

# How to Use the SKF MARLIN Inspector Application



Supports Firmware Version 4.2.3  
P/N 32197800-EN  
Revision A

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## User Manual

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# Table of Contents

<b>Introduction</b>	<b>1</b>
Organization of Your MARLIN Application	
User Manual .....	1-1
MARLIN Work Notification Feature .....	1-1
Chapter Overview .....	1-1
What is the MARLIN?.....	1-2
User Notes .....	1-2
<b>How to Navigate MARLIN Displays</b>	<b>2</b>
Overview.....	2-1
MARLIN Data Manager Input Methods .....	2-1
How To Select Options in MARLIN Displays.....	2-1
How to log on to MARLIN .....	2-5
The MARLIN's Hierarchy Display .....	2-8
<b>Setting MARLIN Preferences</b>	<b>3</b>
Overview.....	3-1
Administration (Add, Modify, and	
Delete Operators).....	3-1
Operator Preferences .....	3-6
Global Preferences.....	3-8
User Notes .....	3-8
<b>Transferring Data Between</b>	
<b>MARLIN and Software</b>	<b>4</b>
What Is a Data Collection "ROUTE"? .....	4-1
How to Perform Download/Upload Operations ....	4-2
Sync Data .....	4-7
<b>How To Collect MARLIN Measurements</b>	<b>5</b>
Overview.....	5-1
Selecting a Database .....	5-2
Navigating the Hierarchy List .....	5-2
General Data Collection Steps.....	5-4
User Notes .....	5-25

<b>How to Review Collected Data</b>	<b>6</b>
Overview.....	6-1
How to Access Feedback Displays .....	6-1
How to View a POINT's Trend Plot.....	6-2
User Notes .....	6-3
<b>Adding Non ROUTE POINTs</b>	<b>7</b>
Overview.....	7-1
Adding Non ROUTE POINTs .....	7-2
Modifying POINTs/SETs .....	7-10
Deleting Non ROUTE POINTs.....	7-11
Modifying Machines .....	7-12
<b>Generating MARLIN Reports</b>	<b>8</b>
Overview.....	8-1
Generating MARLIN Reports .....	8-1
User Notes .....	8-3
<b>Statistical Process Control</b>	<b>A</b>
Overview.....	A-1
<b>Emmissivity</b>	<b>B</b>
Setting Emmissivity .....	B-1
<b>Firmware Security</b>	<b>C</b>
Using the Version 4.2 Key Code.....	C-1
<b>Work Notification</b>	<b>D</b>
The MARLIN Work Notification Feature .....	D-1
SKF Machine Work Notification Software	
Overview.....	D-1
Administrative Setup .....	D-1
Creating Work Notifications.....	D-2
Reviewing Existing Work Notifications .....	D-6
<b>Index</b>	

## Organization of Your MARLIN Application User Manual

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This MARLIN Application User Manual describes the MARLIN firmware operations.

- Not all documented features are available in all MARLIN data managers. Refer to your MARLIN data manager hardware manual for device specific information.

## MARLIN Work Notification Feature

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The MARLIN works with SKF Machine Work Notification to allow you to generate work notifications to effectively manage plant maintenance.

- SKF Machine Work Notification refers to Machine Analyst software (version 3.1 or higher) with the work notification plug-in installed.

The Work Notification plug-in processes work notifications initiated on the MARLIN data collector. This allows machinery maintenance personnel to walk a ROUTE, and create work notification(s) immediately as problems are detected or observed. Work notifications can then be uploaded to SKF Machine Analyst for MARLIN or SKF Machine Inspector software, where the work notification management tools are available.

- The MARLIN work notification features are only operable if the host computer is running Machine Analyst software version 3.1 or higher, with the work notification plug-in installed.

In addition, for those clients who use an SAP CMMS system, an available SAP interface plug-in allows you to automatically submit work notifications to the SAP CMMS using the SKF Machine Monitor application.

- The SAP interface plug-in is an optional component purchased separately.

## Chapter Overview

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**Chapter 1, Introduction** – Introduces manual conventions and overviews the MARLIN.

**Chapter 2, How to Navigate MARLIN Displays** - Introduces MARLIN conventions (main screens, terminology, menus, and data input methods, etc.), introduces the hierarchy list, and discusses hierarchy list procedures in detail.

**Chapter 3, Setting MARLIN Preferences** – Describes in detail how to set up operator / hardware preferences.

**Chapter 4, Transferring Data Between MARLIN and Software** – Describes how to upload / download measurement collection ROUTEs to and from the host computer, and how to set MARLIN communication parameters.

**Chapter 5, How to Collect MARLIN Measurements** – Describes how to navigate the hierarchy list, how to collect data, how to attach notes to POINTs, and how to utilize data input displays.

**Chapter 6, How to Review Collected Data** – Describes methods for displaying collected machinery measurements in graphic plot format.

**Chapter 7, Adding Non ROUTE POