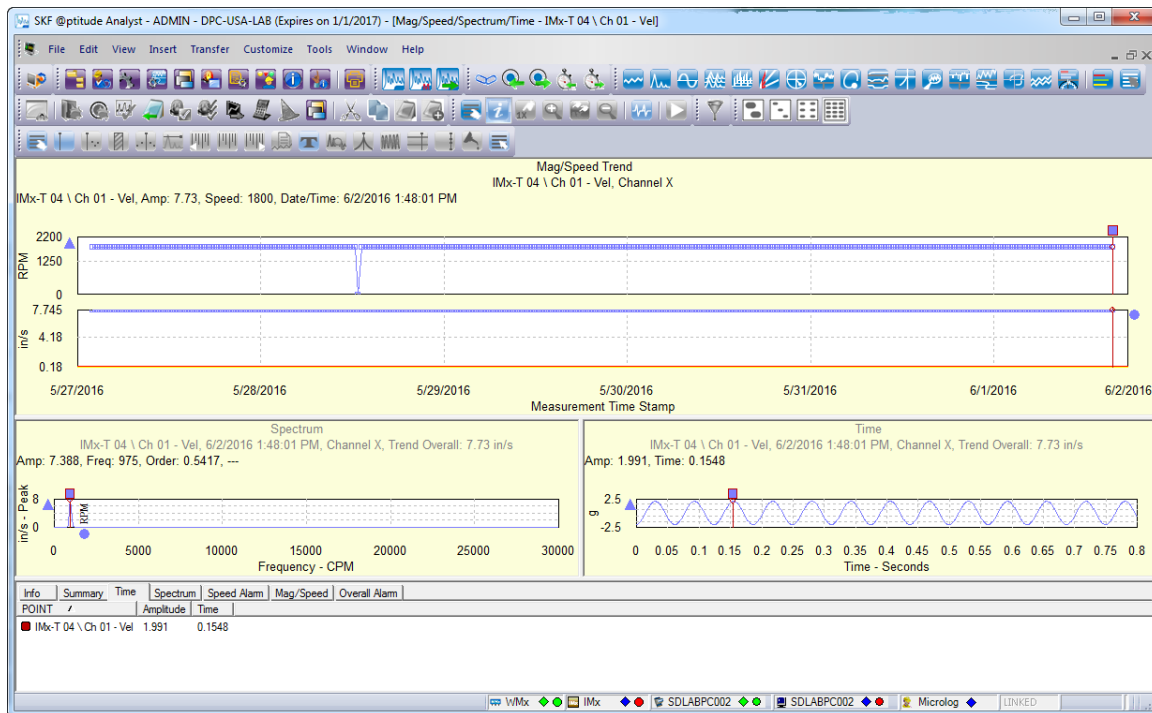


Figure 4 - 23.
Example of a Mag / Speed / Spectrum / Time Trend Plot.

Mag / Speed / Spectrum / Time trends display a POINT's mag / speed plot, spectrum plot, and time plot. The three plots display in three different panels. The mag / speed panel is the primary panel of the display.

All mag / speed, spectrum, and time plot operations behave as described previously in plot descriptions.

- Right-click on each plot to access its context menu

See **Mag / Speed Settings**, **Spectrum Settings**, and **Time Settings** for display parameters that can be modified to change plot display.

Mag / Speed / Time Trend

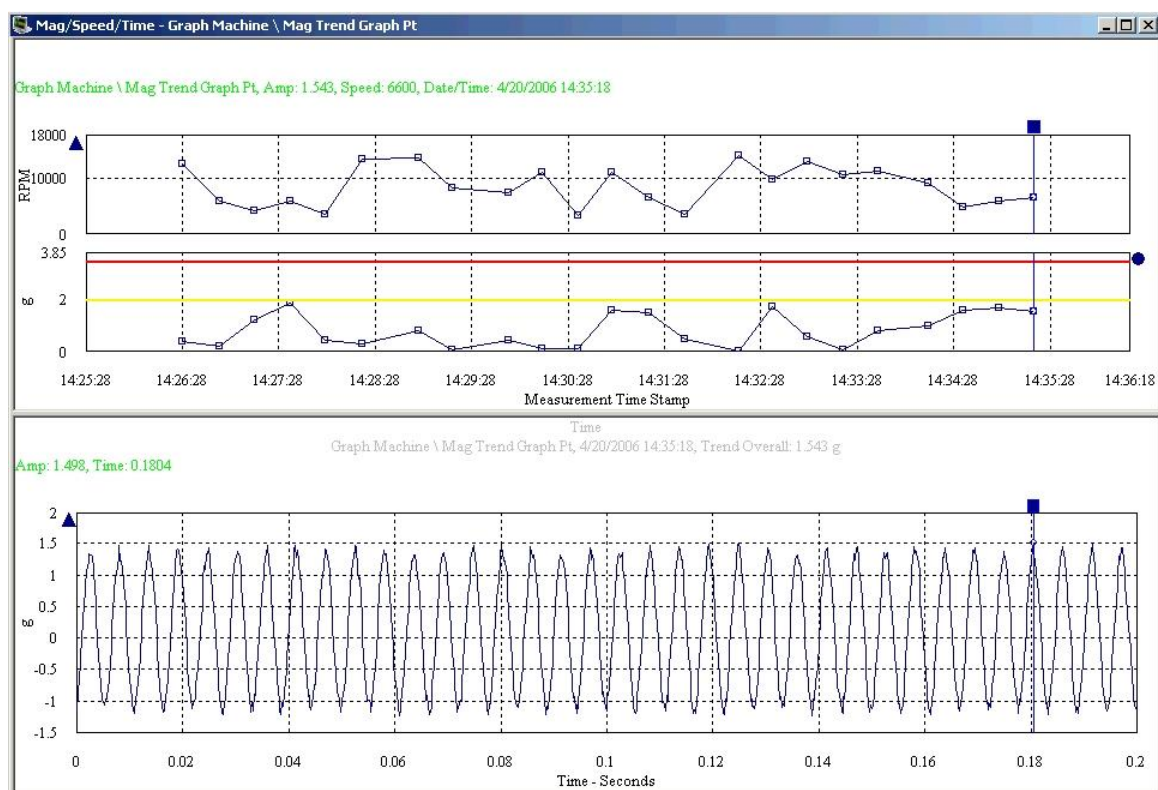


Figure 4 - 24.

Example of a Mag/Speed/Time Trend Plot.

Mag / Speed / Time trends display a POINT's mag / speed plot and time plot. The two plots display in two different panels. The mag / speed panel is the primary panel of the display.

All mag / speed and time plot operations behave as described previously in plot descriptions.

- Right-click on each plot to access its context menu

See **Mag / Speed Settings** and **Time Settings** for display parameters that can be modified to change plot display.

Orbit Plot

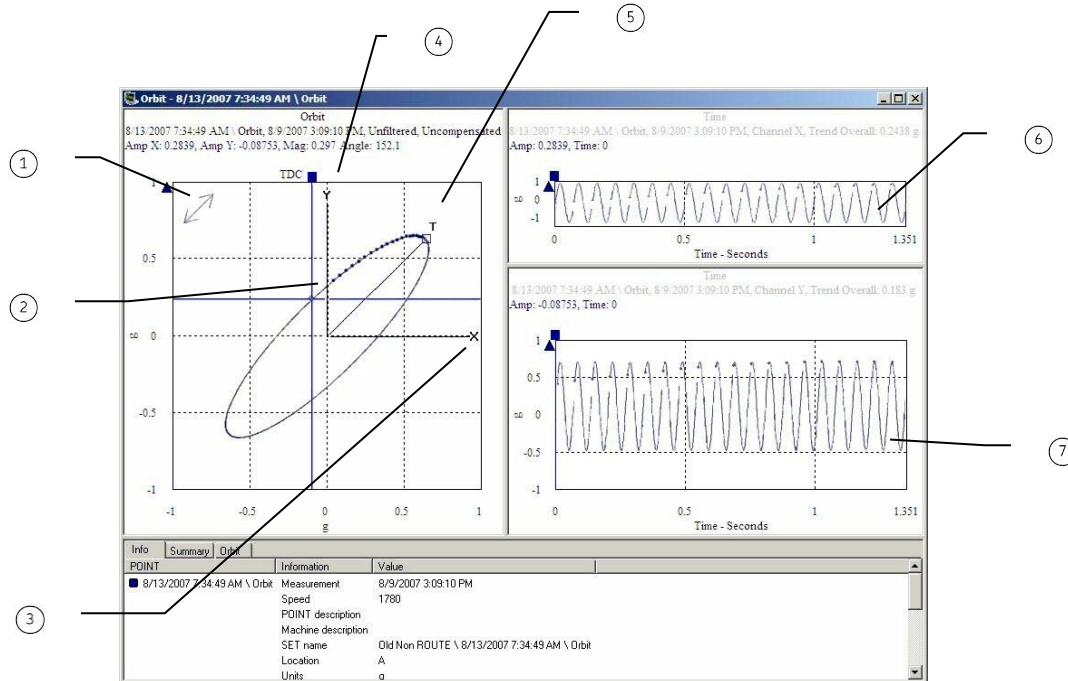


Figure 4 - 25.
Example of an Orbit Plot.

- ① directional arrows
- ② flash blank
- ③ X channel sensor location
- ④ Y channel sensor location
- ⑤ tachometer's physical location
- ⑥ X Channel Time Plot
- ⑦ Y Channel Time Plot

The Orbit plot displays the shaft's most recent orbit data for the two input channels (X and Y). Orbit plots can be used to show the movement of the shaft within the bearing.

Orbit plot labels include:

↔ - Indicates the direction the shaft is rotating. ← indicates the shaft is rotating counterclockwise, → indicates the shaft is rotating clockwise, and ↔ indicates the shaft is rotating bi-directional.

T – Indicates the physical location of the tachometer sensor.

X – Indicates the physical location of the channel X sensor.

Y – Indicates the physical location of the channel Y sensor.

Flash blank – Indicates the starting point of the rotation of the shaft. A blank on the orbit plot precedes the dot for easier identification of the starting point.

Orbit Plot Settings

To access the Orbit Plot Settings screen:

- With an orbit plot displayed, select the **View** menu's **Plot/Settings** option, or use the settings toolbar button.
 - The **Settings** screen is also available from the orbit plot's right-click context menu.

Orbit Plot Settings fields include:

Autoscale - Enabling **autoscale** automatically scales the initial orbit axis so it is approximately 120% of the largest orbit. Disabling **autoscale** displays the orbit on the same full scale axis used when it was recorded.

Mag. Min. / Mag. Max. - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Orbit settings

Slow roll compensation - When the machine is shut down for maintenance, the shaft will rotate very slowly (1 – 400 RPM). Enable the **Slow roll compensation** checkbox to allow the plot to compensate based on either the vector compensation or waveform compensation settings in PONT Properties (depending on the **Filtering** settings, below).

- Press F2 on your keyboard when viewing the plot to toggle vector compensation on or off.

Filtering - Allows you to display the orbit data for a specific frequency. Choices are **Raw**, **1x**, **2x**, **3x**. If **1x**, **2x**, or **3x** is selected with **Slow roll compensation**, the corresponding **1X**, **2X**, or **3X** vector compensation settings on the **Vector** tab in POINT Properties are applied. If **Raw** is selected along with **Slow roll compensation**, it uses the waveform measurement selected in POINT Properties.

- Press F3 on your keyboard when viewing the plot to scroll through the filtering options.

Revolutions - Specify the number of revolutions to display on the orbit plot. Choices are **1 revolutions**, **2 revolutions**, **3 revolutions**, **4 revolutions**, **5 revolutions**, or **All revolutions**.

- Press F4 on your keyboard when viewing the plot to scroll through the revolution options.

Shaft Centerline Plot

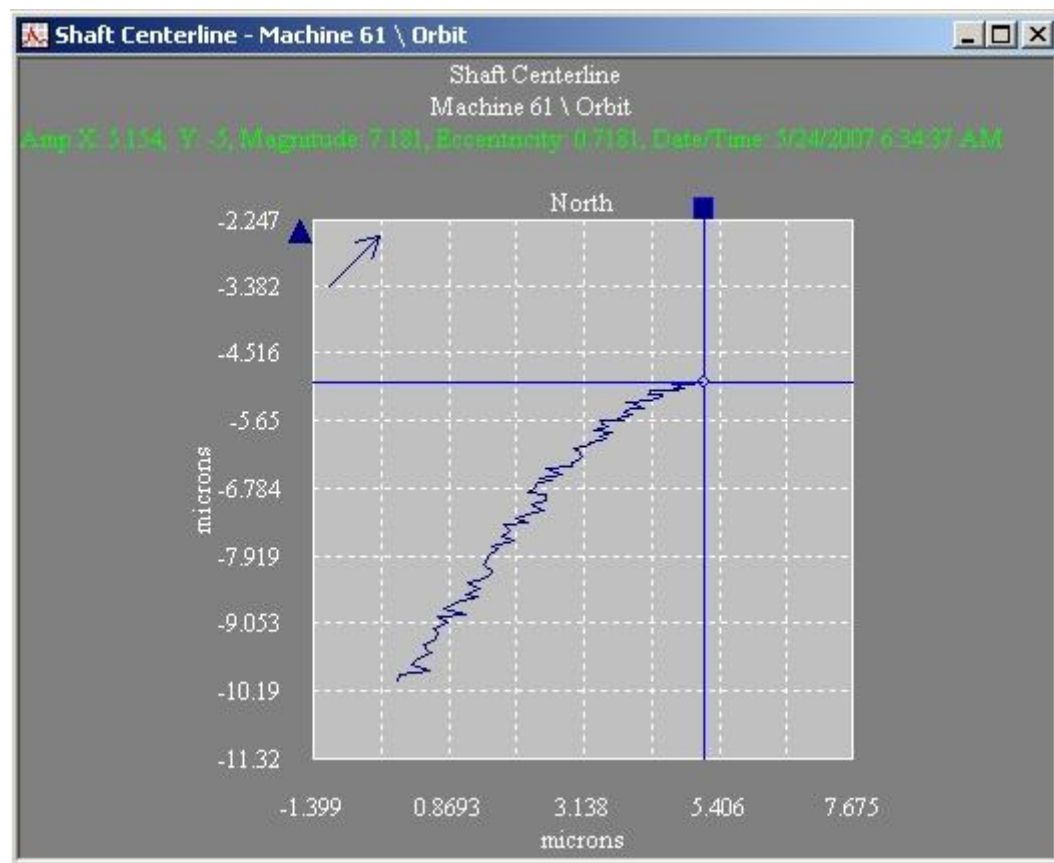


Figure 4 - 26.
Example of a Shaft Centerline Plot.

The Shaft Centerline plot displays a trend of the shaft's average centerline for Orbit POINTs. Shaft centerline plots can be used to show the movement of the shaft within the bearing.

Shaft Centerline Plot Settings

To access the SCL Plot Settings screen:

- With a **Shaft Centerline** plot displayed, select the **View** menu's **Plot/Settings** option, or use the settings toolbar button.
 - The **Settings** screen is also available from the shaft centerline plot's right-click context menu.

SCL Plot Settings fields include:

Autoscale - Enabling **autoscale** automatically scales the initial amplitude axis so it is approximately 120% of the largest amplitude. Disabling **autoscale** displays the spectrum on the same full scale vertical axis used when it was recorded.

Mag. Min. / Mag. Max. - Enter the minimum and maximum magnitude scale values in the designated text boxes.

Date / Time Scale- Enter the minimum and maximum date / time scale values in the designated text boxes.

Tag – Allows you to display RPM tags on the plot. Select either **No Tag** or **RPM**.

Band Trend

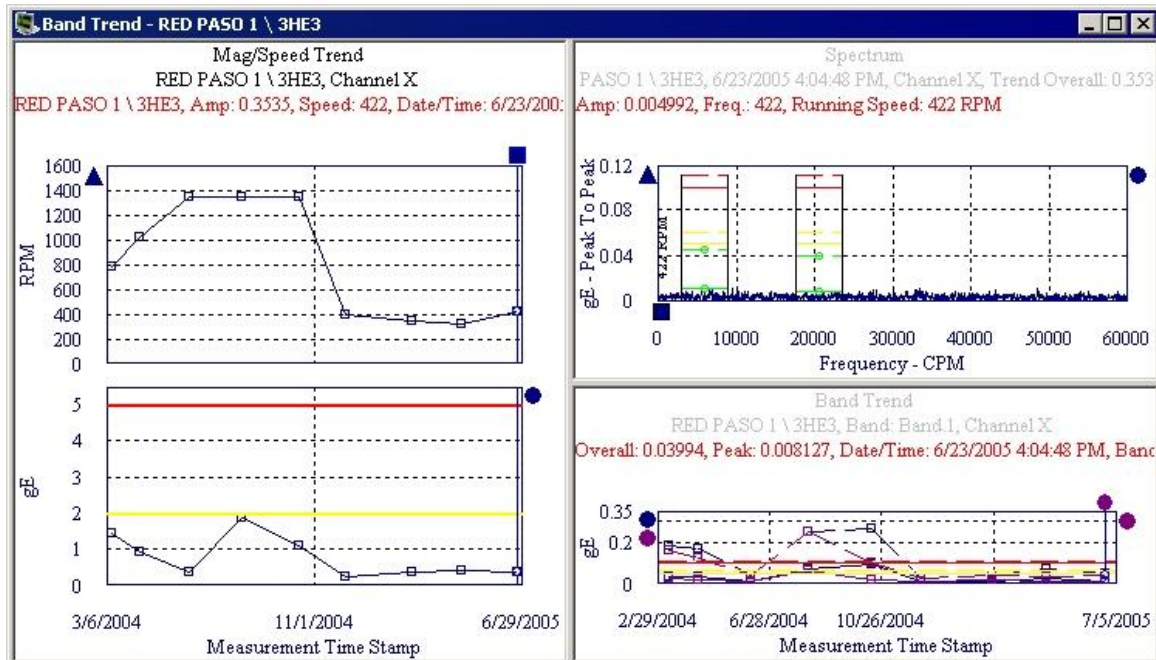


Figure 4 - 27.
Example of a Band Trend.

Band trends combine the spectrum and available band trends for the selected POINT. Band Trends are used to analyze the energy within the band to closely monitor that particular frequency range.

To view a spectral band trend plot:

- Select the POINT whose band trends you wish to display.
- Select the **View** menu's **Plot / All Plots** option. The **All Plots** dialog displays.
- Select the **Band Trend** option.

Initially, all bands for the specified POINT display in the Band Trend display's plots.

To view specific bands / band trends:

- On the display's spectrum plot, right-click on the overlay "anchor" in the plot's upper right corner and select the Settings option. The **Band Alarm Settings** dialog displays.

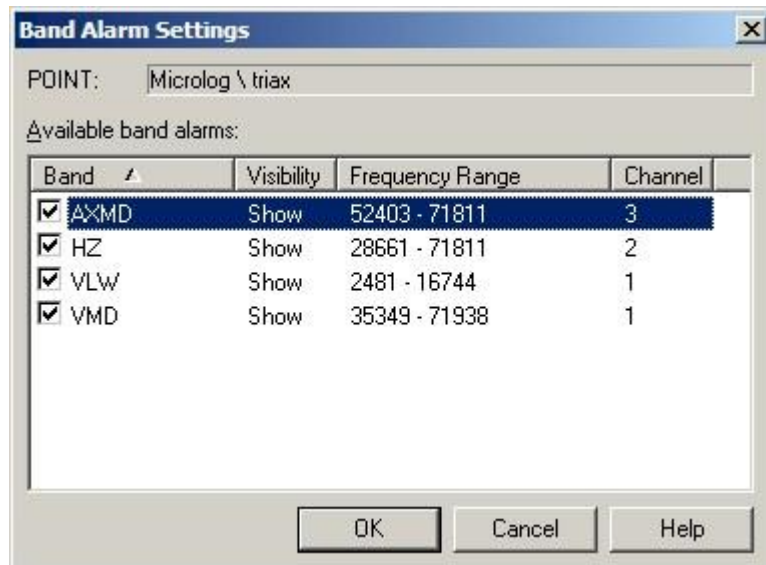


Figure 4 - 28.
Band Alarm Settings Dialog.

POINT – Displays the selected POINT name.

Available band alarms

- Use checkboxes to enable and disable bands for display.

In the plot window's lower band trend plot, specified bands display along with band alarm overlays for one of the band trends. Right-click on the trend's overlay anchor to display the Next Trace's band alarms.

- On the band trend plot, position the cursor and mouse pointer and use feedback areas to analyze the plot.
 - Right-click on either plot to access the appropriate context menu.

See **Trend Settings** and **Spectrum Settings** for display parameters that can be modified to change plot display.

Extracted Trend

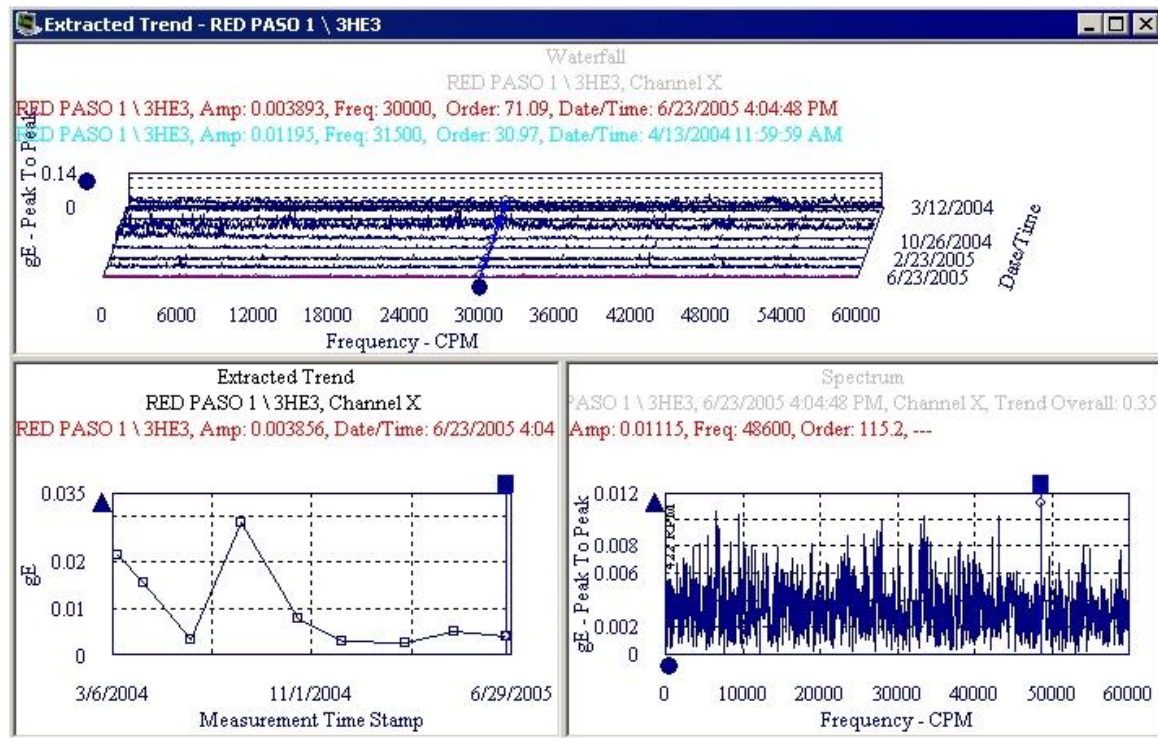


Figure 4 - 29.
Example of an Extracted Trend Plot.

Extracted trend plots display a trend plot of spectrum amplitudes at a frequency. A waterfall plot shows which spectra are to be used. The single cursor in the waterfall controls which frequency to plot in the trend. In addition, the single cursor in the waterfall plots selects which spectrum is displayed in the spectrum plot. The waterfall plot is the primary plot.

- Right-click on each plot to access its context menu.

See **Trend Settings**, **Spectrum Settings** and **Waterfall Settings** for display parameters that can be modified to change plot display.

Extracted Band

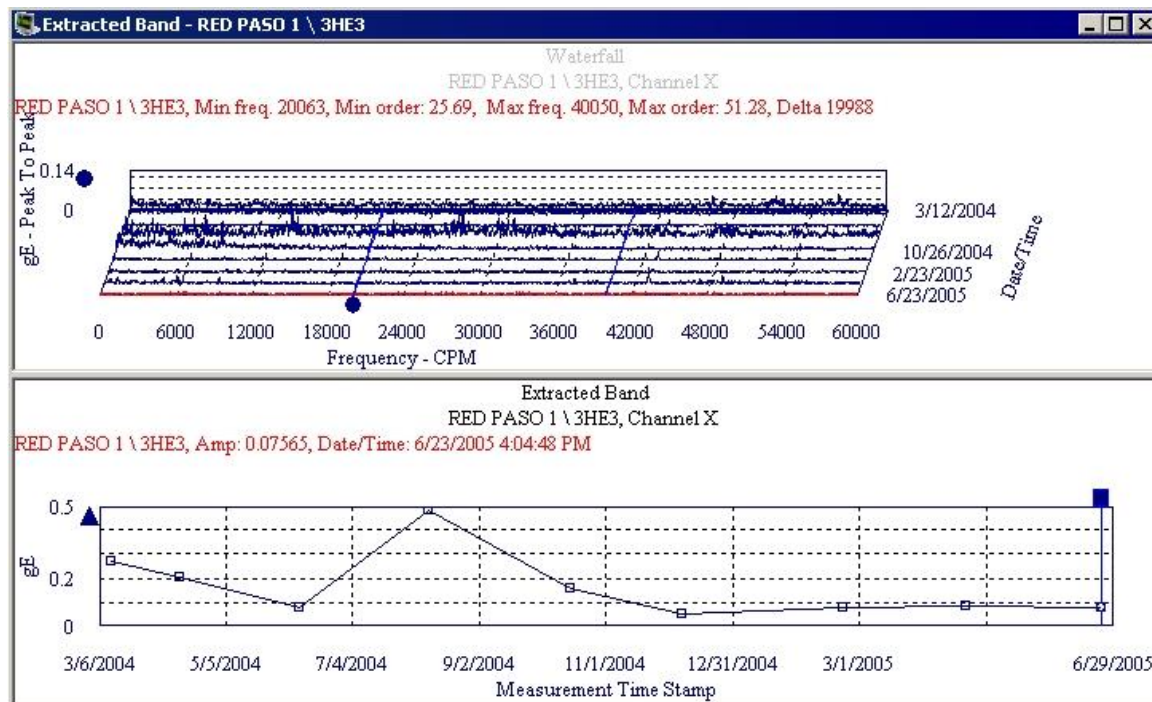


Figure 4 - 30.
Example of an Extracted Band Plot.

Extracted band plots display a waterfall and extracted band plot. The energy of the frequency within the band across the spectrum displays. You may create and move the band while viewing, allowing you to analyze a particular component's energy.

- Right-click on either plot to access the appropriate context menu.

See **Trend Settings** and **Waterfall Settings** for display parameters that can be modified to change plot display.

HAL Trend

The HAL trend plot can be viewed for any POINT that has: a) a defined Frequency set in the POINT Properties dialog and b) FFT data measurements. The POINT does not need to be in HAL alarm to view the trend.

The HAL trend plot has the following characteristics:

- Trend plot shows the HAL values calculated from the FFT data.
- Each plot/data line in the HAL trend represents a frequency.
- The selection of one or more frequencies can be displayed.
- The HAL trend plot view supports individual POINT and multiple POINT trends.
- You can right-click the active plot line (triangle) anchor and select **View Frequencies** from the context menu to exclude or include specific frequency plot/data lines.

- The cursor in a HAL trend plot is used to update the frequency display for that particular date and time.
- You can drag and drop POINTs from the hierarchy into the HAL trend view to display all applicable HAL trends that are assigned to the same bearing type and same frequencies (BPFO, BPFI, etc.).
- Standard trend plot functionality applies.
 - Live HAL trend plots are NOT supported due to processing time constraints and the need to recalculate the HAL values before the next live measurement.
- If the HAL value for a frequency cannot be calculated, that frequency does not display on the plot. See *About HAL Trend Plot Calculation Limitations* below for details.

About HAL Trend Plot Calculation Limitations

Under specific limiting conditions, the HAL value for a frequency cannot be calculated or the calculation result is zero. When this occurs, a HAL trend plot for that frequency is not generated. The main benefit of these limiting conditions is to eliminate the display of trace lines that do not present coherent, useful information.

- Derived point HAL calculations that return a non-calculation result will produce a non-collection measurement.

The following terms are used in the table below:

Fundamental Frequency = Multiplier x Running Speed
 Resolution = $F_{\max} / (\text{Number of Lines} - 1)$
 Harmonics = $F_{\max} / \text{Fundamental Frequency}$
 Base Energy = Sum (FFT values)
 Average Base Energy = Base Energy / Number of Lines

Reason a HAL Trend Plot Is Not Produced	One or More Limiting Conditions Applied to the Calculation
HAL Calculation Cannot Be Completed	No FFT values in the measurement Number of Lines = 0 Harmonics is greater than or equal to Number of Lines / 4
HAL Calculation Results = 0	Harmonics is less than 1.0. All individual harmonic energy levels are less than Average Base Energy.

Two additional limitations are enforced by Analyst to make the HAL calculation results meaningful for condition monitoring purposes.

- One is a global preference setting, **Maximum harmonics to use in HAL calculations**. The default range is 4 to 50, but the maximum can be increased up to 500.
- The other limitation is that the Fundamental Frequency cannot be in low frequency cut-off region. (**Low freq. cutoff** parameter displays on POINT Properties, Setup tab.)

Information Area Displays

In the **HAL Trend** tab (which shows the values for the measurement where the single cursor is active), the column is blank for any frequency that could not be calculated (the FTF column in the example below).

Info	Summary	HAL Trend	Notes	HAL Alarm						
POINT	/		Date/Time	Description	BPFO	BPFI	BSF	FTF	Other	
■ #78 DRYER ROLL BS \ DRY 78-D 6K 36/6			11/28/2012 12:29:59 AM	24260CA (SKF)	1.353	0.7944	1.19			


Figure 4 - 31.
Blank FTF Column.

In the **Summary** tab, frequencies for which HAL values could not be calculated display in the **Not Calculated** column, as shown below.

Info	Summary	HAL Trend	Notes	
POINT	/	Information	Value	Not Calculated
#78 DRYER ROLL BS \ DRY 78-D 6K 36/6		POINT description	2PM/DRYER 79/TEND/TOP/7TH SECT	
		Units	HAL	
		Measurement	11/28/2012 12:29:59 AM 24260CA (SKF) BPFO = 1.353, BPFI = 0.7944, BSF = 1.19	FTF
		Measurement	11/27/2012 12:30:39 AM 24260CA (SKF) BPFO = 1.558, BPFI = 0.896, BSF = 1.477	FTF
		Measurement	11/26/2012 12:30:33 AM 24260CA (SKF) BPFO = 0.7649, BPFI = 0.4776, BSF = 0.9777	FTF
		Measurement	11/25/2012 12:30:19 AM 24260CA (SKF) BPFO = 0.8897, BPFI = 0.7583, BSF = 1.047	FTF
		Measurement	11/24/2012 12:30:33 AM 24260CA (SKF) BPFO = 0.6891, BPFI = 0.4688, BSF = 0.9888	FTF

Figure 4 - 32.
Not Calculated Summary Column.

To view historical HAL data in a trend plot:

- From the hierarchy, select a POINT that meets the two requirements of having assigned frequencies and FFT data.
- Right-click the POINT and select **Plot > HAL Trend**, OR click the HAL trend icon .

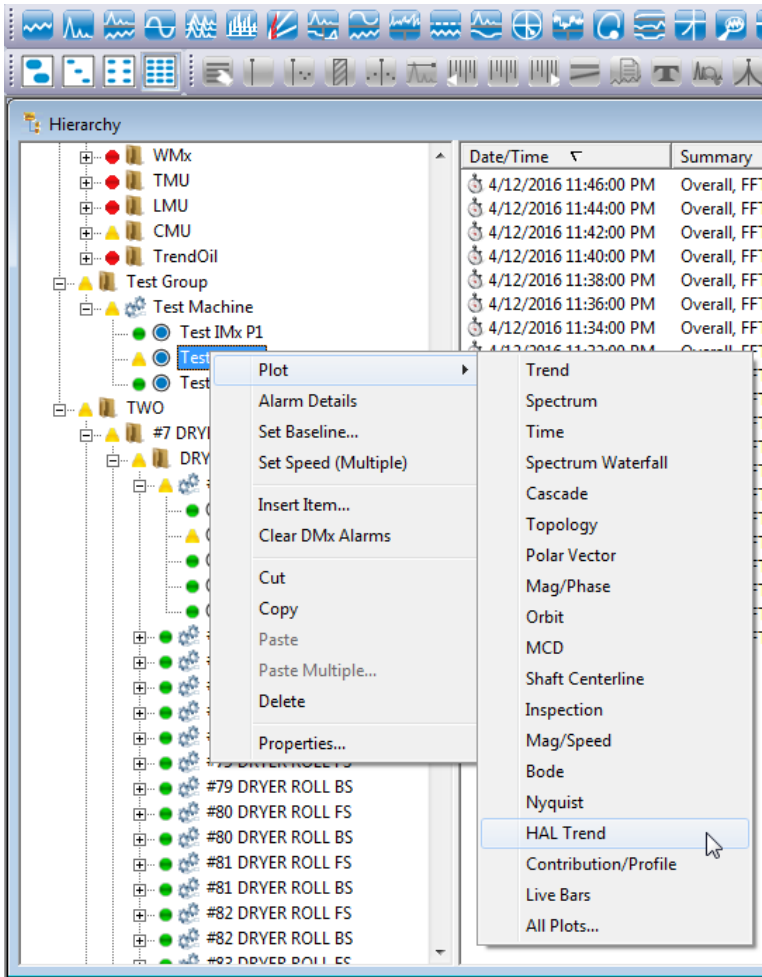


Figure 4 - 33.
Path to Open a HAL Trend Plot.

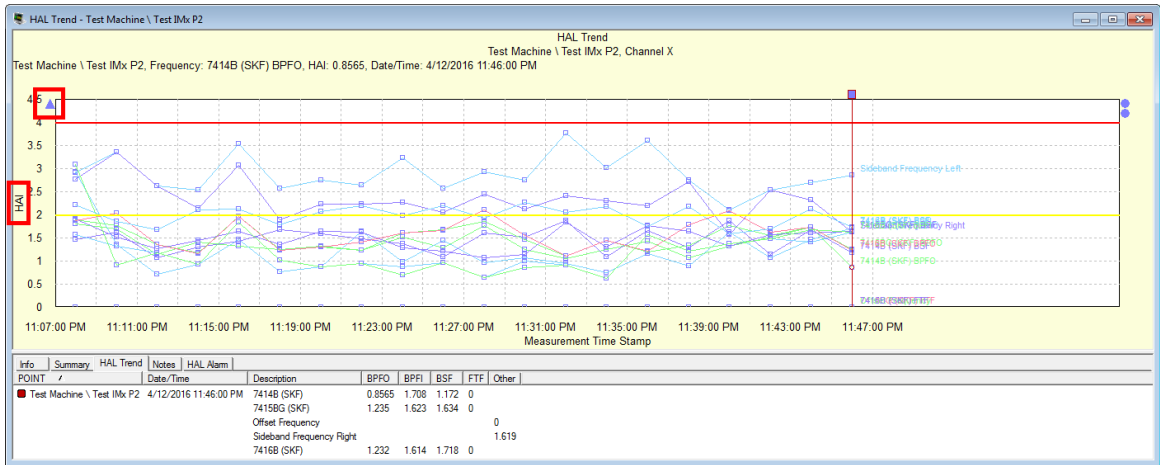




Figure 4 - 34.
Example of HAL Trend Plot.

All HAL trends display in one trend plot. Each frequency associated with the POINT displays a separate HAL trend line. When a frequency has a sideband cursor, two trends are displayed for the sidebands: one for the right side and one for the left.

- Click the **Previous Frequency/Next Frequency** buttons ( / ) or use the +/- keys on your keyboard's ten-key area to cycle through which frequencies are shown in the plot (all, each individually, etc.).

Preference settings determine how many historical spectra are computed in the HAL trend. The preferences for all measurements are set in the **Measurement** tab (go to **Customize > Preference > Measurement** tab).

- HAL Trend plot itself and the Summary tab show Units = HAI (harmonic activity index).
- A plot line anchor represents a POINT and one of its channels (indicated as X, Y, or Z). A 3-channel POINT will display three plot line anchors, as shown below.

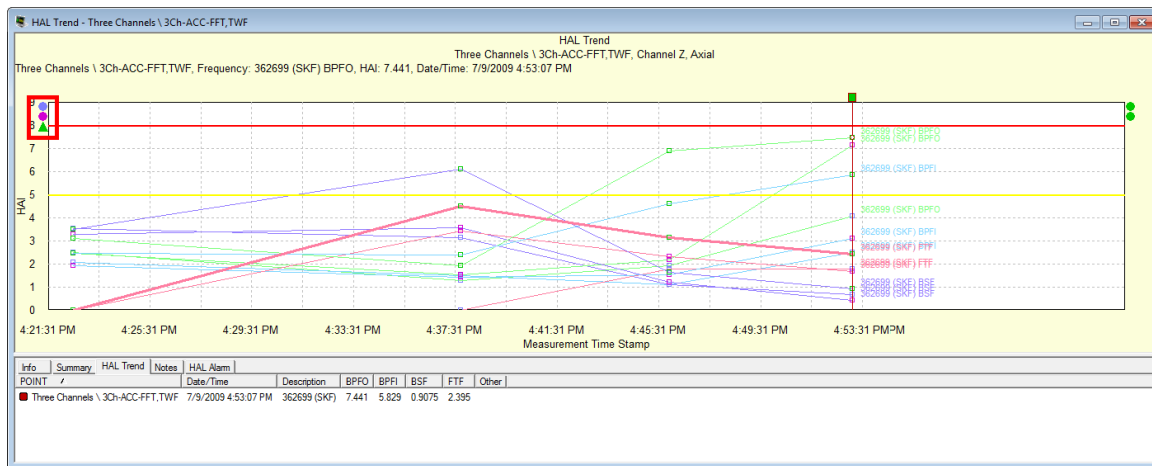


Figure 4 - 35.
Example of a 3-channel POINT Showing Three Plot Line Anchors.

You can right-click the anchor at the upper left to open the context menu. Select **View Frequencies** to specify which frequencies to display in the HAL trend view.

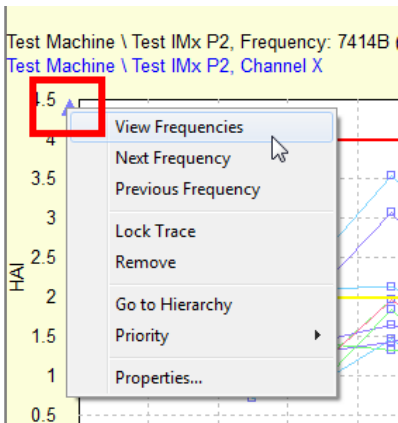


Figure 4 - 36.
Example of the Context Menu Accessible Via the Anchors.

The **View Frequency** dialog opens, showing only available frequencies.

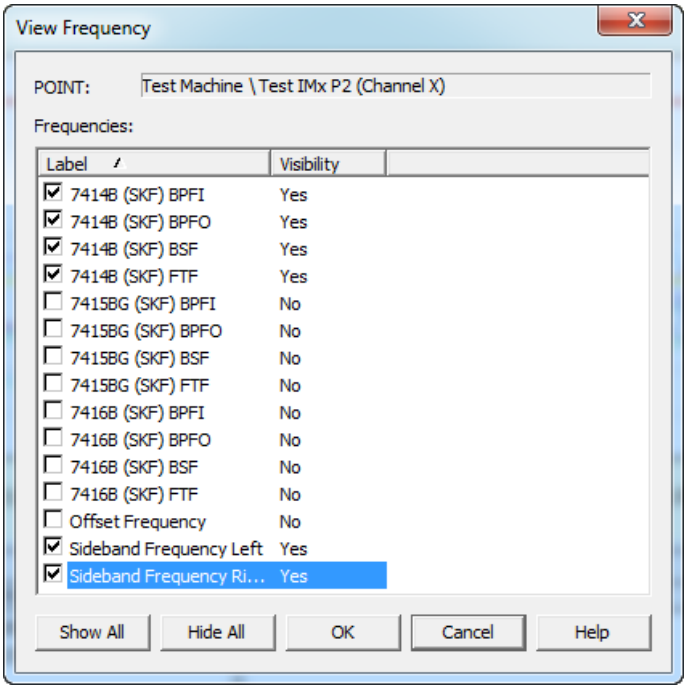


Figure 4 - 37.
View Frequency Dialog.

In the **View Frequency** dialog, all frequencies associated with the POINT are listed with the **Visibility** set to **Yes** by default. You can deselect a checkbox to change **Visibility** in the HAL trend plot to **No**. Click **OK** to accept your changes.

- The **Show All** and **Hide All** buttons enable setting all the frequencies as visible or not visible.

Displaying Graphic Plots

Plot Types

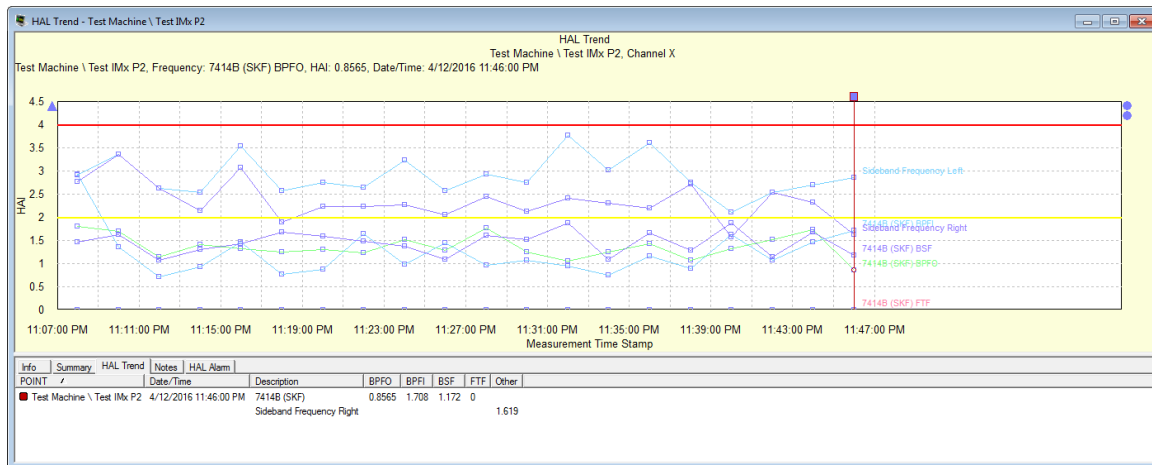


Figure 4 - 38.

Example of HAL Trend Plot with Some Frequencies Changed to Not Visible.

If you drag a single channel POINT into the HAL trend, it will add another plot line anchor. Similarly, dragging in a 2-channel POINT will add two more plot line anchors and a 3-channel POINT will add three plot line anchors.

- The drag and drop feature does NOT check if the additional POINTs are assigned to the same bearings or frequencies. The **View Frequencies** dialog can be used to remove any frequencies that do not match the frequencies associated with the original POINT.

Spectrum/HAL Trend Plot

When a POINT with associated frequencies is selected in the hierarchy, you can view the Spectrum and HAL Trend plots together. The two plots interact so that the measurement and frequency selections made on one plot alter the data displayed on the other. This behavior is described below.

When the Spectrum/HAL Trend plot opens, the spectrum is highlighted by default and the HAL trend below is disabled by default.

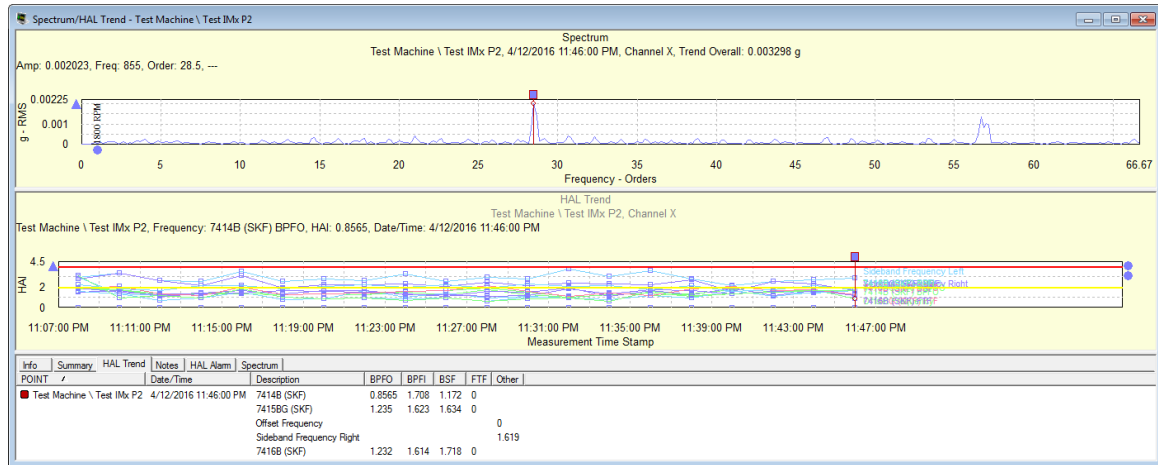


Figure 4 - 39.
Example of a Spectrum/HAL Trend Combo Plot.

The frequencies displayed in the spectrum plot control which frequencies are shown in the HAL trend plot. This includes the frequencies indicated with spectrum single cursor markers and the frequency markers shown by the frequency overlay.

The Spectrum/HAL trend combo plot does not support the frequency selection menus that are available on the standalone HAL trend plot. Instead, the frequencies displayed in the HAL trend plot are controlled by the frequencies being called out in the spectrum plot. You can show or hide frequencies by using the methods described below.

- To show all frequencies, click on the **Frequencies** icon in the SKF @ptitude Analyst toolbar. The spectrum plot will show all the frequencies available. The info area is also updated and the **FAM** tab appears containing the details of the frequencies.

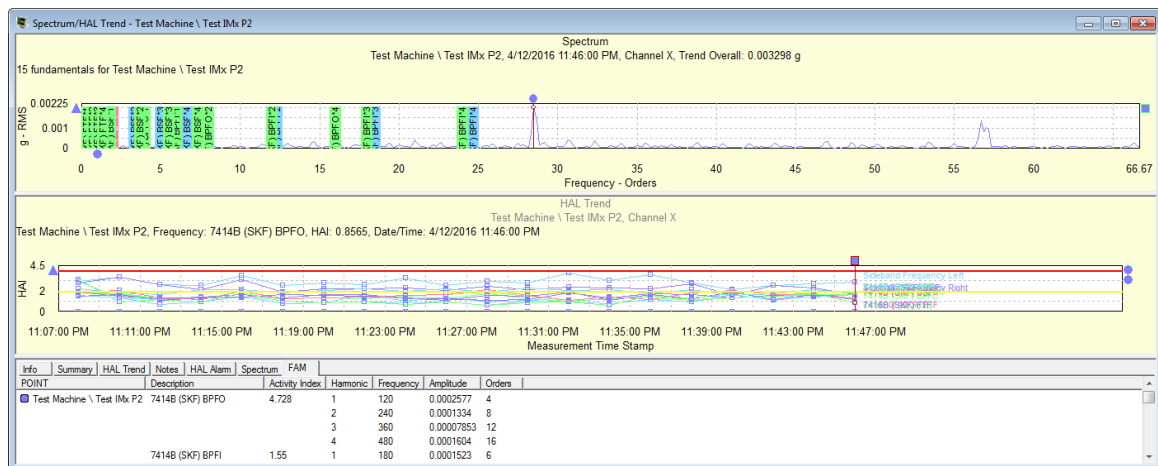


Figure 4 - 40.
Example of Spectrum Plot Showing all Available Frequencies with the Cursor on 7414B (SKF) BPFO.

- You can change from one frequency to another by clicking the **Next Frequency** or **Previous Frequency** icons in the toolbar. The frequency now displayed in the spectrum plot is reflected in the HAL trend also.

- To select a specific frequency (hiding the others), you can right-click on any frequency in the spectrum to open the **Frequency Settings** dialog. Enable the desired frequency (in this example, 7416B (SKF) BPFI) to show, and then click **OK**.

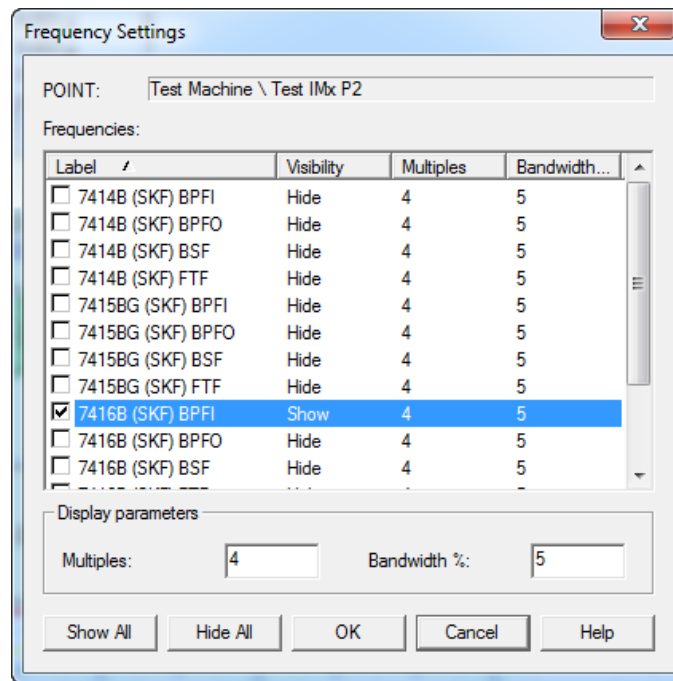


Figure 4 - 41.
The **Frequency Settings** Dialog.

- The selected frequency is now the only one shown in the in the HAL trend plot.

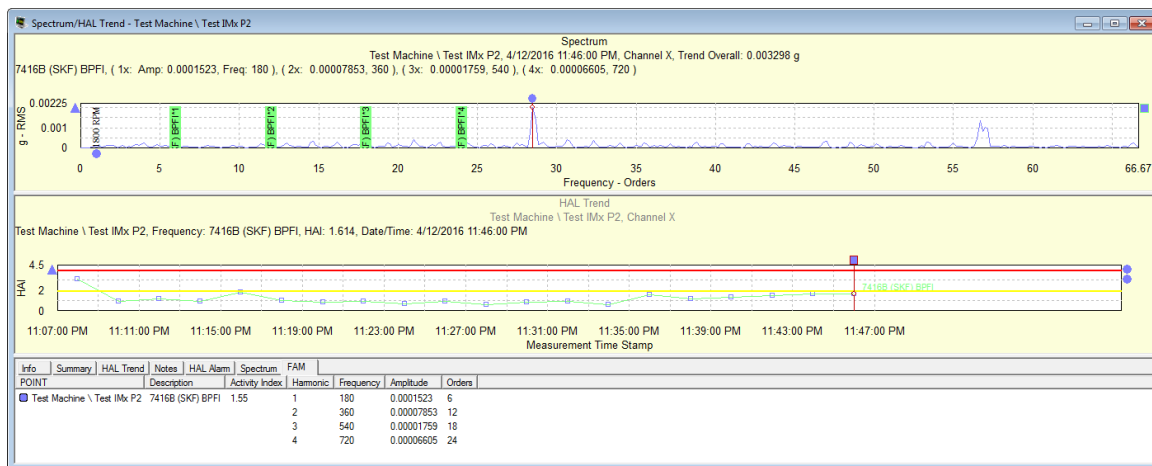


Figure 4 - 42.
Example of Frequency Changed to 7416B (SKF) BPFI in the Spectrum/HAL Trend Plot.

You can drag and drop an additional POINT on to the existing combo plot window in the same manner as other plot types. The additional POINT will display all HAL trends related to it.

Contribution/Profile

A Note about Cyclic Time Averaging (CTA)

CTA is a post process operation that operates on time waveform signals, creating an averaged waveform similar to a Synchronous Time Averaging (STA) measurement. Unlike STA, CTA does not require a trigger and can be computed on already acquired time domain signals.

One of the best cases for using Cyclic Time Averaging is when an external trigger is not possible, or practical, such as when monitoring the inner shafts of a gearbox. The goal is to find out if there are damaged gear teeth on the gear without having to stop the machine and open it up for inspection.

CTA uses only a single measurement to perform averaging. CTA can be performed on any time domain measurement as long as this measurement covers more than two revolutions of the defect source under study. Consider a measurement length of 10 seconds (not uncommon in the paper industry) and a defect frequency of 5 Hz (200 ms). One single measurement captures $10/0.2 = 50$ cycles of the defect. CTA realigns the samples in the measurement so that they can be averaged to produce an improved signal waveform with reduced noise.

In the Roundness Profile plot, the time domain is wrapped around each component frequency's periodic cycle time. It can be seen that a damaged gear tooth generates a significant amount of high frequency vibration during initial contact with the mating tooth.

The Contribution/Profile Plot

The Contribution/Profile combo plot shows the contribution bar graph. The Trend plot in the bottom panel is a standard Trend plot that displays traces for selected points and channels. The Contribution (upper left panel) and Roundness Profile (upper right panel) plots display data for the point and channel indicated by the active Single Cursor on the trend plot.

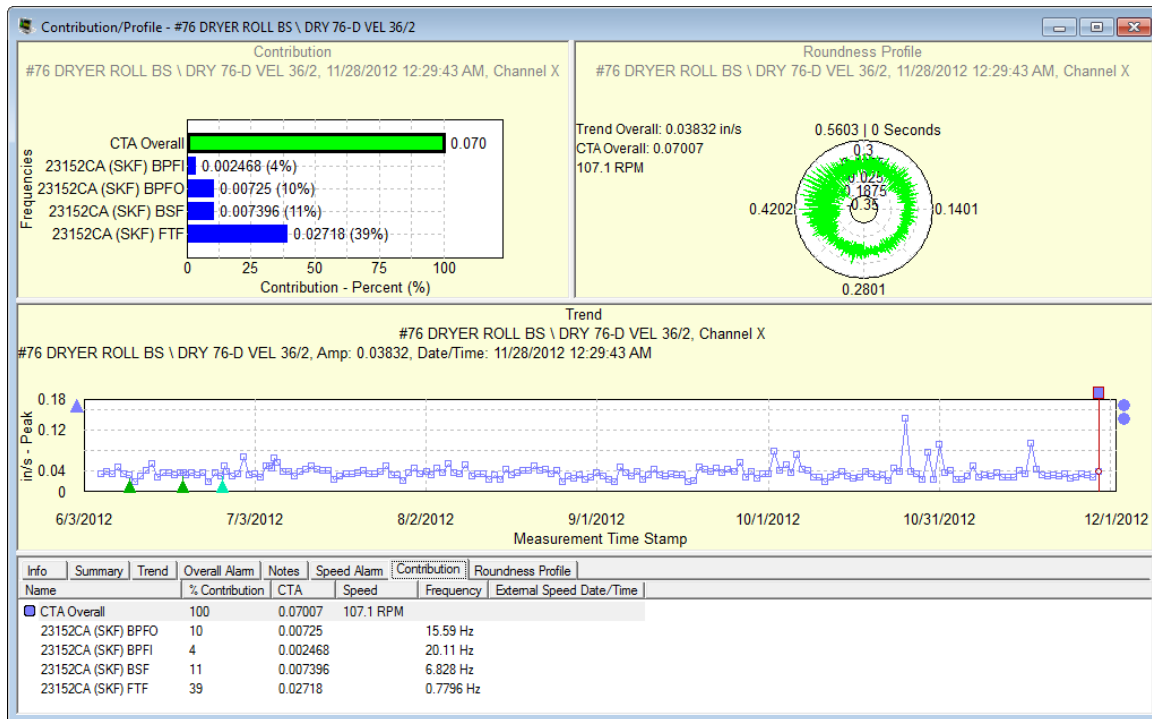


Figure 4 -43.
Example of Contribution/Profile Plot with Contribution Tab Below.

The Trend Plot and Data Selection

The Trend plot is the standard Trend plot so it supports the usual behaviors and overlays. It opens with a Single Cursor but additional Single Cursors can be added.

The data selection process through the plots is as follows:

- The Trend plot is the initial content driver. The active Single Cursor determines the data that displays in the Contribution plot. When there are multiple Single Cursors on the Trend plot, only the active Single Cursor drives the Contribution plot.
- Use the arrow keys to navigate among measurements. The Contribution plot updates to display data for the selected measurement.
- The Contribution plot drives the content of the Roundness Profile plot based on the selected bar (either the CTA Overall or a Frequency). The CTA Overall bar is initially selected. CTA stands for Cyclical Time Averaging; CTA Overall applies specifically to the Contribution plot.
 - If the Single Cursor that currently drives the Contribution plot is removed, the Contribution and Roundness Profile plots will go blank and show the message: "There is no data available to display on the plot".
 - The Contribution/Profile combo plot supports "live data" mode. Details are provided later in this document.
 - Only the Trend plot supports the zoom function.

The Contribution Plot

As stated, the contribution plot displays data for the frequencies associated with the particular trace that is indicated by the active single cursor on the Trend plot. The plot title presents the following elements: plot type as Contribution, Machine/Point name, Measurement date/time, and Channel.

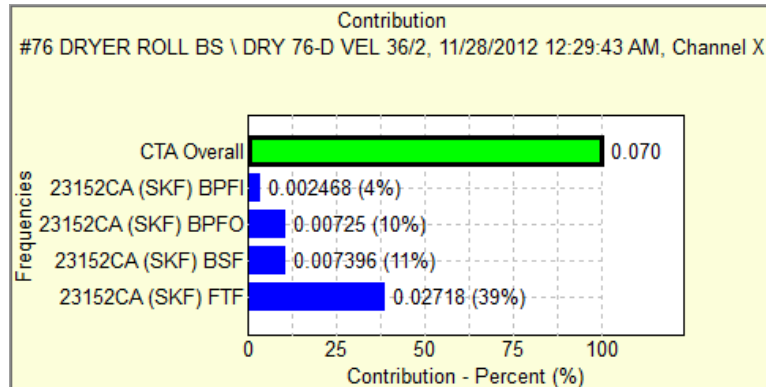


Figure 4 - 44.
Example of a Contribution Plot Only.

The data displays in bar chart format, showing the measurement value and vibration contribution by percent of the total (the x-axis) for each frequency (the y-axis). The top bar, labeled **CTA Overall**, represents the total of the selected frequencies associated with the POINT and therefore represents 100%. The overall value of the measurement is given at the right of the **CTA Overall** bar.

The other bars show the names (up to 15 characters) of the frequencies selected for inclusion by the checkboxes on the **POINT Properties > Frequencies** tab. Each bar represents the relative contribution of a frequency; the label at the right provides both the measurement value and percent of the contribution to the overall. If more than 15 frequencies are enabled on the **Frequencies** tab, only the first 15 (depending on the sort type) will display in the bar chart.

Right-click in the Contribution plot to open the context menu.

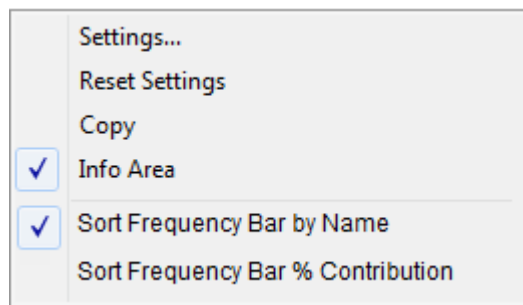


Figure 4 - 45.
Contribution Plot Context Menu

Settings... - open the **Contribution Settings** dialog.

Reset Settings - reset changes made in the **Contribution Settings** dialog to the default settings.

Copy - copy the Contribution plot to the Windows clipboard. (This menu item appears in all plots.)

Info Area - hide or show the Info Area. (This menu item appears in all plots.)

Sort Frequency Bar by Name - sort the Frequency bars by the frequency name in ascending order.

- The **CTA Overall** bar is not sortable and remains at the top.

Sort Frequency Bar by % Contribution - sort the Frequency bars by the % contribution in descending order.

To change the Speed Reference Time Window:

- Select **Settings...** to open the **Contribution Plot Settings** dialog.

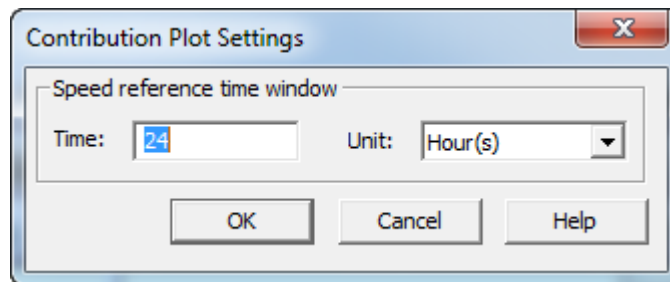


Figure 4 - 46.
Contribution Plot Settings Dialog.

- You can change the **Speed reference time window** value and units. The maximum allowable value is 48 hours; this is equivalent to 2880 minutes or 172800 seconds.
- Click **OK** to save the settings. Any change you make applies only to the plot currently open; the global plot preference setting is not changed. Bear in mind that the settings implemented in this dialog continue to be applied to this plot when the data changes (until the settings are changed manually again).

The Roundness Profile Plot

The Roundness Profile plot shows only one time waveform at a time. The Roundness Profile plot is determined by the frequency bar selected in the Contribution section. Selecting a frequency bar (the color changes upon selection) updates the profile to show CTA(Fd) in a roundness plot. The calculated statistics for the Contribution-derived time waveform are also displayed.

- The Roundness Profile plot supports only the **Linear Speed** overlay

The Roundness Profile plot is drawn as follows:

- The circle angle represents the Time.
 - 0 degree is 0 second.
 - 360 degrees is the time for one revolution, using the specified speed reference.
- Each circle represents the waveform amplitude.
 - The innermost circle is the minimum amplitude.

- The outermost outer circle is the maximum amplitude.
- There are five circles for the max value, min value, mid level, a circle between the mid and max circles and another between the mid and min circles.
- Traces for values outside the minimum and maximum values will be clipped.

When first opened, the **CTA Overall** bar is selected in the Contribution plot and the Roundness Profile plot draws the whole raw time waveform, with each cycle representing one revolution. The plot line color matches the color of the CTA Overall bar in the Contribution plot. (Refer to the first example, Figure 2-1.) The plot title presents the following elements: plot type as Roundness Profile, Machine/Point name, Measurement date/time, Channel, and Overall value. The Machine/Point name, Measurement date/time, Channel, and Overall value reflect the data from the trace selected by active single cursor in the Trend plot.

When a Frequency bar is selected in the Contribution plot, the roundness plot draws one revolution of the frequency time waveform. The plot line color matches the color of the selected Frequency bar in the Contribution plot. The plot title presents the following additional elements: the selected frequency name, RMS and speed.

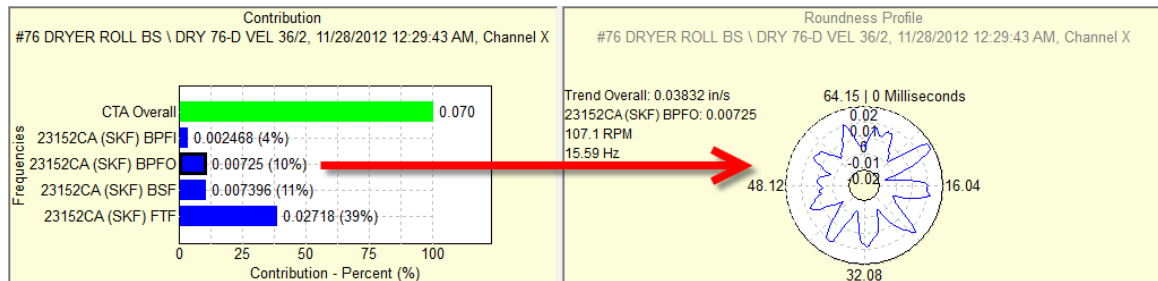


Figure 4 - 47.

The Roundness Profile Plot with a Frequency Bar Selected.

Right-click in the Roundness Profile plot to open the context menu.

- The access levels "Operator" and "View Data HMI Operator" will not see **Settings...** and **Reset Settings**. All users will see the **Copy** and **Info Area** options.

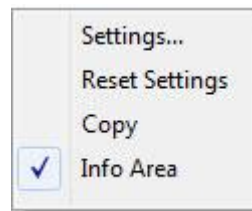


Figure 4 - 48.

Roundness Profile Plot Context Menu (Complete).

Settings... - open the **Roundness Profile Plot Settings** dialog.

Reset Settings - reset changes made in the **Roundness Profile Plot Settings** dialog to the default settings.

Copy - copy the Contribution plot to the Windows clipboard. (This menu item appears in all plots.)

Info Area – hide or show the Info Area. (This menu item appears in all plots.)

To change the Magnitude Range:

- Select **Settings...** to open the **Roundness Profile Plot Settings** dialog.

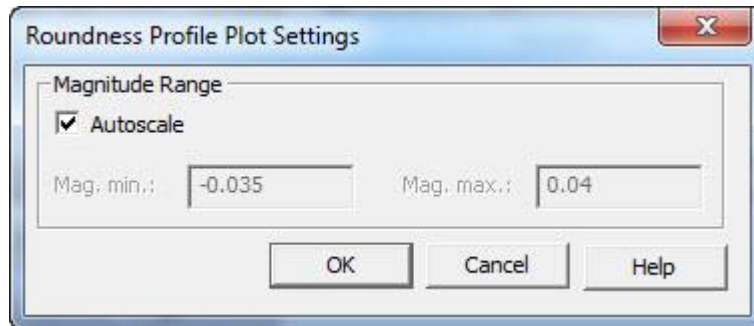



Figure 4 - 49.

Roundness Profile Plot Settings Dialog.

- When **Autoscale** is disabled, you can change the values for **Mag. min.** and **Mag. max.** Negative values and values with decimal points are allowed.
- Click **OK** to save the settings.

Linear Speed Overlay

From the Roundness Profile plot, click the **Linear Speed** tool  in the overlay toolbar. Or go to **View > Plot Overlays > All Overlays** and select **Linear Speed**.

- Only one instance of the Linear Speed overlay is supported in the Roundness Profile plot.

The overlay behavior is the same as Linear Speed in the Time plot. An anchor displays at the top left of the plot and feedback for Linear Speed displays.

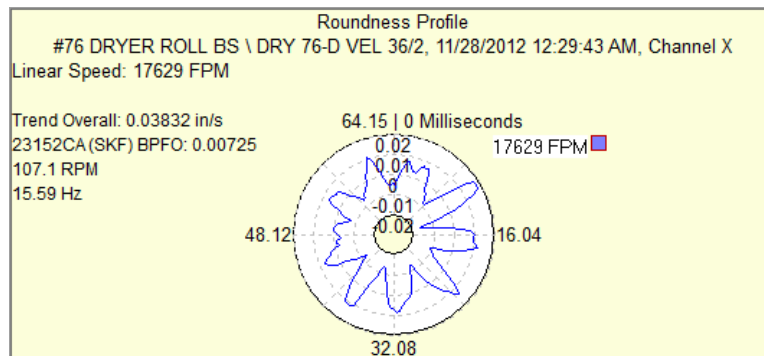


Figure 4 - 50.

Roundness Profile Plot with Linear Speed Overlay.

Speed References

As stated previously, the Contribution/Profile combo plot supports “live” display. For setups that require an external speed reference, the live display includes the external speed reference as part of the live display so that a valid value is obtained.

If the nearest speed measurement is outside the allowable speed reference window time, the frequency bar will change different color. The Contribution plot will display the message: "Speed reference out of range". The same color change and message also appear in the Roundness Profile plot.

If the speed measurement is not available (that is, the speed reference was removed from system, or no measurement data is available), then the Frequency bar is not shown. Instead, there is the message: "No speed data".

If any of the calculations fail (for frequencies or CTA Overall), then the bar is not shown. Instead, there is the message: "Insufficient data".

Live Data Mode

Click the **Live Data** tool to switch the Trend plot (main content driver) into live mode. As the Trend plot is updated with live data, the Contribution plot is also updated depending on the Single Cursor position in the live Trend plot.

If the frequency uses an external speed point, the speed point is also put into live mode so that the frequency will have the live speed data.

- The external speed point live data will not be shown in the Trend plot.
- If one or more external speed points fail to go live, a message will inform you of it, but other live POINTs will continue.
- As with other plots, saving live data is supported. If an external speed point is used, the speed point's live data is saved as well.

Working with Overlays

Plot “overlays” superimpose cursors, alarms, and frequency markers on displayed plots. Each overlay displays an “anchor” which you use to manipulate the overlay.

Displaying Overlays Using Toolbar Buttons

@ptitude Analyst has toolbar buttons for commonly used overlays.

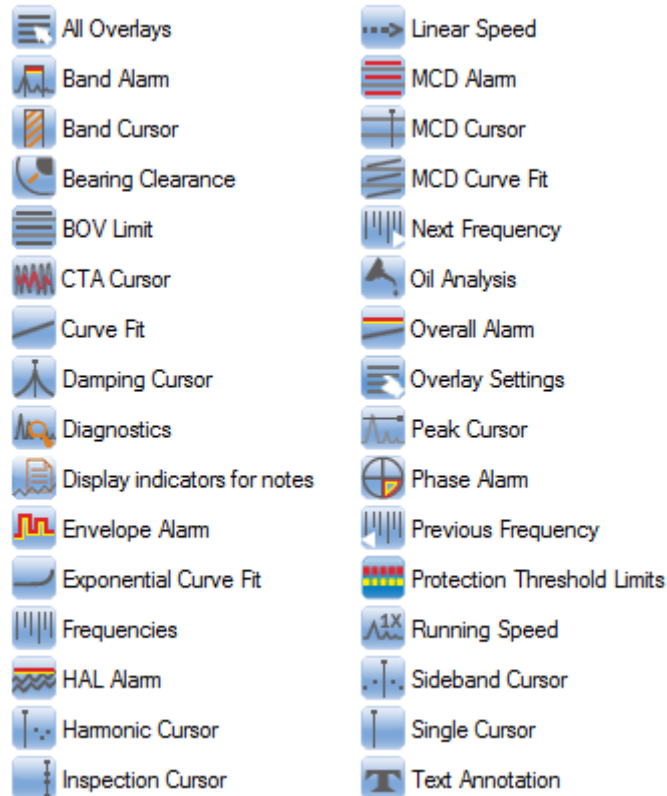


Figure 4 - 51.
Overlay Toolbar Buttons (Shown Here as Two Columns).

Toolbar buttons are available for each overlay. The buttons on the toolbar can be configured using the **Customize** menu's **Toolbar** option. For more information on customizing toolbars, refer to **Appendix A, SKF @ptitude Analyst Toolbars**.

Each button is enabled / disabled based on whether the overlay can appear on the active plot. Individual toolbar buttons are identified later in this section.

Displaying Overlays Using the View Menu

The **View** menu's **Plot Overlays** option contains a list of commonly used overlays. Individual items on this list are enabled or disabled based on whether the overlay is available for the plot window displayed when the item is selected.

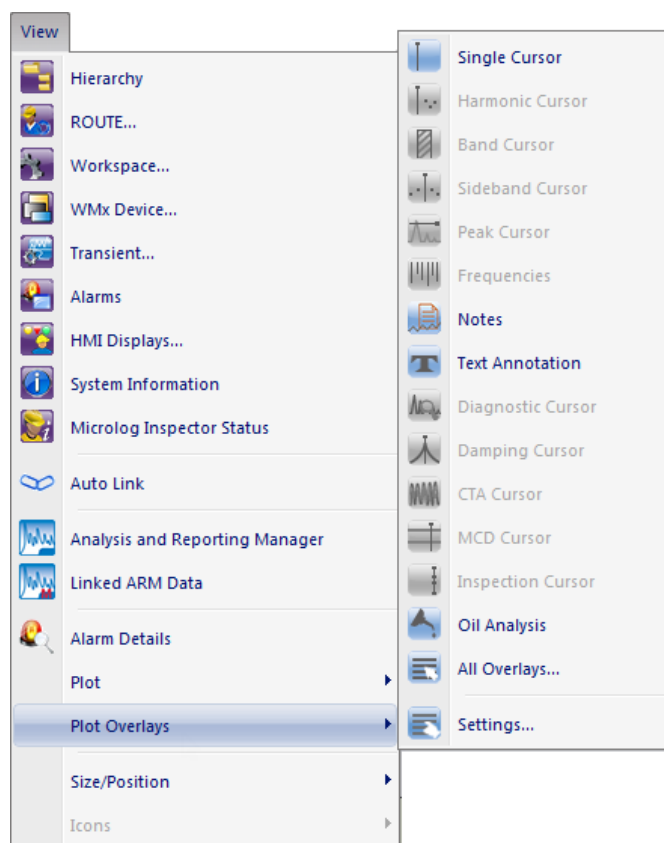


Figure 4 - 52.
The **View** Menu's **Plot Overlays** Option.

Using the **View** menu's **Overlay** option:

Select the **View** menu's **Plot Overlay** option. A group of commonly used overlay types displays on the menu.

- Select one of the visible overlay types, or select **All Overlays** for more selections.
You may also use the **All Overlays** toolbar button to display the **All Overlays** dialog.

All Overlays

- Select the **View** menu's **All Overlays** option. The **All Overlays** dialog displays.
All overlays applicable to the open plot display in the dialog.
- Select an overlay to display and click **OK**. The selected overlay displays in the plot window.
 - You may add as many instances of overlays as needed (excluding the peak cursor).
- Click **Cancel** to undo your selection.

Overlay Settings

To access the **Settings** screen for the selected overlay, either click the toolbar's overlay settings button, or use the **View** menu's **Plot Overlays / Settings** option.

Overlay Types

Individual Overlay types and settings are listed below:

Text Annotation

Use text annotation overlays to create temporary textual notations and display on a plot.

- Text annotations are for temporary use. They are not attached to the measurement or stored in the hierarchy. They remain on a plot until the plot is closed.

To create a text annotation:

- With a plot displayed, click the toolbar's text annotation button, or select the **View** menu's **Plot Overlays / Text Annotation** option. The "Text Annotation" displays on the plot.

To edit the text annotation:

- Double-click the text annotation. The **Text Annotation Settings** screen displays.

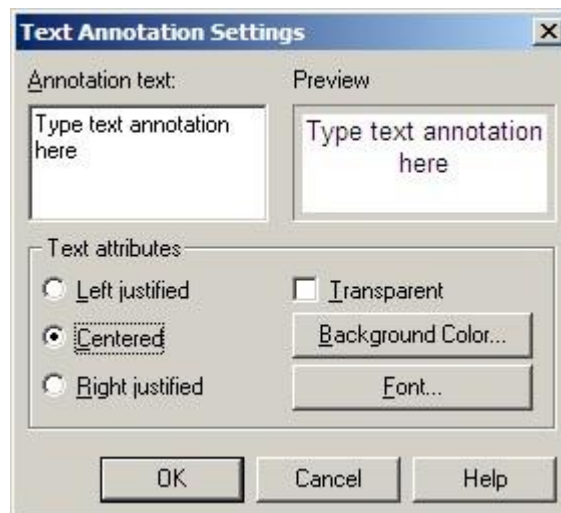


Figure 4 - 53.
The **Text Annotation Settings** Screen.

Annotation text - Enter text to display on the plot. The entered text displays in the screen's **Preview** area, allowing you to view the entered text before displaying it on the plot.

Text attributes options include:

Left justified, Centered, or Right justified - Determine how the text displays in its text box.

Transparent - Enable to make the annotation's background area transparent, allowing you to see the plot beneath the text.

Background Color - Click to select the annotation's background area color.

Font - Click to select the font for the annotation text.

- Click the **OK** button. The entered text annotation displays on the active plot.

Context Menu - Right-click on the displayed text annotation to reveal its context menu. Available operations are:

Remove – Removes the annotation from the plot.

Settings – Launches **Text Annotation Settings** screen.

Keyboard Support – Press **Delete** to remove the annotation from the plot. Use up / down / left / right arrow keys to re-position. Use **Shift** and the left or right arrow key to enlarge in the direction of the selected arrow. Use **Ctrl** and the up / down / left / right arrow keys to shrink the box from the direction of the selected arrow.

Feedback Area – Displays the annotation text.

Information Area – None.

Available Preferences

None.

- Text annotation may also be moved with the mouse (drag and drop). Click on an anchor area and drag to re-size.

Trend / Notes

Use the notes overlay to create and display notes at a specific date / time on the trend plot.

To create a note:

- With a trend plot displayed, position your cursor over the plot area and right click to display the right-click context menu.
- Select **Add Notes**. The **Add Notes** screen displays. A new note displays in the **Notes** list with the date and time of the location you right-clicked on the plot.

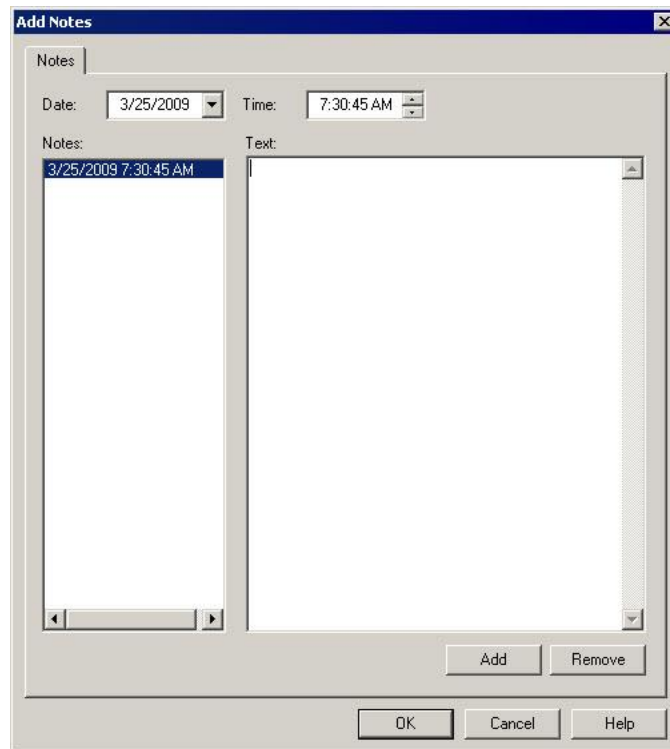


Figure 4 - 54.
The **Add Notes** Screen.

- If you need to change the date / time of the note, use the **Date** and **Time** fields to adjust the date / time as necessary. The **Add / Remove** buttons will change to **Save / Undo** buttons. Click **Save** and the note's date / time adjusts accordingly in the **Notes** list.
- Type your note in the **Text** area and click **Save**.
- Click **OK**. The created note displays on the plot at its specified date / time location.

To create additional notes:

- Click the **Add** button. A new note is added to the **Notes** list with the current date / time stamp.
- Adjust the date / time using the **Date** and **Time** fields as necessary.
- Type your note in the **Text** area and click **Save**.
- Click **OK**. The created note displays on the plot at its specified date / time location.

To remove a note:

- Select the note you wish to remove in the **Notes** list.
- Click the **Remove** button. You will be asked to confirm that you wish to remove the note.
- Click **Yes**, or if you do not wish to remove the note, click **No**.

How Notes Overlays Display on the Plot

Feedback Area - Displays note and date / time information.

Information Area – Specific information displays on the **Notes** tab. Tab information includes the POINT on which the cursor is currently positioned, note, and date / time.

Context Menu - Right-click on the displayed note to reveal its context menu. Available operations are:

Remove – Removes overlay from the plot.

- This does not delete existing notes. To display the notes overlay again, select **View / Plot Overlays / Notes**.

Next Trace – Toggles between traces when the plot is displaying more than one trace.

Display Note – Displays the note on the plot.

Remove All Display Notes – Hides all notes displayed on the plot.

Filter Notes – Allows you to select one or more note categories to display on the plot.

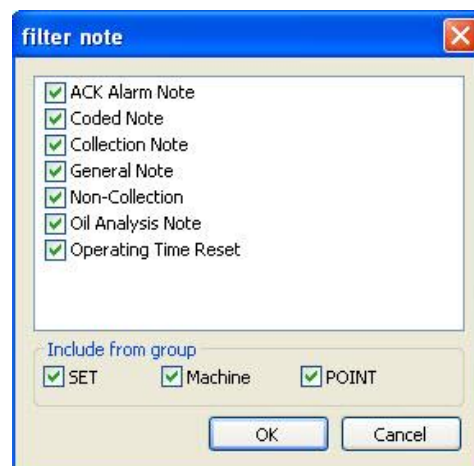


Figure 4 - 55.
The **Filter Notes** Dialog.

- From the list of note categories, enable the check box next to one or more note categories.
- In the **Include from group** area, select the check boxes to include notes from SETs, Machines, and / or POINTs.
- Click **OK**. Only notes from the selected note categories display on the plot.

Available Preferences

The following preferences are found on the **Preferences** screen's **Plot** tab.

Notes – Configure the default display status (on or off).

Notes Indicator Location – Configure the display notes indicator (at top or bottom of plot).

Notes Indicator Tooltip – Configure whether to display the tooltip (on or off) when hovering over the notes indicator.

Notes Line Style – Configure how the notes cursor line displays (dashed, solid, etc.).

Trend / Single Cursor

Use a single cursor to view individual measurement data on the trend plot by moving the cursor to various measurement records.

To display a single cursor:

- With a trend plot displayed, select the **View** menu's **Plot / Plot Overlays / Single Cursor** option, or use the single cursor overlay toolbar button.
- Drag the cursor to position it on the plot.
- If multiple traces appear in a plot, double-click the cursor overlay's anchor to position it on another trace. The anchor's color indicates the current trace.

Feedback Area - Displays amplitude and date / time information.

Information Area – Specific information displays on the **Trend** tab. Tab information includes the POINT on which the cursor is currently positioned, cursor color, amplitude, and date / time.

Right-Click Context Menu - Right-click on the single cursor overlay anchor to reveal its context menu.

Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Exclude Reading – Toggles selected measurement's **Exclude** status on and off. When **Exclude** is selected, the measurement is excluded from all calculations. This setting is stored with the measurement and is in effect until the setting is changed.

Keyboard Support – Move the cursor with the left and right arrow keys. Press **Enter** to toggle to next trace. Press **Delete** to remove the cursor.

Available Preferences

Color - Cursor is the color of the next available cursor (as configured in **Cursor / Color Preferences** in the **Preferences** screen).

Display Status – Display status (on or off) is configured in the **Trend Single Cursor / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Trend / Overall Alarm

Use an overall alarm overlay to display your overall alarms graphically (as configured in **POINT Properties**) on the active trend plot.

To display an overall alarm overlay:

- With a trend plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option. The **All Overlays** dialog displays.
- Select **Overall Alarm** and click **OK**.

Feedback Area - Identifies the POINT, displays private alarm or alarm name (if shared), and the alarm levels set.

Information Area - Specific information displays on the **Overall Alarm** tab. Tab information includes POINT name, type, alarm level values and alarm message summaries.

Right-Click Context Menu - Right-click on the overall alarm overlay anchor to reveal its context menu.

Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Available Preferences

Color – Alert and Danger colors appear as configured in **Cursor / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Trend Overall Alarm / Plot Preferences** in the **Preferences** screen.

➤ The default status is on.

Trend / Linear Speed

Use a linear speed overlay to graphically display the value of the linear factor multiplied by the running speed.

To display linear speed overlay:

- With a trend plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option. The **All Overlays** dialog displays.
- Select **Linear Speed** and click **OK**.

Feedback Area – Displays amplitude, frequency, orders, and linear speed.

Information Area - No tabs display for this overlay.

Right-Click Context Menu - Right-click on the linear speed overlay anchor to reveal its context menu.

Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Available Preferences

Display Status – Display status (on or off) is configured in the **Trend / Linear Speed / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Linear Speed Overlay Settings

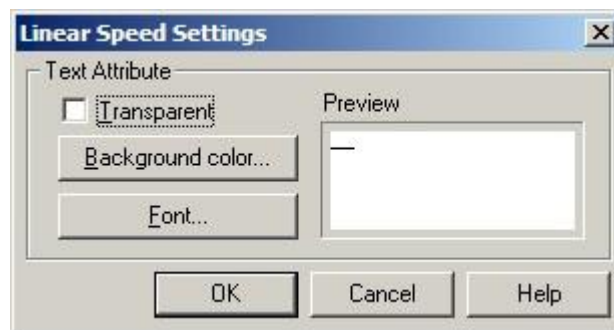


Figure 4 - 56.
The **Linear Speed Settings** Screen.

Use the **Linear Speed Settings** screen to set the text attributes for your linear speed overlay.

In the **Text attribute** section:

- Click the **Transparent** checkbox to display a transparent text annotation over the active plot.
- Click the **Background Color** button to select the color of the textbox background.
- Click the **Font** button to select the desired font.
 - Observe linear speed edits in the Preview window before applying your linear speed overlay.
- Click **OK** to close the screen and save your edits.

Trend / Curve Fit

Use a curve fit overlay to graphically display the projected linear direction a trend is heading based on current data

To display a curve fit overlay:

- With a trend plot displayed, select the **View** menu's **Plot / Plot Overlays / Curve Fit** option, or use the curve fit toolbar button.

Feedback Area - Identifies the curve fit and associated POINT.

Information Area - Specific information displays on the **Curve Fit** tab. Tab information includes:

Date, time, and amplitude for 2 years from last plotted measurement.

Date, time, and amplitude when alert exceeded (or projected to be reached).

Date, time, and amplitude when danger exceeded (or projected to be reached).

Information is sorted by the POINT name or color of the current trace.

Right-Click Context Menu - Right-click on the curve fit overlay anchor to reveal its context menu.

Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Available Preferences

Color – Color appears as configured in **Curve Fit / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Trend Curve Fit / Plot Preferences** in the **Preferences** screen.

➤ The default status is off.

Trend / HAL Alarm

The HAL alarm overlay has the following characteristics:

- If HAL alarm levels have been defined for a POINT in the POINT Properties > HAL Alarms tab, then the HAL trend plot will open with the HAL alarm overlay displaying the alert and danger level lines.
- The alert (yellow) and danger (red) lines are shown for the selected frequency.

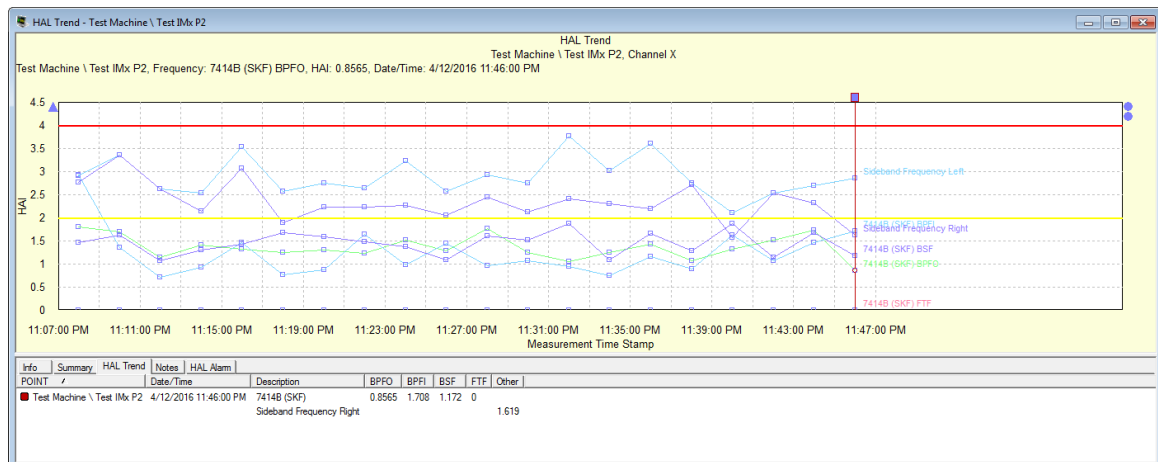


Figure 4 - 57.
Example of HAL Trend Plot with HAL Alarm Overlay.

In the example below, the active overlay is the single cursor (indicated by the square box on the cursor) and the primary feedback text is displayed in black. When you use the mouse to hover your cursor on the circle at the right, representing the HAL Alarm overlay, the blue secondary feedback text highlights and displays alarm information.

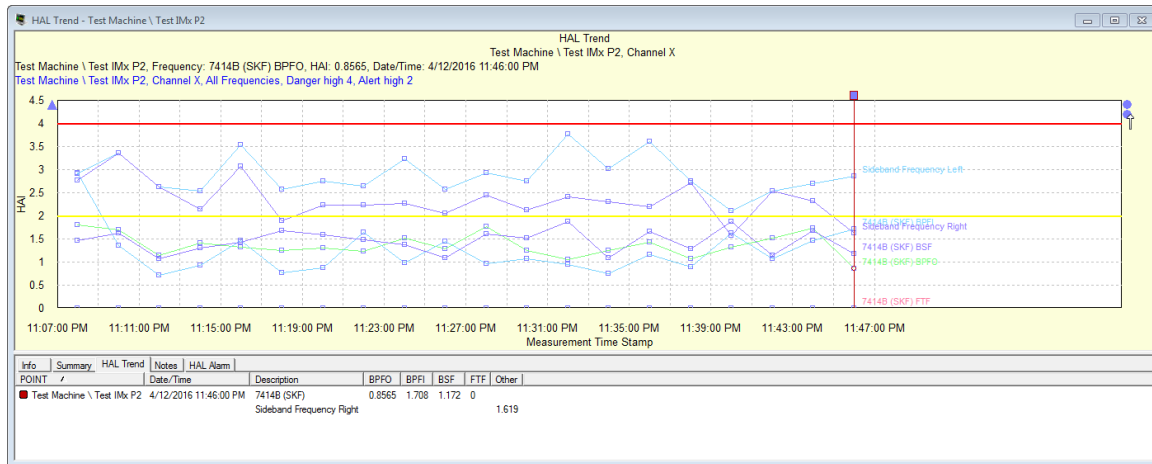


Figure 4 - 58.
Example of HAL Trend Plot with HAL Alarm Overlay Feedback Text.

To change the HAL alarm cursor to a different frequency, either:

- click the HAL alarm anchor and use the up/down arrow keys to select different frequencies on the HAL Alarm plot, OR
- right click the HAL alarm anchor to open the context menu and then select another HAL alarm frequency to highlight on the trend plot.

The line for the selected frequency is highlighted and the corresponding highlight rectangle indicates the current measurement displayed in the feedback text.

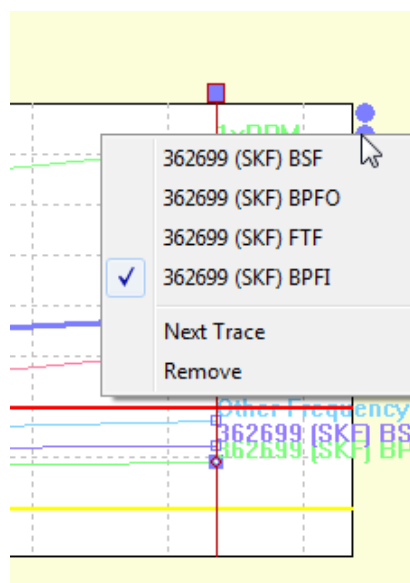


Figure 4 - 59.
Example of the HAL Trend Plot Anchor Context Menu.

A HAL Alarm tab is added to the information area at the bottom of the HAL trend plot when the cursor is visible. The tab shows the POINT name, its frequency, and the alert and danger threshold values set on the POINT Properties > HAL Alarm tab for the current selected HAL alarm. Alarm levels display in the plot and are updated appropriately for each HAL frequency.

Info	Summary	HAL Trend	Notes	HAL Alarm
POINT	Frequency	Alert High	Danger High	
<input checked="" type="checkbox"/> Test Machine \ Test IMx P2	All Frequencies	2	4	

Figure 4 - 60.
Example of the HAL Alarm Tab for the HAL Trend Plot.

Spectrum / Single Cursor

Use a single cursor on a spectrum plot to display the amplitude for the frequency of the cursor's current placement

To display a single cursor overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / Single Cursor** option, or use the single cursor toolbar button.

Feedback Area - Displays amplitude, frequency, number of orders, and phase angle (if available).

Information Area - Specific information displays on the **Spectrum** tab. Tab information includes POINT name, cursor color, frequency, amplitude of each channel, number of orders, and phase angle (if available).

Right-Click Context Menu - Right-click on the single cursor overlay anchor to reveal its context menu. Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Set Speed – Launches the **Set Running Speed** dialog.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove. Left and right arrow keys move one line at a time. **Shift** and the left or right arrow moves 15 lines at a time.

Available Preferences

Color - Cursor is the color of the next available cursor (as configured in **Cursor / Color Preferences** in the **Preferences** screen).

Display Status – Display status (on or off) is configured in the **Spectrum Single Cursor / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Set Running Speed

The calculated or custom running speed appears on the active plot if the running speed overlay is displayed.

To specify the running speed:

- Right click on the single cursor overlay and select **Set Speed** from the pop-up menu.



Figure 4 - 61.
The **Set Speed** Dialog.

Use the **Set Speed** dialog to edit the running speed for the measurement.

Current frequency – Displays the frequency of the current cursor position on the open plot.

To set a custom running speed:

- Enter the desired frequency in the **Calculated running speed** field and click **OK**.

To automatically calculate running speed by current frequency and number of orders:

- Enter the desired value in the **Equivalent to order#** field.
- Click **OK**.

Spectrum / Running Speed

Use a Running Speed overlay to visually indicate the running speed frequency (Machine's running speed at time of measurement).

To display a running speed overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option to display the **All Overlays** dialog.
- Select **Running Speed** and click **OK**.
 - Use the **Customize** menu's **Toolbar** option to activate the running speed overlay toolbar button.

Feedback Area - Displays amplitude, frequency, orders, and running speed.

Information Area - No tabs display for this overlay.

Right-Click Context Menu - Right-click on the running speed overlay anchor to reveal its context menu. Available options include:

Next Trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

- An anchor symbol appears on the bottom of the plot. Click the anchor to toggle between multiple spectra.

Available Preferences

Color – Running speed color is configured in **Running Speed / Colors** in the **Preferences** screen).

- The default color is black.

Display Status – Display status (on or off) is configured in the **Running Speed - Spectrum / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Spectrum / Band Cursor

Use a band cursor to display the frequency / time and amplitude difference (delta) between two cursor positions.

To display a band cursor overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / Band Cursor** option, or use the band cursor toolbar button.

Feedback Area - Displays left amplitude and frequency, right amplitude and frequency, orders, and delta (distance between cursor positions in frequency units).

Information Area – Specific information displays on the **Spectrum Band** tab. Tab information includes left frequency and amplitude for each channel, right frequency and amplitude for each channel, orders, delta, and overall for each channel.

Right-Click Context Menu - Right-click on the band cursor overlay anchor to reveal its context menu. Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes the overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

The band cursor is made up of three parts. The fundamental left line, fundamental right line, and the band width. The active line is indicated by the cursor line focus icon. This icon displays as a triangle on the active part of the cursor. Use left and right arrow keys to move band width or an individual line (depending on which is active) left or right. The **Page Up** and **Page Down** keys toggle between left line, right line, and band width.

- The individual fundamental lines and the band width move in small increments (one line at a time). Use the **Shift** and the left

or right arrow key to move part or the entire band in larger increments (15 lines at a time).

Available Preferences –

Color – Cursor is the color of the next available cursor (as configured in **Color Preferences** in the **Preferences** screen). Cursor line focus icon color appears as configured in **Cursor Line Focus** in **Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Spectrum Band Cursor / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Spectrum / Harmonic Cursor

Use a harmonic cursor to display multiples of the current frequency.

To display a harmonic cursor overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / Harmonic Cursor** option, or use the harmonic cursor toolbar button.

Feedback Area – Displays the value for fundamental and harmonic amplitude, frequency, and orders. When the mouse pointer is positioned over a harmonic marker, that marker's amplitude, frequency, and orders display on the feedback area's second line.

Information Area – Specific information displays on the **Harmonic Cursor** tab. Tab information includes POINT name, cursor color, frequency, amplitude of each channel, number of orders, and percentage of each channel's fundamental frequency for each harmonic.

Info	Summary	Harmonic Cursor					
POINT	Activity Index	Harmonic	Frequency	Order	Amplitude	% of Fund.	
RED PASO 1 \ 8H	3.786	Fund.	47.13	6.24	0.005567		
		2	94.25	12.48	0.001719	30.88	
		3	141.4	18.72	0.0005326	9.567	
		4	188.5	24.96	0.0003046	5.472	

Figure 4 - 62.
The **Harmonic Cursor** Tab.

The **Harmonic Cursor** tab provides details on potential harmonics using SKF's Harmonic Activity Index (HAI). All impact defects create spectra with a fundamental and a series of harmonics (i.e., a harmonic pattern). The amplitudes of these harmonics are affected by the defect itself, as well as the filtering effect of the machine. HAI is a calculation that quantifies the likelihood of harmonic patterns being present in a spectrum, and therefore, the likelihood of a defect being present.

The result of the HAI calculation is displayed in the **Activity Index** column. The **Activity Index** is a quick indicator to determine if there is a meaningful pattern under the current cursor position (i.e., whether or not there is a defect associated with this

frequency). It can also act as a guide to determine the best cursor position for a suspected a harmonic pattern.

An HAI value of 2.5 or greater indicates a likely defect pattern; HAI values of 3 or more show clear patterns.

- HAI values are the same across spectra from different sources (i.e., the number of lines or unit types do not matter).
- HAI values are calculated from spectral data only. In some spectra, many different sources unrelated to each other may create a seemingly harmonious pattern. The HAI value for this pattern might be high enough to suggest a true pattern is shown. To verify it is a true pattern, always check a few spectra taken over time for similar HAI values.

Right-Click Context Menu - Right-click on the harmonic cursor overlay anchor to reveal its context menu. Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes the overlay from the plot.

Keyboard Support – Press **Enter** to toggle to the next trace. Press **Delete** to remove.

Left and right arrow keys move the fundamental line in small increments (one line at a time). Use the **Shift** and the left or right arrow key to move in larger increments (15 lines at a time).

Ctrl and the left or right arrow key moves the marker on the far right in small increments.

Available Preferences

Color - Cursor is the color of the next available cursor (as configured in **Color Preferences** in the **Preferences** screen).

Display Status – Display status (on or off) is configured in the **Harmonic Cursor / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Number of Harmonics – Maximum number of harmonic markers displayed (1-100).

- The default number is 50.

Spectrum / Sideband Cursor

Sideband markers consist of an array of five pairs of markers evenly spaced on both sides reference position. Sideband markers are referenced as located from left to right around markers to the left of the center cursor are referenced with negative numbers; their associated cursor are referenced with positive numbers.

To display a sideband cursor overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / Sideband Cursor** option, or use the sideband cursor toolbar button.

Feedback Area - Displays the center position's amplitude and frequency, orders, delta, and each sideband marker's amplitude and frequency (arranged negative to positive).

When the mouse pointer is over a sideband marker, its amplitude and frequency display on the feedback area's second line.

Information Area – Specific information displays on the **Sideband** tab. Tab information includes sideband position, frequency, orders, amplitude, and delta (arranged negative to positive by sideband marker number).

Right-Click Context Menu - Right click on the sideband cursor overlay anchor to reveal its context menu. Available options include:

Next Trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Use the left and right arrow keys to move the center cursor in small increments (one line at a time). Use **Shift** and the left and right arrow keys to move the center cursor in larger increments (15 lines at a time). Use **Ctrl** and the left and right arrow keys to move the markers in and out in small increments (left arrow to expand / right arrow to contract). Use **Ctrl** and **Shift** and the left and right arrow keys to move markers in larger increments (15 lines at a time).

You may drag every individual marker, effectively changing the delta value, and thus the location of all other markers.

Available Preferences

Color - Cursor is the color of the next available cursor (as configured in **Color Preferences** in the **Preferences** screen).

Display Status – Display status (on or off) is configured in the **Sideband Cursor Spectrum / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Spectrum / Peak Cursor

Peak cursors label all peaks above a user determined amplitude.

- The default amplitude is based on the **Threshold %** preference.

To display a peak cursor overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / Peak Cursor** option, or use the peak cursor toolbar button.

Feedback Area - Displays the amplitude line value and the total number of peaks. Displays each peak's position, amplitude, frequency, and orders.

Information Area – Specific information displays on the **Peak** tab. Tab information includes peak position (index), amplitude, frequency, and orders.

Right-Click Context Menu - Right-click on the peak cursor overlay anchor to reveal its context menu. Available options include:

Next Trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Use the up and down arrow keys to increase or decrease the amplitude line 1% of the current amplitude value. Use the **Shift** and up and down arrow keys to increase / decrease the amplitude range in larger increments (10% at a time).

Available Preferences

Color - Cursor is the color of the next available cursor (as configured in **Color Preferences** in the **Preferences** screen).

Display Status – Display status (on or off) is configured in the **Peak Cursor - Spectrum / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Threshold % - This value is used to determine the initial position of the cursor as a percentage of the full scale value.

- The default amplitude is based on the **Threshold%** preference.

Spectrum / Band Alarm

Use a band alarm overlay to display all band alarms assigned to the active POINT.

- If the band alarms display was previously modified for the active POINT, then only those marked visible will display.

To display a band alarm overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option. The **All Overlays** dialog displays.
- Select **Band Alarm** and click **OK**.
 - Use the **Customize** menu's **Toolbar** option to activate the band alarm overlay toolbar button.

In displayed band alarm overlays, solid lines represent peak values and dashed lines represent overall values. Green lines represent the band's peak and overall value for the measurement, yellow lines show *alert* alarm values, red lines show *danger* alarm values.

Feedback Area– When anchor is active, displays band alarm for specific POINT. When band alarm is active, displays band name, alarm level, and value (Overall Danger and Alert / Peak Danger and Alert).

Information Area – Specific information displays on the **Band Alarm** tab. Tab information includes low and high frequency values, orders, peak, overall alert and danger alarm values, data values, for example: peak value and status / overall value, and status.

Right-Click Context Menu - Right-click on the band alarm overlay anchor to reveal its context menu. Available options include:

Next Trace - Toggles between traces when the plot is displaying more than one trace.

Remove - Removes the overlay from the plot.

Settings - Launches **Band Alarm Settings** dialog.

Keyboard Support - Press **Enter** to toggle to next trace. Press **Delete** to remove.

Available Preferences

Color - Color preferences set in following areas of the **Preferences** screen:

Band Alarm / Colors - Configures frequency lines (left and right) colors.

Clear / Colors - Configures data value line colors.

Alert / Colors - Configures alert color.

Danger / Colors - Configures danger color.

Display Status - Display status (on or off) is configured in the **Band Alarm - Spectrum / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Band Alarm Settings Dialog

Use the **Band Alarm Settings** dialog to show / hide available band alarms on the active POINT's plot. Available Band Alarm names, visibility status, and frequency range display on the tab.

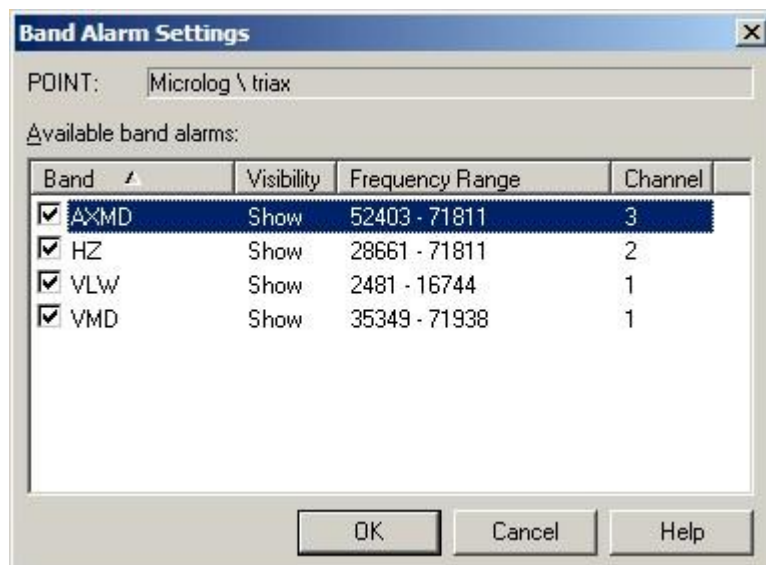


Figure 4 - 63.
The **Band Alarm Settings** Dialog.

Band Alarm Settings fields include:

POINT - Displays POINT name.

Available band alarms - Displays individual band alarms and their visibility status, frequency ranges, and channels.

To show / hide band alarms:

- Click the band alarm's checkbox to toggle the band alarm's status from **Show** to **Hide**.
- Click **OK** to save changes, click **Cancel** to close the dialog without saving changes.
 - These display settings are stored with the POINT. Whenever the POINT displays, the current settings are used.

Spectrum / Envelope Alarm

Use an envelope alarm overlay to display the envelope alarm assigned to the active POINT(s).

To display an envelope alarm overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option. The **All Overlays** dialog displays.
- Select **Envelope Alarm** and click **OK**.

The generated envelope alarm remains in *** EDIT *** mode until you **Save** or **Undo** your settings using the plot's context menu.

Editing the Envelope Alarm

After you have generated an envelope alarm, you can edit it graphically using your mouse, or enter numeric envelope parameters using the **Set Frequency** dialog.

To graphically edit the envelope alarm:

- While in edit mode, the plot window displays *** EDIT *** in each upper corner. Move the mouse over the envelope alarm. The cursor changes to an up arrow.
- Click the mouse on the portion of the envelope alarm line to be edited. A square icon identifies where the line will be drawn.
- Drag the mouse to draw the line to create the new envelope alarm.

Tip - You can use your keyboard's **Insert** key to begin drawing the envelope alarm line. Then, use the arrow keys to move the line, and the **Insert** key again to stop drawing the line.

- Right-click within the plot to display its context menu.
- Select **Save** to save your envelope alarm settings and end *** EDIT *** mode, or select **Undo** to undo your settings.

To edit the envelope alarm using numeric frequency ranges:

- Click the **Set Range** button. The **Set Frequency** dialog displays.
- Enter the desired low frequency, high frequency, and level value.

- Click **OK**. The displayed envelope alarm automatically conforms to your entries.

Feedback Area – Identifies the envelope alarm and POINT.

Information Area – Specific information displays on the **Envelope** tab. Tab information includes each frequency that pierced the envelope, FFT amplitude, and alarm amplitude.

Right-Click Context Menu - Right-click on the envelope alarm overlay anchor to reveal its context menu. Available options include:

Next Trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Available Preferences

Color – Alarm line color is configured in **Danger / Colors** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Envelope Alarm - Spectrum / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Spectrum / Linear Speed

Use a linear speed overlay to graphically display the value of the linear factor multiplied by the running speed.

To display linear speed overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option. The **All Overlays** dialog displays.
- Select **Linear Speed** and click **OK**.

Feedback Area – Displays amplitude, frequency, orders, and linear speed.

Information Area - No tabs display for this overlay.

Right-Click Context Menu - Right-click on the linear speed overlay anchor to reveal its context menu.

Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Settings – Launches the **Linear Speed Settings** screen.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Available Preferences

Display Status – Display status (on or off) is configured in the **Spectrum / Linear Speed / Plot Preferences** in the **Preferences** screen.

- The default status is **off**.

Spectrum / Frequency

Use a frequency overlay to label POINTs' assigned frequency set(s) for identification and analysis of bearing defects, etc.

- The current POINT must have an assigned frequency set.

To display a frequency overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot / Plot Overlays / Frequency** option, or use the frequency toolbar button.

Feedback Area – Displays the number of fundamental frequencies available for the POINT. Displays individual frequency label, orders, each multiple's amplitude and frequency.

When the mouse pointer is over a frequency label, that label's amplitude and frequency values display feedback area's second line.

- The number of fundamental frequencies is not limited to the number of displayed frequencies.

Information Area – Specific information displays on the **FAM** tab. Tab information includes all displayed frequencies for active overlay, harmonic, frequency, orders, and amplitude values.

Also included on the **FAM** tab is an **Activity Index** column. The Activity Index displays the result of an HAI (Harmonic Activity Index) calculation, which quantifies the likelihood of defects at the FAM frequencies for the BPFO, BPFI, BSF, and FTF harmonics in the spectrum.

A HAI value in the **Activity Index** column of 2.5 or greater indicates a likely defect pattern; HAI values of 3 or more show clear patterns.

Right-Click Context Menu - Right-click on the frequency overlay anchor to reveal its context menu. Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Next Frequency – Advance to next frequency set.

Previous Frequency - Return to previous frequency set.

Remove – Removes the overlay from the plot.

Settings – Launches **Frequency Settings** screen.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove the overlay. Use the plus (+) and minus (-) keys to cycle through the four frequency sets for an individual POINT and return to original selection.

Available Preferences

Color – Frequency color is configured in **Frequency / Color Preferences** in the **Preferences** screen).

Display Status – Display status (on or off) is configured in **Frequency – Spectrum/Plot Preferences** in the **Preferences** screen.

- The default status is **off**.

Frequency Settings Screen

Use the **Frequency Settings** screen to enable/disable any or all frequencies for display on the current POINT's plot.

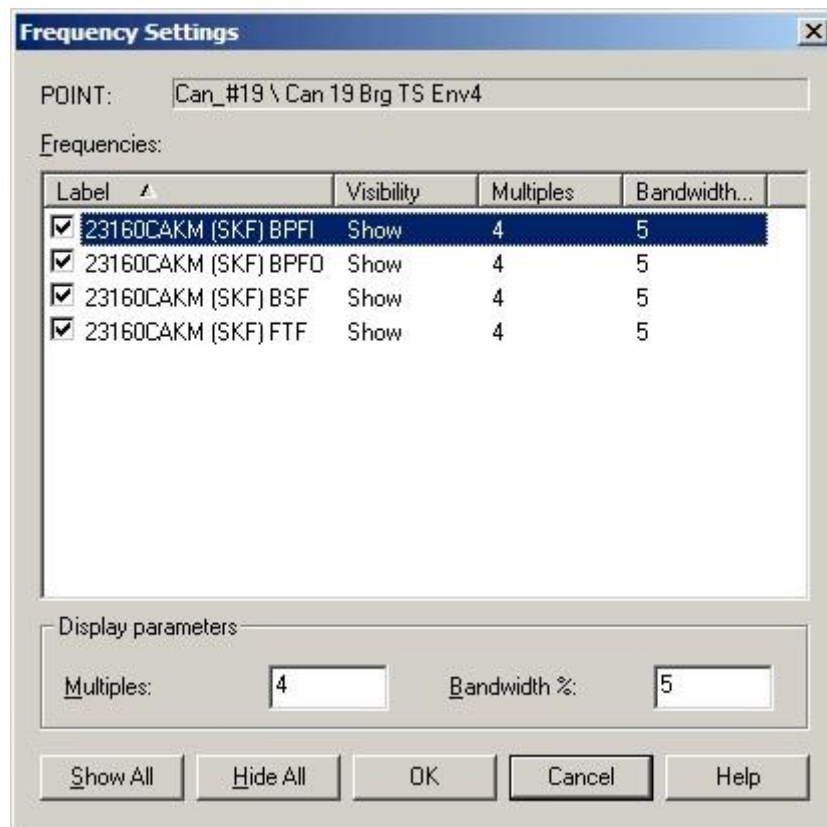


Figure 4 - 64.
The **Frequency Settings** Screen.

To enable / disable frequencies:

- Click the checkbox next to the frequency set to enable it for display. Clear the checkbox to disable the frequency set.

Display parameters fields include:

Multiples - Enter number of multiples for each label.

Bandwidth % - Enter bandwidth % for each label.

➤ Settings are permanently saved with the POINT.

- Click **Show All** to **enable** all frequencies for display, click **Hide All** to disable all frequencies for display.
- Click **OK** to save changes, click **Cancel** to close screen without saving changes.

Spectrum / Diagnostic Cursor

Use a diagnostic cursor to let @ptitude Analyst compute and display all relevant harmonic series of the current spectrum, and rank all series found according to probability.

- This option is only available with @ptitude Analyst CMSW7400.

To display a diagnostic cursor overlay:

- With a spectrum plot displayed, select the **View** menu's **Plot Overlays / Diagnostic Cursor** option, use the diagnostic cursor toolbar button, or press X on your keyboard.

@ptitude Analyst uses a patented algorithm to distinguish between very probable and less probable harmonic series, and ranks all series found according to probability.

The result is shown on the **Diagnostics** tab in the info area below the spectrum plot. The probability is expressed as an activity index, whereby values of 1.5 and higher indicate an increasing probability of a significant harmonic pattern.

In addition, the algorithm compares the fundamental frequency of each series to any frequency associated with the POINT (e.g., bearing defect frequencies). If a match is found, it displays the name of this frequency next to the related harmonic pattern.

POINT	Index	Activity Index	Frequency	Order	Information
Bottom Wire TS \ Bottom Wire Vel	1	3.779	47.13	6.24	22319C (SKF) BPFO
	2	3.757	31.42	4.16	
	3	3.695	9.988	1.322	
	4	3.647	16.97	2.248	
	5	3.323	12.23	1.62	

Figure 4 - 65.
The **Diagnostics** Tab.

- ① List of patterns ranked by probability
- ② Activity Index (2.5 or greater indicates a likely defect pattern; 3 or more show clear patterns)
- ③ Pattern matches BPFO

Feedback Area – Displays the values for the currently shown harmonic series by activity index, fundamental frequency, and orders.

Information Area – Specific information displays on the **Diagnostics** tab. Tab information includes harmonic frequency, orders, and activity index for all relevant harmonic series, sorted by activity index. Use the mouse or cursor keys to scroll through the list and display the highlighted series on the spectrum plot.

Right-Click Context Menu – Right-click on the diagnostic cursor overlay anchor to reveal its context menu. Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes the overlay from the plot.

Keyboard Support – Press Enter to toggle to the next trace. Press Delete to remove.

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Color Preferences** in the **Preferences** screen).

Diagnostics Percentage – Configured in **Diagnostic Percentage – Spectrum / Plot Preferences** in the **Preferences** screen. Filters the list of harmonic patterns displayed, based on a percentage of the highest Activity Index detected in the spectrum. (For example, if the highest Activity Index is 3.5, a Diagnostics Percentage of 50% would filter out any harmonic patterns with an Activity Index below 1.75.)

- The default percentage is 30%.

Diagnostic Cursor – Configured in **Diagnostic Cursor – Spectrum / Plot Preferences** in the **Preferences** screen. Determines whether the diagnostic cursor is on by default when a spectrum plot is displayed.

- The default status is off.

Waterfall / Single Cursor

Use a single cursor to select a particular frequency across one or more spectra and toggle between open spectra.

To display a single cursor overlay:

- With a waterfall plot displayed, select the **View** menu's **Plot / Plot Overlays / Single Cursor** option, or use the single cursor toolbar button.

Feedback Area – Displays the amplitude and frequency for the selected spectrum line with a marker. Displays the spectrum's name and date / time.

Information Area – Specific information displays on the **Waterfall** tab. Tab information includes selected spectrum line's amplitude and frequency, measurement date / time, and selected measurement details.

Right-Click Context Menu – Right-click on the single cursor overlay anchor to reveal its context menu. Available options include:

Next POINT – Toggles between open POINTs (with two or more POINTs active).

Next / Previous Spectrum – Moves to next or previous spectrum for active POINT.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to the next POINT. Press **Delete** to remove. Use the left and right arrow keys to move to next / previous frequency in small

increments (one line at a time). Use the up and down arrow keys to move to next / previous spectrum for the POINT.

- Use **Shift** and left and right arrow keys to move to next or previous frequency in larger increments (10 lines at a time).
- In Palogram mode, the keys are reversed. Use left and right arrow keys to move to next / previous spectrum, and up and down arrow keys to move to next / previous frequency.

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Cursor / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Single Cursor - Waterfall / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Waterfall / Band Cursor

Use a band cursor to calculate and display the delta between two frequencies.

To display a band cursor overlay:

- With a waterfall plot displayed, select the **View** menu's **Plot / Plot Overlays / Band Cursor** option, or use the band cursor toolbar button.

Feedback Area – Displays the minimum and maximum frequency and delta for the active POINT.

Information Area – Specific information displays on the **Waterfall Band** tab. Tab information includes minimum and maximum frequency and delta for the active POINT.

Right-Click Context Menu - Right-click on the band cursor overlay anchor to reveal its context menu. Available options include:

Next POINT - Toggles between open POINTs (with two or more POINTs active).

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to the next POINT. Press **Delete** to remove. The band cursor is made up of three parts, the fundamental left line, fundamental right line, and the entire band. The active line is indicated by the cursor line focus icon. This icon displays as a triangle on the active part of the cursor. Use left and right arrow keys to move the entire band or an individual line (depending on which is active) left or right. The **Page Up** and **Page Down** keys toggle between left line, right line, and entire band.

- The individual fundamental lines and the entire band move in small increments (one line at a time). Use the **Shift** and the left or right arrow key to move part or all of the band in larger increments (15 lines at a time).

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Cursor / Color Preferences** in the **Preferences** screen. Cursor line focus icon

color appears as configured in **Cursor Line Focus** in **Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Band Cursor - Waterfall / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Polar Vector / Single Cursor

Use a single cursor to display the magnitude and phase for FFT / phase data and to navigate between individual readings for a selected order.

To display a single cursor overlay:

- With a polar vector plot displayed, select the **View** menu's **Plot / Plot Overlays / Single Cursor** option, or use the single cursor toolbar button.

Feedback Area – Displays amplitude, phase angle, POINT name, and measurement date / time for cursor location.

Information Area – Specific information displays on the **Polar Vector** tab. Tab information includes POINT name, date / time stamp, amplitude, and phase angle.

Right-Click Context Menu – Right-click on the single cursor overlay anchor to reveal its context menu. Available options include:

Next Trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to next POINT. Press **Delete** to remove. Use the left and right arrow keys to move to next or previous reading (by date/time).

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Cursor / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Single Cursor – Polar Vector / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Polar Vector / Phase Alarm Cursor

Use a phase alarm overlay to graphically display alarm levels for phase data. Normal levels display inside small enclosed areas. Alert levels are contained within a larger enclosed area. Danger levels appear outside the enclosed area.

To display a phase alarm overlay:

- With a polar vector plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option. The **All Overlays** dialog displays.
- Select **Phase Alarm** and click **OK**.
 - Use the **Customize** menu's **Toolbar** option to activate the phase alarm overlay toolbar button.

Feedback Area– Displays POINT name and phase alarm.

Information Area – Specific information displays on the **Phase Alarm** tab. Tab information includes order number, start and end angle, and low and high amplitudes for enabled alarms (alert, danger, or both).

Right-Click Context Menu - Right-click on the phase alarm overlay anchor to reveal its context menu. Available options include:

Next Trace - Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next POINT. Press **Delete** to remove.

Available Preferences

Color – Alarm colors configured in **Danger** and **Alert / Colors** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Phase Alarm – Polar Vector / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Mag / Phase / Single Cursor

Use a single cursor to display amplitude and phase data in linear form for trending purposes. Navigate by date / time and simultaneously analyze magnitude and phase data.

To display a single cursor overlay:

- With a mag / phase plot displayed, select the **View** menu's **Plot / Plot Overlays / Single Cursor** option, or use the single cursor toolbar button.

Feedback Area – Displays POINT name, date / time, amplitude, and phase.

Information Area – Specific information displays on the **Mag/Phase** tab. Tab information includes POINT name, date / time, amplitude, and phase.

Right-Click Context Menu - Right-click on the single cursor overlay anchor to reveal its context menu. Available options include:

Next Trace - Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next POINT. Press **Delete** to remove.

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Cursors / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Single Cursor – Mag-Phase Trend / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Time / Single Cursor

Use a single cursor to analyze a time waveform's amplitude and time data.

To display a single cursor overlay:

- With a time plot displayed, select the **View** menu's **Plot / Plot Overlays / Single Cursor** option, or use the single cursor toolbar button.

Feedback Area– Displays amplitude and time data for cursor's location on the plot.

Information Area – Specific information displays on the **Time** tab. Tab information includes POINT name, amplitude, and time.

Right-Click Context Menu - Right-click on the single cursor overlay anchor to reveal its context menu. Available options include:

Next Trace - Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next POINT. Press **Delete** to remove.

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Cursors / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Single Cursor – Time / Plot Preferences** in the **Preferences** screen.

- The default status is on.

Time / Harmonic Cursor

Use a harmonic cursor to create and view a time interval's harmonics.

To display a harmonic cursor overlay:

- With a time plot displayed, select the **View** menu's **Plot / Plot Overlays / Harmonic Cursor** option, or use the harmonic cursor toolbar button.

Feedback Area – Displays amplitude and time of fundamental left line and right line of cursor. Displays interval in time and interval as a frequency.

Information Area – Specific information displays on the **Harmonic Cursor** tab. Tab information includes POINT name, left and right fundamental lines' amplitude and time, interval, frequency, and all visible harmonic labels.

Right-Click Context Menu - Right- click on the harmonic cursor overlay anchor to reveal its context menu. Available options include:

Next Trace - Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next POINT. Press **Delete** to remove.

The cursor is made up of three parts. The fundamental left line, fundamental right line, and the entire cursor. The active line is indicated by the cursor line focus icon. This

icon displays as a triangle on the active part of the cursor. Use the left and right arrow keys to move the entire cursor or either individual line (depending on which is active) left or right. The **Page Up** and **Page Down** keys toggle between selections of left line, right line, and entire cursor.

- The individual fundamental lines and the entire cursor move in small increments (one line at a time). Use the **Shift** and left and right arrow keys to move all or part of the cursor in larger increments (15 lines at a time).

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Cursors / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Harmonic Cursor –Time / Plot Preferences** in the **Preferences** screen.

- The default status is off.
- The **Time – Harmonic** cursor's fill pattern lines slope *downward* from left to right to distinguish it from a **Band** cursor. A **Band** cursor's fill pattern lines slope *upward* left to right.
- The default number of harmonics is 50.

Time / Band Cursor

Use a band cursor to identify the time interval and amplitude delta.

To display a band cursor overlay:

- With a time plot displayed, select the **View** menu's **Plot / Plot Overlays / Band Cursor** option, or use the band cursor toolbar button.

Feedback Area – Displays amplitude and time of left and right fundamental lines and the delta (in time).

Information Area – Specific information displays on the **Time Band** tab. Tab information includes current position, amplitude, time, delta (frequency and time), positive and negative peak, RMS and time domain statistics for the time data shown within the band, including:

Standard Deviation – A basic measure of the spread of values within a set around their average value.

Skew – A measure of the asymmetry of the time domain values when plotted around their average. Whereas the Standard Deviation suggests that values are homogeneously distributed left and right of their average, the Skew indicates whether this assumption is true.

Kurtosis – A measure of the general extent of peaks. A high value means that more of the variance is due to infrequent, extreme deviations as opposed to frequent, modest deviations.

Crest Factor – A calculation of the highest absolute Peak / RMS value of the signal. The Crest Factor is a measure of general extent of peaks as compared to a pure sinusoid. The crest factor for pure sinusoid is 1.41 (square root of 2).

- This information also displays on the **Info** tab in time plots. Time domain statistics on the **Info** tab pertain to the entire plot, whereas statistics on the **Time Band** tab only pertain to the time interval within the band.

Right-Click Context Menu - Right-click on the band cursor overlay anchor to reveal its context menu. Available options include:

Next Trace - Toggles between traces when the plot is displaying more than one trace.

Remove - Removes overlay from the plot.

Keyboard Support - Press **Enter** to toggle to next POINT. Press **Delete** to remove.

The band cursor is made up of three parts. The fundamental left line, fundamental right line, and the entire band. The active line is indicated by the cursor line focus icon. This icon displays as a triangle on the active part of the cursor. Use left and right arrow keys to move the entire band or an individual line (depending on which is active) left or right. The **Page Up** and **Page Down** keys toggle between the left line, right line, and entire band.

- The individual fundamental lines and the entire band move in small increments (one line at a time). Use the **Shift** and the left or right arrow key to move part or all of the band in larger increments (15 lines at a time).

Available Preferences

Color - Cursor is the color of the next available cursor (as configured in **Cursors / Color Preferences** in the **Preferences** screen. Cursor line focus icon color appears as configured in **Cursor Line Focus** in **Color Preferences** in the **Preferences** screen.

Display Status - Display status (on or off) is configured in the **Band Cursor - Time / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Cursor Cross Hashing - Cross-hashing (on or off) is configured in the **Cursor Cross-Hashing - Time / Plot Preferences** in the **Preferences** screen. Determines whether the band is shaded with a single diagonal line or a cross-hash.

- The Time - Band cursor's fill pattern lines slope *upward* from left to right to distinguish it from a harmonic cursor. A harmonic cursor's fill pattern lines slope *downward* from left to right. Cross hashing can be useful to help further distinguish a time band cursor from a harmonic band cursor.

Time / Peak Cursor

Use a peak cursor overlay to label all peaks above a set amplitude value.

To display a peak cursor overlay:

- With a time plot displayed, select the **View** menu's **Plot / Plot Overlays / Peak Cursor** option, or use the peak cursor toolbar button.

Feedback Area – Displays the line's current amplitude, total number of peaks displayed, and the peak number, amplitude, and time for as many displayed peaks as space allows.

Information Area – Specific information displays on the **Peak** tab. Tab information includes POINT name, line amplitude, and each peak number's time and amplitude.

Right-Click Context Menu - Right-click on the peak cursor overlay anchor to reveal its context menu. Available options include:

Next Trace - Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from the plot.

Keyboard Support – Press **Enter** to toggle to next POINT. Press **Delete** to remove.

Use the up and down arrow keys to increase / decrease the amplitude range in small increments (1% at a time). Use the **Shift** and up and down arrow keys to increase / decrease the amplitude range in larger increments (10% at a time).

Available Preferences

Color – Cursor is the color of the next available cursor (as configured in **Cursors / Color Preferences** in the **Preferences** screen.

Display Status – Display status (on or off) is configured in the **Peak Cursor – Time / Plot Preferences** in the **Preferences** screen.

- The default status is off.

Time / Linear Speed

Use a linear speed overlay to graphically display the value of the linear factor multiplied by the running speed.

To display linear speed overlay:

- With a time plot displayed, select the **View** menu's **Plot / Plot Overlays / All Overlays** option. The **All Overlays** dialog displays.
- Select **Linear Speed** and click **OK**.

Feedback Area – Displays amplitude, frequency, orders, and linear speed.

Information Area - No tabs display for this overlay.

Right-Click Context Menu - Right-click on the linear speed overlay anchor to reveal its context menu.

Available options include:

Next trace – Toggles between traces when the plot is displaying more than one trace.

Remove – Removes overlay from plot.

Keyboard Support – Press **Enter** to toggle to next trace. Press **Delete** to remove.

Available Preferences

Display Status – Display status (on or off) is configured in the **Time / Linear Speed / Plot Preferences** in the **Preferences** screen.

- The default status is **off**.

Analysis and Reporting Manager Add-On

The Analysis and Reporting Manager (ARM) provides graphical displays of Microlog module data (e.g., Recorder, Run up / Coast down, FRF, etc.).

The ARM add-on to @ptitude Analyst allows you to associate ARM data files with your hierarchy and access graphical displays of Microlog module data from within @ptitude Analyst.

Uploading and Linking ARM Data

Module data may be uploaded from the Microlog and saved with ARM, and then linked to your @ptitude Analyst hierarchy.

To transfer and link module data:



- Select the **Transfer** menu's **Microlog ARM data** option. The **Mobile Device Viewer** wizard launches.
- Follow the wizard to upload your Microlog module data to ARM files and link them to any element in your @ptitude Analyst hierarchy.
 - Click the **Help** button or press F1 on your keyboard for help on the wizard options.

Viewing ARM Data

From within @ptitude Analyst, you can:

Launch the Analysis and Reporting Manager where you can select Microlog module data files from the Explorer-style tree structure;

View a list of ARM data associated with any element in your @ptitude Analyst hierarchy and quickly open a graphical display of a selected item.

To launch the Analysis and Reporting Manager:



- Select the **View** menu's **Analysis and Reporting Manager** option, or select the View Analysis and Reporting Manager toolbar icon. The Analysis and Reporting Manager displays.

- Refer to the help files within the ARM add-on for instructions on locating and viewing data from your Microlog modules.

To view linked ARM data for a hierarchy element:



- Highlight the item in the @ptitude Analyst hierarchy whose linked ARM data you would like to view.
- Select the **View** menu's **Linked ARM Data** option, or select the View Linked ARM Data toolbar icon. The **Linked Analysis and Reporting Manager (ARM) Data** dialog displays.

Options include:

Linked File List – Lists all ARM data files linked to the currently selected hierarchy element. Use your mouse or the up and down arrow keys on your keyboard to highlight the desired data file.

Name – The linked ARM data file name.

Description – A user defined description of the file.

Date Added – The date the module data was collected.

View – Launches ARM at a graphical display of the selected Microlog module data.

Delete – Deletes the link between the ARM file and the @ptitude Analyst hierarchy element.

Edit – Opens an edit dialog where you can modify the link description.

Generating and Printing SKF @ptitude Analyst Reports

Overview

- The **File** menu's **Print** option or the toolbar's **Print** button may be used at any time to print the contents of the "active" @ptitude Analyst window (including graphic display windows).
- Microsoft Internet Explorer version 4.X or newer is required to view reports.

@ptitude Analyst's **Reports** feature provides options for controlling the generation and printing of hard copy reports showing database and measurement information.

Collection Status – Produces a report of set ROUTE activity dates and the status of each POINT. POINT status includes **Collected**, **Not Collected** (current time period), **Missed** (previous time period), and **Uncollectible**.

- If a conditional POINT's source POINT has not been collected, or if the source POINT has been collected, but the conditional POINT's criteria was not met, then the conditional POINT displays an **Uncollectible** status and is not counted toward the total percentage of non-compliant POINTs.

Compliance – (calendar-based POINTs only) – Produces a report of the collection status for all *calendar-based* POINTs in a ROUTE (for either the **current** or **previous** data collection interval).

If reporting on the **current** data collection interval (implying that the calendar-based time period has not yet expired), for each ROUTE collected, the report displays the number of calendar-based POINTs in the ROUTE, the number of these POINTs that have been collected so far, and the percentage of POINTs that have been collected vs. all calendar-based POINTs.

If reporting on the **previous** data collection interval, the report is split into two sections. The top section displays those POINTs that are in compliance (as described in the paragraph above). The bottom section displays similar data for those POINTs that are out of compliance. In addition, when reporting on the **previous** data collection time period, you have the option to list POINT ID information for all POINTs that are out of compliance.

Exception – Produces a report of POINTs in violation of specified exception criteria.

History – Produces a report of machine notes.

Last Measurement – Reports POINTs' last measurement values.

Overdue/Non-Compliant – Produces a report of all POINTs that are overdue or out of compliance for data collection as per their data collection schedule.

Pending Overdue/Non-Compliant – Produces a forecast report of all POINTs that will be overdue/non-compliant within a user specified time period (e.g., report all POINTs that will be overdue/non-compliant if they are not collected within the next seven days).

ROUTE Statistics – Produces a report of statistics for one or more ROUTEs. Statistics include when due, last downloaded, total number of POINTs in the ROUTE.

ROUTE History Report – Produces a report of ROUTE history for the selected ROUTEs. ROUTE History reports include ROUTE collection time duration, and start and stop times. The amount of reported ROUTE historical information is determined using the **ROUTE Properties / General** tab.

SET Statistics – Produces a report of statistics for the selected data source. The statistics include total number of POINTs, POINTs in alarm, POINTs disabled, and POINTs overdue.

Upload Statistics – Produces a report of the statistics for information last uploaded from the DAD.

- Each of @ptitude Analyst's report types may be customized. Report setup is discussed later in this chapter.

Reports Screen

- Select the **File** menu's **Reports** option. The **Reports** screen displays.

The **Reports** screen allows you to select, configure, manage, and generate reports. Each report type is available for use and may also be used as a starting point to customize reports to fit your particular application.

- Reports may also be generated automatically using the **Scheduler** feature. Refer to **Chapter 2, Working With Your SKF @ptitude Analyst Database** for more information on scheduling automatic reports.

Use the **Reports** screen to work with existing reports and to create new report templates. The top area provides options for new and current reports. The bottom area provides options for preserved (archived) reports.

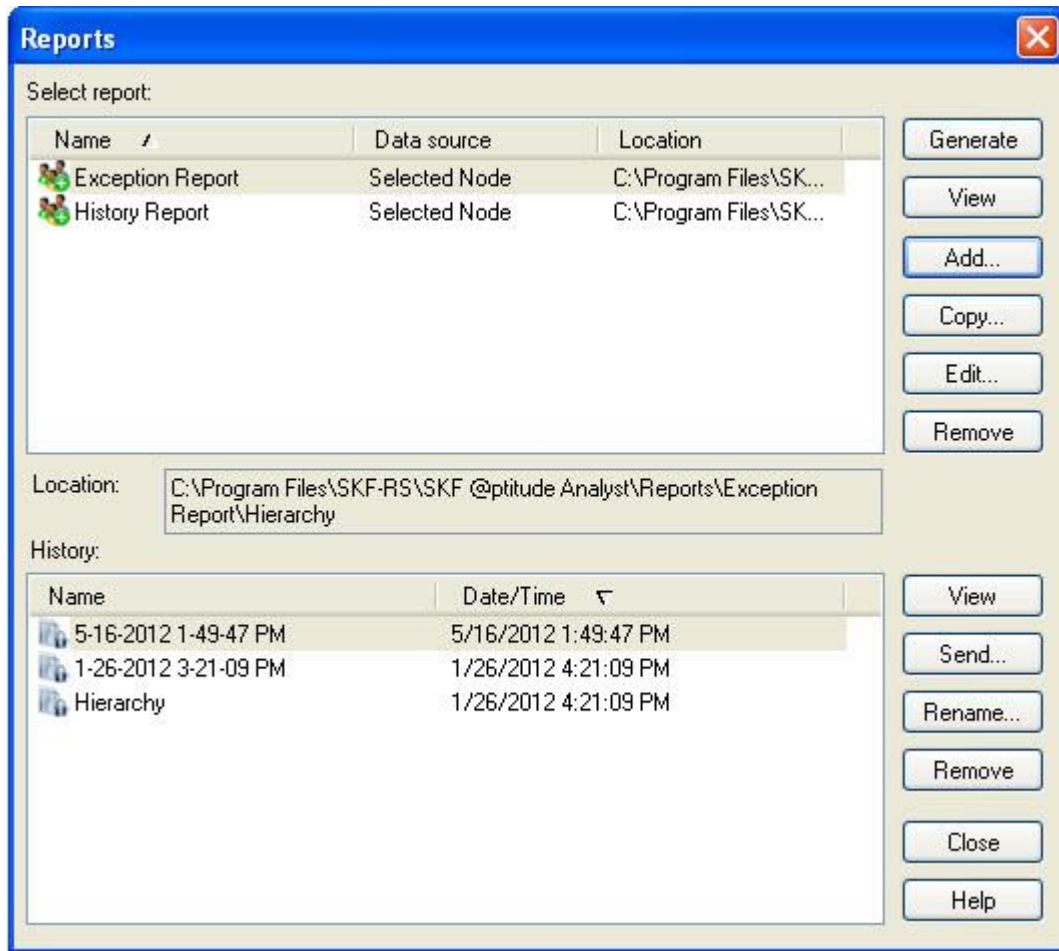


Figure 5 - 1.
The **Reports** Screen.

Select report area - Displays all existing report definitions.

- Click a report's name to select it.

Reports options include:

Generate – Generates a report to the computer display based on the selected report definition.

View – Displays the latest generated version of the selected report.

Add – Defines a new report based on a pre-defined @ptitude Analyst template.

Copy – Defines a new report using the selected custom report as a template.

Edit – Launches the **Report Editor** screen to edit the selected report.

Remove – Deletes the selected report definition. When you delete a report from the screen's top area, you are asked if you also want to delete all preserved historical reports for the selected report definition.

- When a report is removed, its corresponding subdirectory and all included files are also removed from your computer's hard drive. If you wish to delete a report, but save previous copies, copy the

report's files from its subdirectory to a new location on your hard drive before removing the report.

History area – Displays all existing preserved reports for the selected report definition.

- Refer to the **Report Editor / General** section later in this chapter for more information on preserving historical reports.

- Click a preserved report's name to select it.

View - Displays the preserved version of the selected report, identified by its date and time.

Send – Launches the **Recipient Selection** dialog and allows you to send the report in an email message to one or more selected contacts or groups of contacts. The report is sent in HTML and PDF format to the selected email recipients.

- Refer to the **SKF @ptitude Analyst Introduction and Global Features User Manual, Chapter 2, Getting Around in @ptitude Analyst / Contact Information** section for details on how to set up contacts and groups.

Rename – Allows you to rename the selected preserved report. The **Enter Name** dialog displays, prompting you to enter the new report name. Click **OK** to rename the selected report.

Remove – Removes the selected preserved report.

Close – Closes the screen.

To generate a @ptitude Analyst Report:

- Open the Hierarchy window whose data you wish to report. If necessary, open or select hierarchy items within the window to limit the report's content.
- Select the **File** menu's **Reports** option. The **Reports** screen displays.
- Select a report from the **Reports** screen's **Select report** area.
- Click the **Generate** button. The report is rendered and when complete, displays in a report window for viewing or printing.
 - Report generation progress displays in the progress bar in the screen's lower right corner.
 - When setting up a report, there is an option to select the data source at the time the report is generated. If this has been selected, the **Select Data Source** dialog displays. Refer to the *Selecting the Data Source* heading, later in this chapter, for details.
- Press your keyboard's **End** key to go to the end of the report.
- Press your keyboard's **Home** key to go to the top of the report.

To print a generated report:

- With the generated report on the computer's display, use the **Print** toolbar button or select the **File** menu's **Print** option.

To view an existing report:

- In the **Reports** screen, select the desired report.
- Click the **View** button. The report displays in a **Report** window and is available for viewing and/or printing.

Use the **Reports** screen to “add” a customized report type. Customized reports are based on pre-defined report types, then modified to suit your particular application. Once your new report type is defined, it is available for selection from the **Reports** screen, and may be generated as needed.

To add a new report:

- Click the **Report** screen’s **Add** button. The **Select Report Template** dialog displays.

The **Select Report Template** dialog displays all pre-defined @ptitude Analyst report templates. These templates may be used to generate reports without further modification, or as a starting point for creating custom reports.

- Select the template to use as a basis for your new report.
 - If you wish to use the selected report “as is,” (no modifications are required) assign the report a unique name, verify the path settings, and click the **OK** button to accept all default settings.
- Click **OK**. The **Report Editor** screen displays.

Report Editor

The **Report Editor** screen contains three tabs:

General – Defines the new report’s identity and processing parameters.

Definition – Defines the new report’s criteria, criteria settings, and content.

Assign – Allows you to configure default report configurations for both public and hierarchy-specific reports.

Report Editor / General tab fields include:

Name – Using standard file naming conventions, assign the new report a unique name. Do not use the pound sign (#) in your report name as it can cause errors when printing. The assigned name identifies the most recently generated report and is used to name the disk directory (folder) where the report and all its supporting files are stored. If you maintain historical reports, a separate directory is created beneath the report’s directory identified by the historical report’s name.

If you change a report’s name, all data for the previously generated report remains in the subdirectory with the original report’s name. The original report subdirectory cannot be deleted using @ptitude Analyst.

Title – Enter a descriptive title for the report. This text appears at the top of the generated report.

Header – Enter text to display in the printed report’s header area.

Footer – Enter text to display in the printed report’s footer area.

Preserve Reports – Click to enable report preservation. When enabled, newly generated reports are archived, organized by report definition and date / time.

Report is Available for all users – Click to enable and define the report as a public report, available to all @ptitude Analyst users. If you do not check this option, the report is defined as a private report, available only to the report creator.

Report is Available for all hierarchies – Click to enable and make the report available for use with all @ptitude Analyst hierarchies. If you do not check this option, the report will only be available to the current hierarchy.

Report can specify data sources from multiple hierarchies – Click to enable and make the report available for use with all @ptitude Analyst hierarchies, as well, as enable the ability to select multiple data sources from multiple hierarchies. If you do not check this option, the report will only be available using a single hierarchy source.

Report Editor / Definition

The **Report Editor / Definition** tab is divided into two main areas, the **Select report criteria** area in the tab's left panel and the criteria setup panel on the right. Click an item to expand and view any sub-items available for configuration.

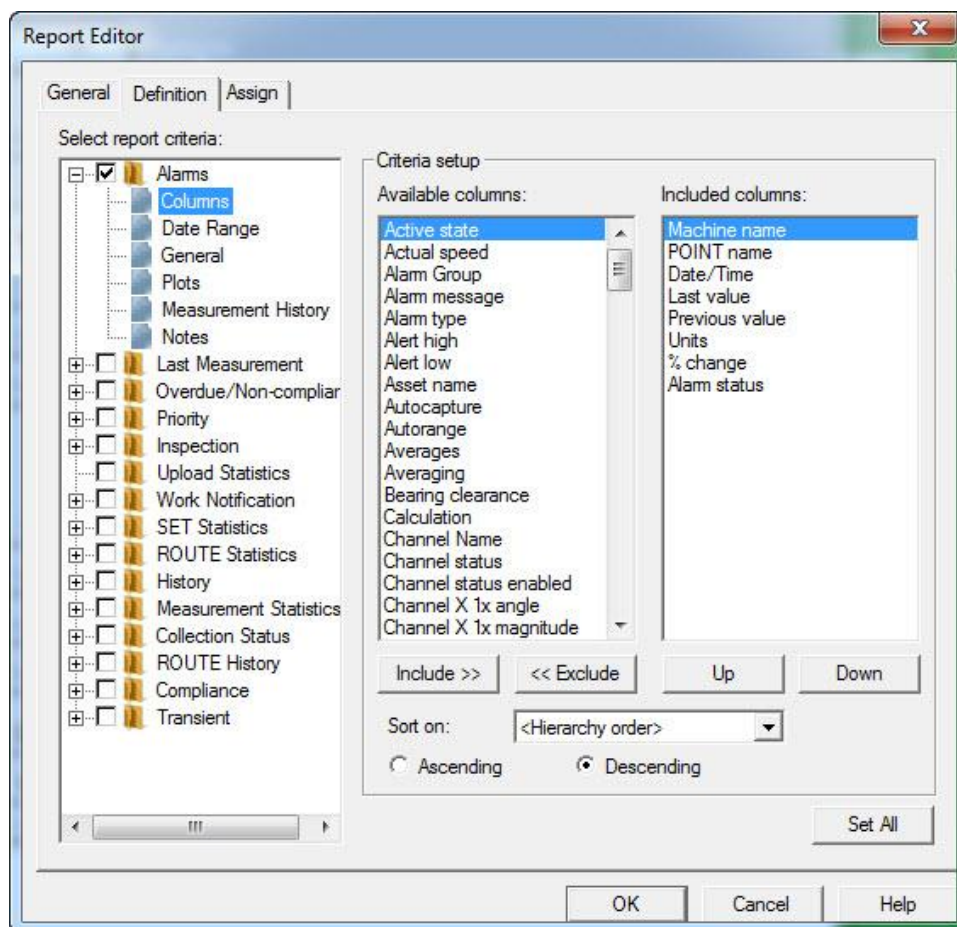


Figure 5 - 2.
The **Report Editor / Definition** Tab.

Select report criteria – Select attributes to appear in the report.

Criteria setup (contents change depending upon item selected in left panel) – Allows you to configure the selected report criteria to determine report content.

To select an element to include in the report:

- Highlight the item and click the item's checkbox to include it in your report. Once selected, the item's input fields (if any) display in the tab's right panel. Available report elements are detailed in the **Report Criteria** section later in this chapter.
- Click the item's + icon to expand the item in the hierarchy list and view its additional configuration options.
- Click an additional configuration item to select it. When selected, the additional item's set up fields display in the **Criteria Setup** area, allowing you to further customize the report. Available setup fields are detailed in the **Criteria Setup Fields** section later in this chapter.

Report Criteria

The following items display in the **Select report criteria** area as top-level items.

Alarms - Select individual alarm conditions and types to include in the report.

Last Measurement - Select to include all POINTs in the report with a last measurement.

Overdue/Non-compliant – Specify the amount of overdue POINTs to include in the report.

Priority – Includes any Machine with a set priority matching your selection(s).

Inspection / Upload Statistics – Select one or more alarm conditions (Clear, In alert, In danger); select the columns, date range and type of notes to include. Check Upload Statistics to include a summary of the last data upload from the DAD.

Work Notification – Select to include all work notifications, a fixed number of them, or select a date or date range. Specific ROUTEs and work request statuses can be selected for the report.

SET Statistics – Select to include a summary of the hierarchy item and all its children.

ROUTE Statistics – Select to include a summary of ROUTE data collection status for each ROUTE included in the report.

History – Select to include all machine notes and images for any machine in the selected data source.

Measurement Statistics – Select to include a summary of statistical information for a selected measurement type (selected by the **Full Scale Units** setting) and alarm threshold (selected by the **Threshold Level** setting). This setting includes the average amplitude for last measurement data of the specified measurement type, and indicates all POINTs with an amplitude above the specified alarm threshold in the report.

Collection Status - Select to include a summary of the ROUTE activities and its POINTs' status. Include all collection activities, a fixed number of them, or select a date or date range. You can choose to show only missed or uncollected POINTs.

Route History – Specify the amount of historical ROUTE information to include in the report.

- **Include records by comparing** options under **Route History** are only applicable to the date range settings. They further filter the range based on start time, end time, or both.

Compliance – Select ROUTEs on which you wish to report a summary of compliance status, and specify to report status for either the previous collection interval (previous compliance) or the current collection interval (current compliance). You may also specify to list all missed or out of compliance POINTs for the specified ROUTEs and to exclude interval-based POINTs.

Transient – Select to include transient data and specify the phase order (1 – 4).

Criteria Setup Fields (right panel setup fields)

Columns

Use the **Columns** input area to specify which columns appear in report tables, to specify column order, and select column sort criteria.

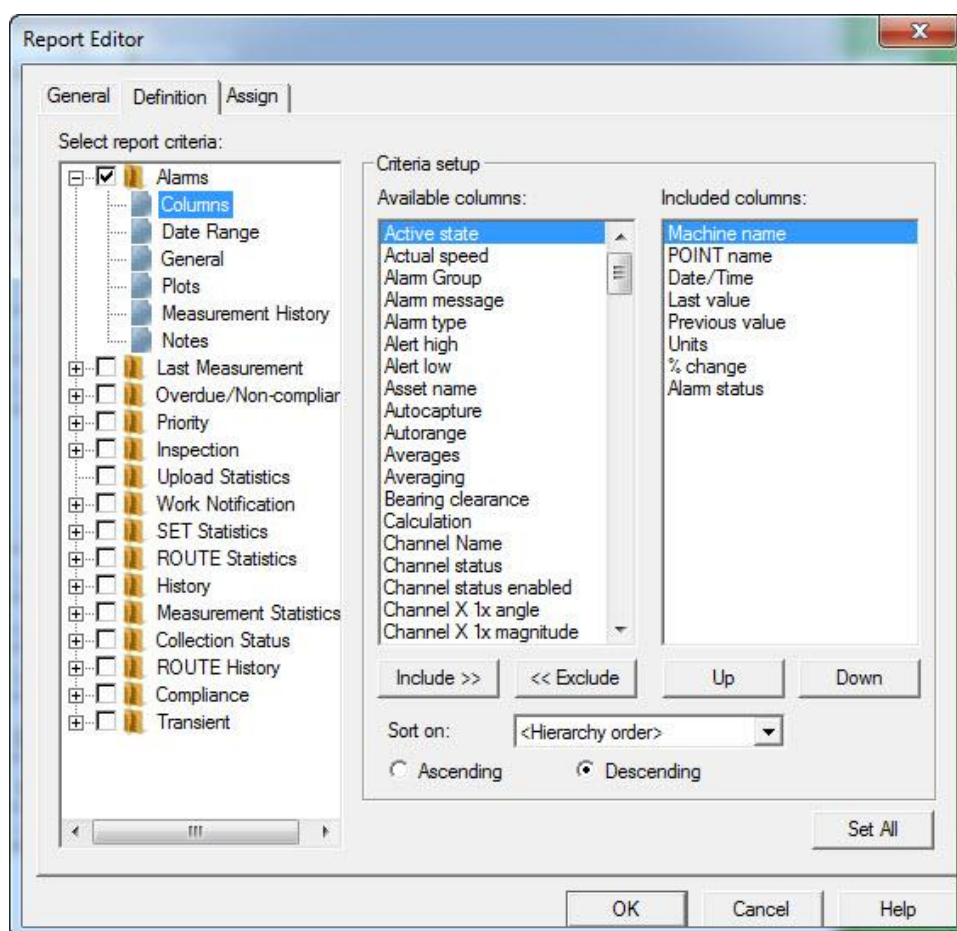


Figure 5 - 3.
The **Report Editor / Definition** Tab, Columns.

Available columns – Displays all available columns for the selected report element.

Included columns – Displays all included columns for the selected report element.

To include / exclude columns:

- Click the column type to select it.
- Use the Include / Exclude buttons to move the selected column to the **Included columns** area to include in the report, or move the selected column to the **Available columns** area to exclude it from the report.

To specify column order:

- Click the column type in the **Included columns** area.
- Use the **Up** and **Down** buttons to place the column into the desired position.

To specify sort criteria:

- Select a column type from the **Sort on** drop down list box.
- Click the desired sort method button, **Ascending** or **Descending**.
- Click the **Set All** button to use the current column settings for all matching column types in other report element setup fields. For example, the same column settings are available for various report elements. The **Set All** feature allows you to configure this information once and then use the same settings for all applicable report elements.
- Click **OK** to save changes, or **Cancel** to undo settings.

Date Range

Use the date range fields to specify a date interval. This date interval is used to retrieve only POINTs with a last measurement that falls within the indicated date interval.

Only include enabled POINTs – Select (check) to have the applicable report criterion retrieve data from enabled POINTs only. This checkbox can be selected or not selected (checked or not checked) by default and may or may not be editable depending on the selected report criterion.

- For **Alarms** and **Overdue/Non-compliant** criteria – This checkbox is selected (checked) by default and is read-only. Thus, these criteria will always retrieve data from enabled POINTs only for reporting.
- For **Last Measurement, Inspection, and Measurement Statistics** criteria – This checkbox is not selected (not checked) by default and is editable. Thus, by default these criteria will retrieve data from all POINTs for reporting, but you can select (check) this checkbox to have them retrieve data from enabled POINTs only.

No date range restriction – Select to remove date range restrictions.

Absolute date – Enter “absolute” (calendar) dates for date range restriction.

Relative date – Enter number of days (from / to) for date range restriction.

- Click the **Set All** button to use the current date range settings for all date range settings in other report element setup fields. The **Set All** feature allows you to configure this information once and then use the same settings for all applicable report elements.

General

Use the **General** fields to configure general report element information.

Include image – Click to enable and include any images associated with the selected report element.

Grouped by machine – Click to enable and display included report items grouped by machine.

Plots

Use the **Plots** fields to specify which plot types are to be included with the report table for the selected report item.

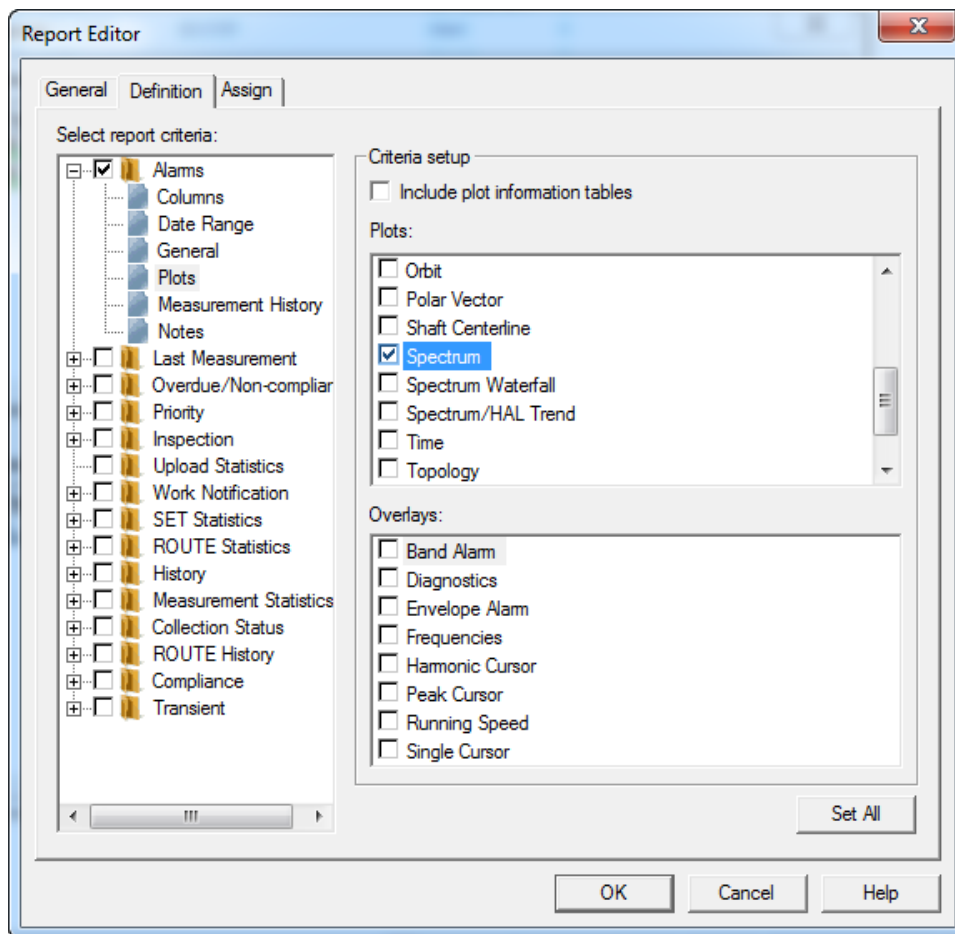


Figure 5 - 4.
The **Report Editor / Definition** Tab.

Include plot information tables – Click to enable and include plot content details and overlay information in table format on the report.

Plots area - Displays all available plots. Click a plot type to include it in the report.

- Selected plots are created only if there is associated data.

Overlays area – Displays overlays associated with the selected plot type (if applicable).

- Click the **Set All** button to use the current plot and overlay settings for all matching plot and overlay types in other report element setup fields. For example, the same plot settings are available for various report elements. The **Set All** feature allows you to configure this information once and then use the same settings for all applicable report elements.

Measurement History

Use the **Measurement History** fields to specify which measurements to include in the report.

Last fixed number of measurements – Select this option and type in or use the arrow buttons to specify the fixed number of measurements to include in the report.

Measurements in this date range – Select this option to include all measurements occurring between your entered date interval in the report. Type in a start date in the **From** field and an end date in the **To** field, or use the arrow buttons to display a pop-up calendar to select start and end dates.

Measurements from the last fixed number of days – Select this option to include measurements occurring within a specific number of days in the report. Type in or use the arrow buttons to specify the fixed number of days.

All measurements – Select this option to include all measurements in the report.

Notes

Use the **Notes** fields to specify which notes to include in the report.

Note Categories – Click to enable and include one or more note categories for the selected report item in the report. Note categories include **ACK Alarm Note**, **Coded Note**, **General Note**, **Non-Collection**, **Oil Analysis Note**, and **Operating Time Reset**.

Settings area – Use the settings area to define which notes to include in the report.

Last fixed number of notes – Select this option and type in or use the arrow buttons to specify the fixed number of notes to include in the report.

Notes in this date range – Select this option to include all notes occurring between your entered date interval in the report. Type in a start date in the **From** field and an end date in the **To** field, or use the arrow buttons to display a pop-up calendar to select start and end dates.

Notes from the last fixed number of days – Select this option to include notes occurring within a specific number of days in the report. Type in or use the arrow buttons to specify the fixed number of days.

All notes – Select this option to include all notes in the report.

Routes

Use the **ROUTES** fields to specify which ROUTEs to include in the report.

Routes – All available ROUTEs display in the **ROUTES** area. Click to select one or more ROUTE.

- Click **Check All** to select all available ROUTEs. Click **Clear All** to clear your selections.
- Click the **Set All** button to use the current ROUTE selections in other report element setup fields. The **Set All** feature allows you to configure this information once and then use the same settings for all applicable report elements.

Overdue

Use the **Overdue** fields to specify the number of days to use with projection and trending.

Number of days from today - Enter a number in the text field or use the up and down arrows to indicate the number of days from now for use with projection and trending.

Report Editor / Assign

Use the **Report Editor** screen's **Assign** tab to configure default report settings, and to override defaults and to override defaults when the report is generated from the current hierarchy.

The **Assign** tab varies, depending on whether **Report is available for all hierarchies** or **Report can specify data sources from multiple hierarchies** is enabled on this screen's **General** tab.

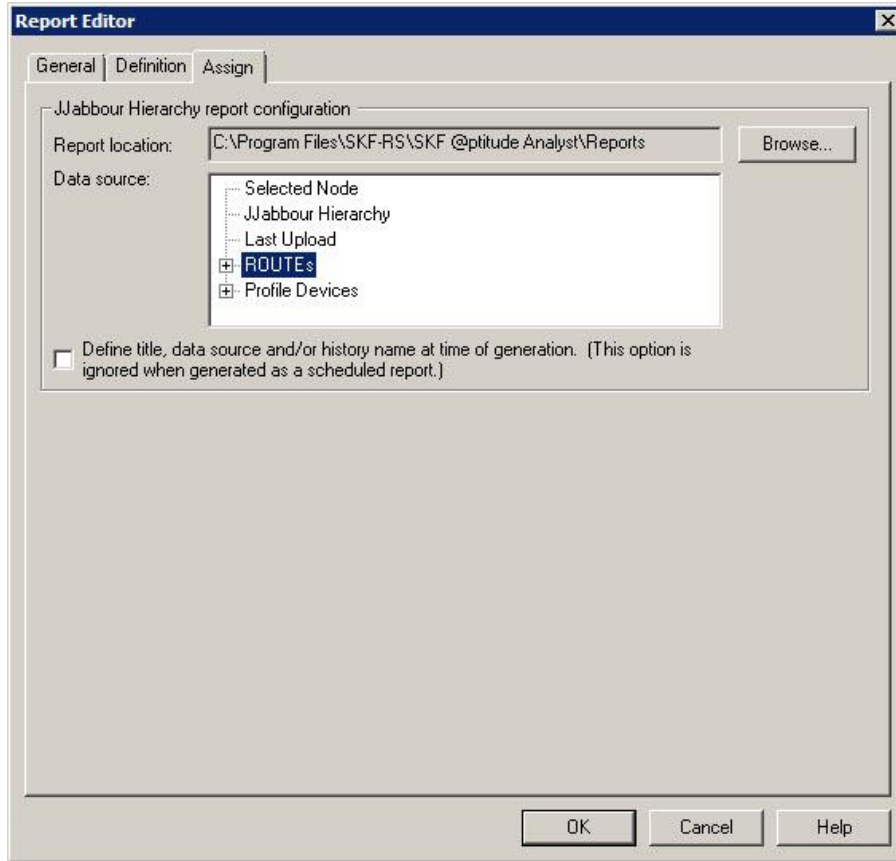


Figure 5 - 5.

The **Report Editor / Assign** Tab with **Report is available for all hierarchies** Disabled.

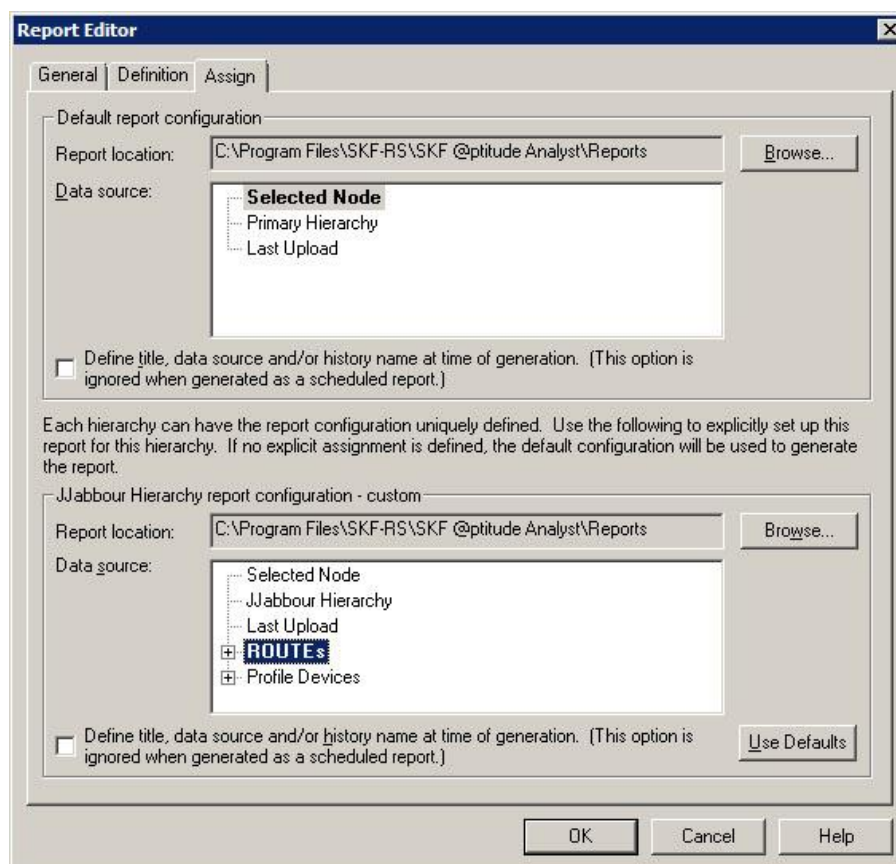


Figure 5 - 6.

The **Report Editor / Assign** Tab with **Report** is available for all hierarchies Enabled.

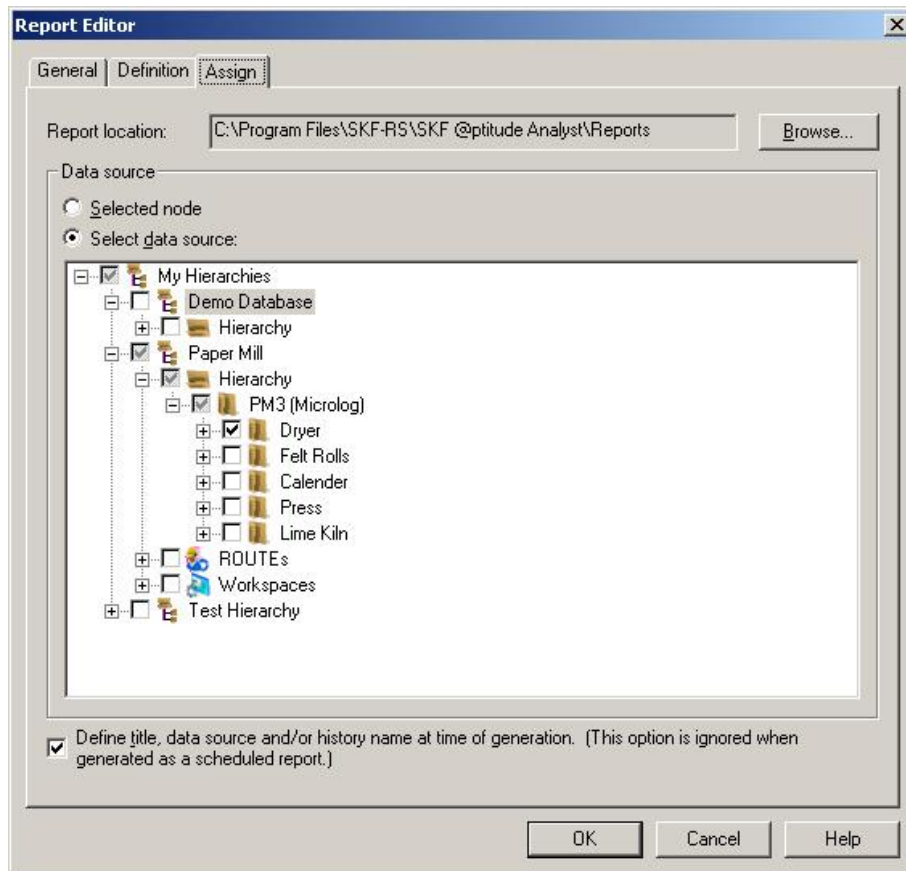


Figure 5 - 7.

The **Report Editor / Assign** Tab with **Report can specify data sources from multiple hierarchies** Enabled.

The tab provides fields to configure default report settings. Options include:

Report Location – Specify the path for the disk directory for report storage. The report is stored in a subdirectory (using the report's name) beneath this indicated directory. For example, specify **E:\SKF @ptitude Analyst\Reports** to place all reports in their unique directories branching from a "reports" directory.

- Click the **Browse** button to specify a new path.
 - Reports are stored in HTML format and are available for copying, moving, and sharing over intranet, world wide web, etc.

Data Source – Select the source of the data to include in the report. Use the plus and minus icons to expand the hierarchy as needed to display sub-items. If **Report can specify data sources from multiple hierarchies** is disabled, options include:

Selected Node – Select to include data from the node that is selected in the hierarchy at the time the report is generated, including all sub items. For example, if a SET is selected in the hierarchy when the report is generated, all POINTs from all Machines under that SET are included.

Current Hierarchy – Select to include all data from the hierarchy that is open when the report is generated.

Primary Hierarchy - Select to use the currently selected primary hierarchy as the report's data source.

Last Uploaded - Select to include the most recently uploaded data.

ROUTEs / Workspace - These options appear in the upper section's **Data source** list if the report is only available for this hierarchy (i.e., **Report is available for all hierarchies** is disabled). Select a previously defined ROUTE or Workspace to use with the report.

- ROUTE based reports, such as ROUTE Statistics, ROUTE History, Compliance, and Collection Status, use data from the ROUTEs specified on the **Definition** tab, rather than the source data specified on the **Assign** tab.

If **Report can specify data sources from multiple hierarchies** is enabled, options include:

Selected Node - Select to include data from the node that is selected in the hierarchy at the time the report is generated, including all sub items.

Select Data Source - Select multiple hierarchies, groups, and POINTs to include in your report.

Define title, data source, and/or history name at time of generation - Enable to receive an option to override the **Data source** selection at the time the report is run. If this is enabled, you must manually specify this report information each time the report is generated. Before report generation occurs, the **Select Data Source** dialog displays, prompting you to enter report information and select the report's data source. (See **Selecting the Data Source** below for details.)

If the **Report is available for all hierarchies** check box is enabled on the **Report Editor's General** tab, the tab's bottom area allows you to configure reports specifically for use with the current Hierarchy only. If you do not use the bottom area's configuration options, the default configuration from the tab's top section is used.

- You must edit the report in each hierarchy where you wish to override the default options.

The top line of this section displays the current hierarchy name and indicates whether the **default** settings are used, or if **custom** overrides have been established in the fields below.

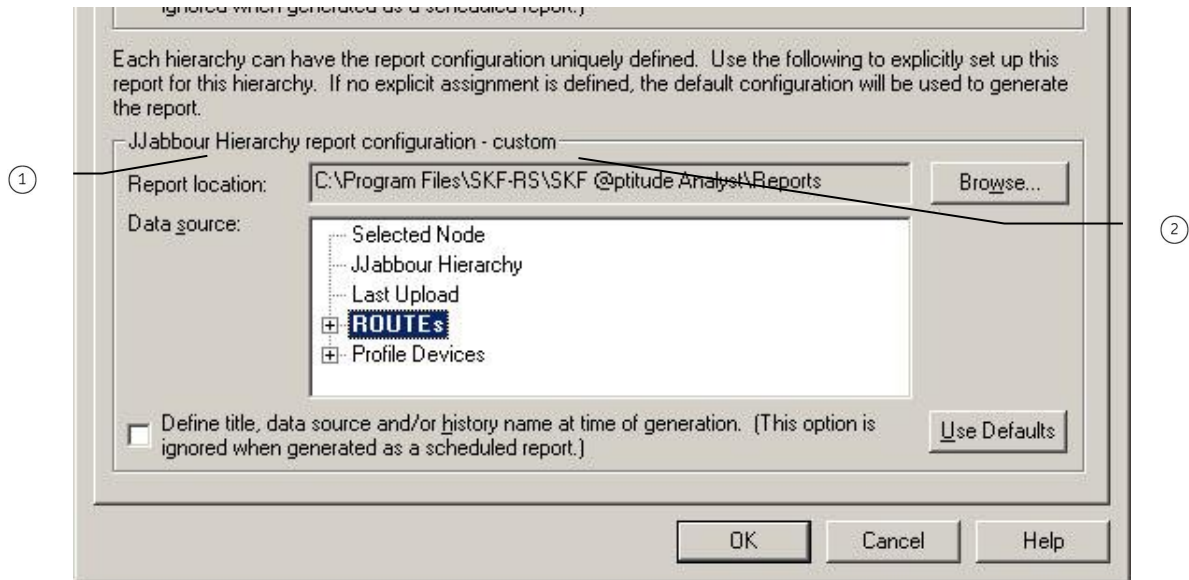


Figure 5 - 8.

The **Report Editor / Assign** Tab's **Default / Custom** Line.

- ① hierarchy name
- ② default / custom

The remaining fields function as previously described. These settings will be used to generate the selected report type for the current Hierarchy only.

- Click the **Use Defaults** button to clear your custom configuration and return to all default settings.

Selecting the Data Source

If **Define title, data source, and/or history name at time of generation** is enabled on the **Report Editor's Assign** tab, the **Select Data Source** dialog appears when the report is generated.

The **Select Data Source** dialog varies, depending on whether **Report can specify data sources from multiple hierarchies** is enabled on the **Report Editor's General** tab.

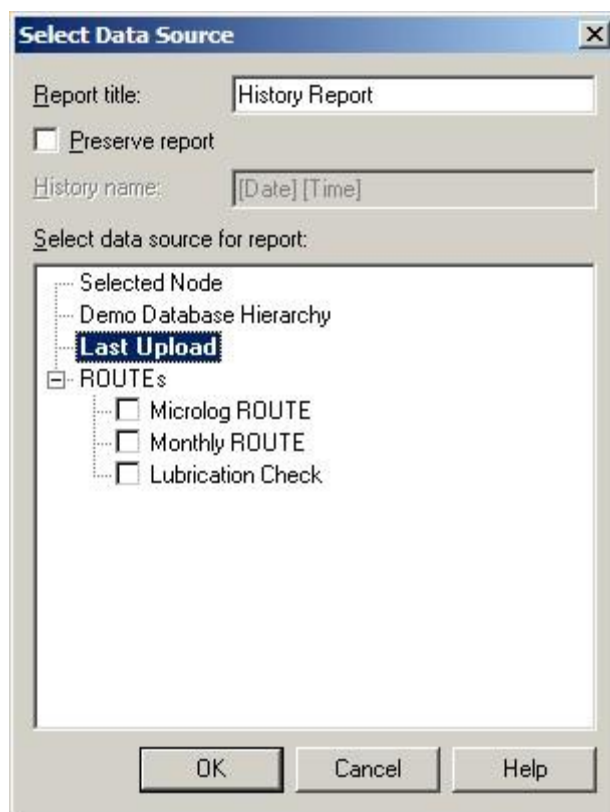


Figure 5 - 9.
The **Select Data Source** Dialog.

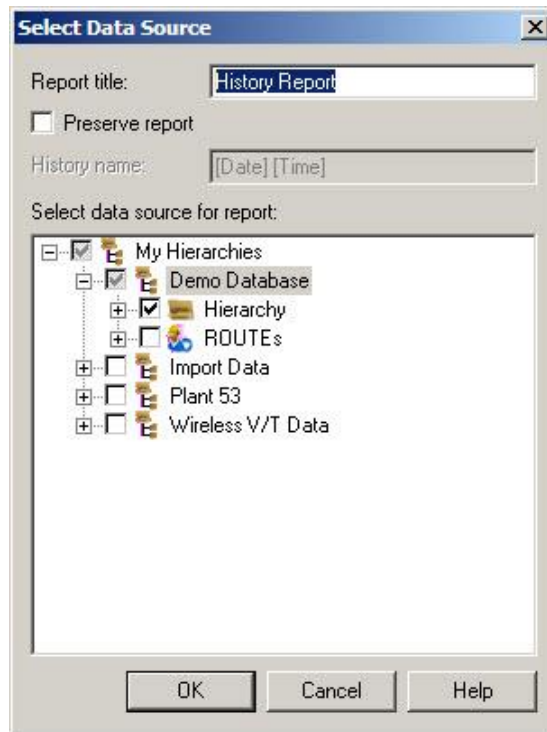


Figure 5 - 10.

The **Select Data Source** Dialog when **Report** can specify data sources from multiple hierarchies is Enabled on the **Report Editor's General** Tab.

This dialog lets you configure the report title, specify whether to preserve a copy of the generated report, and specify the data source for this instance of the report.

- The data source defaults to the **Data source** setting on the **Report Editor's Assign** tab.

- In the **Report title** field, enter the report title.
- Click the **Preserve report** checkbox to enable report preservation. When enabled, newly generated reports are archived, organized (by default) by report definition and date / time.

If **Preserve report** is enabled, you can also manually enter a **History name** to use when organizing your preserved reports, instead of the default date / time naming method. The **History name** determines how the reports are organized, and how they display in both the **Report Editor / General's History** window, and in the separate preserved reports directory created in the disk directory (folder) designated as the report storage location. The **History name** field displays “[Date] [Time]” until you type in the field. If you do not type within the **History name** field, the preserved report is named and organized by its date / time.

To assign a manual history name:

- In the **History name** field, enter text to identify and organize your preserved reports, overriding the default date / time history name.

To select the report's data source:

- From the **Select data source for report** window, click to select the appropriate data source from the displayed hierarchy list.
 - Use the plus and minus icons to expand the hierarchy as needed to display sub-items.

Appendix A

SKF @ptitude Analyst Toolbars

Toolbar Tools

@ptitude Analyst's toolbars and toolbar button assignments are described below.. You can enable any or all of the available buttons by using the **Custom Toolbar** dialog discussed later in this chapter.

Primary Toolbar



Hierarchy Window – open Hierarchy window. Organizes your monitored machinery measurements into a hierarchy structure consisting of Groups (which may be organizational SETs, machines, or custom groups) and measurement POINTs.



ROUTE Manager – open ROUTE dialog. A ROUTE is a measurement POINT collection sequence that is downloaded to a data acquisition device (DAD).



Workspace Manager – open Workspace dialog. A workspace organizes specific Groups into one location for easy comparison and analysis.



Report Setup – open Reports dialog.



System Information – open System Information view to see the Event Log and Online Data



Properties – open Properties dialog for the active hierarchy item (could be Group Properties or POINT Properties)



Print – print window contents (also print to file).



Exit – exit the application. A confirmation message displays before exiting.

Hierarchy View Toolbar



Alarm Details – open the Alarm Details view.



Apply Filter – open Apply Filter dialog. When a filter is applied, the resulting items display in a new Workspace window.



Apply Template – open the Apply Template dialog to select a template to apply to the hierarchy.

Navigation Toolbar



Auto Link – link any open Hierarchy, Workspace, ROUTE, Transient, Template, or Alarms window (source windows) to any open Alarm Details or Plot window (target windows). With Auto Link enabled, selections in one of the source type windows automatically affect all open target type windows.

For example, suppose you have a Hierarchy window open (source type window), select a POINT, and display its spectrum (target type window). With Auto Link enabled, when

you select a different POINT in the Hierarchy window, the plot window automatically updates to display the newly selected POINT's spectrum.



Previous POINT – move focus to the previous POINT in the hierarchy.



Next POINT – move focus to the next POINT in the hierarchy.



Previous Measurement – move focus to the previous measurement.



Next Measurement – move focus to the next measurement.

View Icons Toolbar



Large Icons – display measurements as large icons.



Small Icons – display measurements as small icons.



Simple List Icons – display measurements as a simple list.



Detailed List Icons – display measurements as a detailed list.

Plots Toolbar



Trend Plot – view a POINT's most recent reading in comparison with its previous readings and its alarm set up. See how the POINT is “trending” over time to detect gradual changes in process conditions.



Spectrum Plot – view measured vibration signals with respect to frequency. An FFT spectrum plot displays vibration amplitudes at various component frequencies. [stacked or combined]



Time Plot – view a short time sample of a raw vibration signal with vibration amplitude plotted over the time scale. Current time plots are compared to past time plots to analyze changes in vibration amplitude or frequency.



Spectrum Waterfall Plot – view three-dimensional waterfall plots of POINT's historical spectra collected over time.



Cascade Plot – view plots of collected spectra against running speed on the Z-axis. The Cascade plot is similar to the Waterfall plot, but instead of plotting collected spectra against time, the data is plotted against running speed on the Z-axis.



Topology Plot – view a top-down view of a cascade or waterfall plot using color intensity to visualize the spectral peaks.







Polar Vector Plot – shows vibration amplitude and phase. The phase angle is the angle the shaft travels from the start of a triggering event to when the point at which the sensor experiences maximum positive force. This relationship provides valuable information on shaft orbit and shaft position and is used for analysis, balancing, and shaft orbital analysis.














Mag/Phase Plot – shows trends plotting the amplitude (top) and phase / angle (bottom) aligned by the measurement date. Mag / Phase trends may be used to determine if a machine's mechanics are changing by analyzing the shifting in phase.






Orbit Plot – view the dynamic motion of the center of a rotating shaft with signals from two perpendicularly mounted transducers.

-  SCL Plot – view a trend of the shaft’s average centerline for Orbit POINTs. Shaft centerline plots can be used to show the movement of the shaft within the bearing.
-  Mag/Speed Plot – view trends plotting the amplitude (top) and speed (bottom) aligned by the measurement date.
-  All Plots – open the All Plots dialog to select the plot type to display from all available plots, including combination plots, in addition to the plot types commonly represented with toolbar buttons.
-  HAL Trend Plot – view the trend for a POINT that has a defined Frequency set plus FFT data measurements.

Combination Plot Tools

-  Spectrum/HAL Trend –view the Spectrum and HAL Trend plots together for a POINT with associated frequencies.
-  Contribution/Profile – displays an overview of different frequencies’ contributions to overall vibration within a POINT.
-  Band Trend - combine the spectrum and available band trends for the selected POINT. Analyze the energy within the band to closely monitor that particular frequency range.
-  Extracted Band – display a waterfall and extracted band plot. The energy of the frequency within the band across the spectrum displays.
-  Extracted Trend – display a trend plot of spectrum amplitudes at a frequency. A waterfall plot shows which spectra are to be used. The single cursor in the waterfall controls which frequency to plot in the trend. The waterfall plot is the primary plot.
-  Mag/Speed/Spectrum – view a POINT’s mag / speed trend plot and a spectrum plot. The two plots display in two different panels with the mag / speed panel as the primary panel.
-  Mag/Speed/Spectrum/Time – view a POINT’s mag / speed plot, spectrum plot and time plot. The three plots display in three different panels.
-  Mag/Speed/Time – view a POINT’s mag / speed trend plot and a time plot. The two plots display in two different panels with the mag / speed panel as the primary panel.
-  Trend/Spectrum – view both a trend plot and a spectrum plot for a trend record indicated by the single cursor position.
-  Trend/Spectrum/Time – display a POINT’s trend plot, spectrum plot, and time waveform plot. The three plots display in three different panels with the trend plot as the primary panel.
-  Trend/Time – view both a trend plot and a time waveform plot for a trend record indicated by the single cursor (if available).

Plot Tools Toolbar

-  Plot Settings – open Plot Settings dialog for the active plot.
-  Information Area – open information area beneath the active plot.
-  Set Speed – set the cursor position to correspond with the spectrum’s running speed.



Set Speed (Multiple) – set the same measurement speed for multiple FFT measurements



Activate Zoom – Click to activate the zoom feature, then click and drag across the area of the plot which you would like to zoom. The plot will redraw to display the selected area. When using a mouse scroll wheel, position your cursor over the area of the plot which you would like to zoom. While holding the Ctrl key, roll the mouse scroll wheel up or down. Rolling up causes the plot to zoom in, while rolling down causes the plot to zoom out.



Zoom Out – zoom out one level.



Live Data – initiates live data mode when a single POINT is selected. The active display updates as new data is collected by its on-line device. Previous spectra and time waveform plots are overwritten by updated spectra / time waveforms.



Play Sound Byte – launches the utility providing various playback options to listen to sound data waveform through your computer's speakers or connected earphones.

Overlays Toolbar



Overlay Settings – open the Overlay Settings dialog for the selected overlay.



Single Cursor – display single cursor. Use a single cursor to view individual measurement data on the trend plot by moving the cursor to various measurement records. Use a single cursor on a spectrum plot to display the amplitude for the frequency of the cursor's current placement.



Harmonic Cursor – display harmonic cursor to view multiples of the current frequency. Opens Harmonic Cursor tab in the plot information area to show details on potential harmonics using SKF's Harmonic Activity Index (HAI).



Band Cursor – display band cursor to view the frequency / time and amplitude difference (delta) between two cursor positions. Opens Spectrum Band tab in the plot information area to show details of the left and right cursor positions.



Sideband Cursor – display sideband cursor reference position with an array of five pairs of sideband markers evenly spaced on both sides. Sideband markers to the left of the center cursor are referenced with negative numbers; their associated markers to the right of the cursor are referenced with positive numbers. Opens Sideband tab in the plot information area to show details of the marker positions.



Peak Cursor – display peak cursor and label all peaks above a user-determined amplitude. Opens Peak tab in the plot information area to show details of peak position (index), amplitude, frequency, and orders.



Previous Frequency – display the previous frequency.



Frequencies – display all frequencies associated with the active plot.



Next Frequency – display the next frequency.





Display indicators for notes – active if notes are related to the plot.













Text Annotation – open Text Annotation Settings dialog.



Linear Speed – display the value of the linear factor multiplied by the running speed.

-  **Curve Fit** – display a curve fit overlay to graphically represent the projected linear direction a trend is heading based on current data.
-  **Diagnostics** – compute and display all relevant harmonic series of the current spectrum, and rank all series found according to probability. The results are shown on the Diagnostics tab in the info area below the spectrum plot. The probability is expressed as an activity index, whereby values of 1.5 and higher indicate an increasing probability of a significant harmonic pattern. [This option is only available with @ptitude Analyst CMSW 7400.]

In addition, the fundamental frequency of each series is compared to any frequency associated with the POINT (for example, bearing defect frequencies). If a match is found, the name of this frequency is displayed next to the related harmonic pattern.
-  **CTA Cursor** – display CTA cursor on a time plot and view a time interval's average waveform. Opens CTA Cursor tab in the plot information area to show details of label, interval, frequency, magnitude, and contribution (%).
-  **Band Alarm** – display band alarm levels on the plot. Band Alarms provide alert and danger alarms on both peak and spectral values within a defined frequency band.
-  **Envelope Alarm** – display a "total spectrum" envelope alarm for the POINT. You can select from a list of previously created envelope alarms or edit a private (unique) alarm for the current POINT.
-  **HAL Alarm** – display HAL (harmonic activity locator) alarm levels on the plot for a dynamic measurement POINT.
-  **Overall Alarm** – display the alert and danger levels designated for detection of machinery faults. The overall alarm levels are based on the measurement's "baseline" vibration level.
-  **Phase Alarm** – display alarm levels for phase data on a polar vector plot. Normal levels display inside small enclosed areas. Alert levels are contained within a larger enclosed area. Danger levels appear outside the enclosed area.
-  **Bearing Clearance** – display the bearing's clearance value (typically supplied by the manufacturer). The clearance value assumes the shaft is centered in the bearing and defines the physical distance between the shaft and the bearing, multiplied by 2.
-  **Exponential Curve Fit** – display a curve fit overlay to graphically represent the projected nonlinear trend based on current data.
-  **Oil Analysis** –display the Oil Analysis overlay on a trend plot.
-  **All Overlays** – open the All Overlays dialog and select the overlays to display.

Custom Toolbars

Toolbar buttons are available for each menu item and available function. By default, only toolbar buttons for commonly utilized features are active. Buttons are arranged by related functionality in separate sections of the toolbar area. You can enable any or all of the available buttons using the **Custom Toolbar** dialog.

To open the Custom Toolbar dialog:

- Select the **Customize** menu's **Toolbars** option. The **Custom Toolbar** dialog displays.

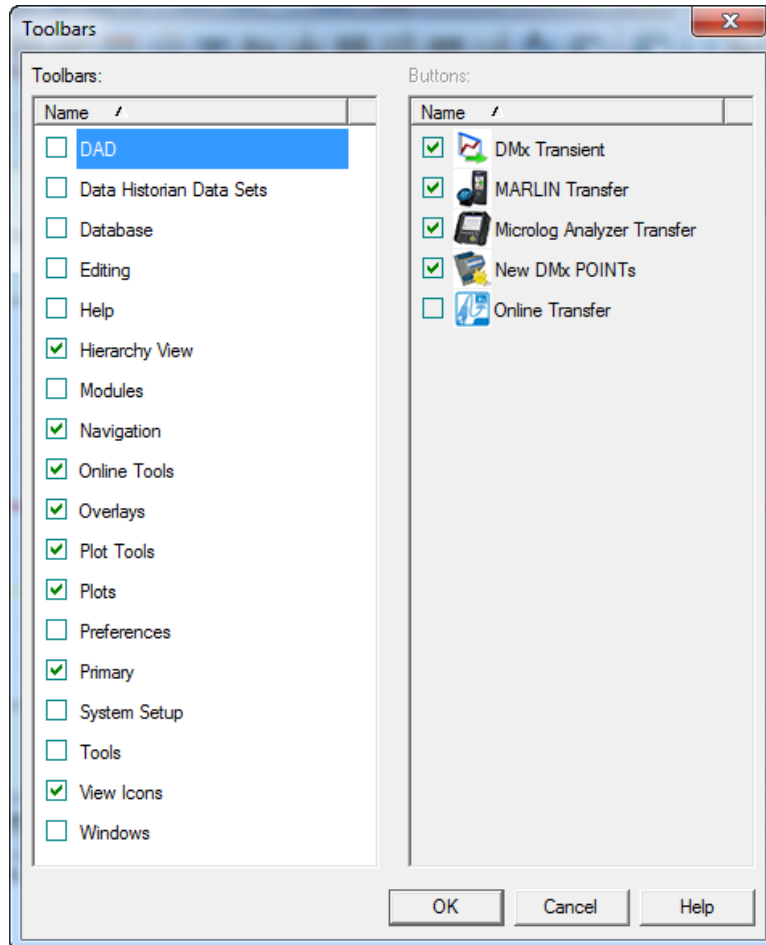


Figure A - 1.
The Custom **Toolbars** Dialog.

The Custom **Toolbars** dialog has two main areas. The **Toolbars** area displays all available toolbars, sorted by name. All available buttons (active and non-active) for the selected toolbar display in the dialog's second area, **Buttons**.

You can configure each toolbar to display the buttons you frequently use. You may *activate* buttons that are *inactive* by default, or *inactivate* buttons that are *active* by default.

By default, the **Hierarchy View, Navigation, Overlays, Plot Views, Plots, Primary,** and **View Icons** toolbars are activated.

- Click the checkbox next to the toolbar to activate the toolbar.
- Click the checkbox next to the individual available buttons to activate the buttons for the selected toolbar.
- Click **Display toolbar titles** to display the toolbar's descriptive name on the toolbar itself for easy identification.
- Click **OK** to rebuild all toolbars incorporating your selections.
 - Custom toolbar selections are stored with your user name and automatically display for you after initial log in.

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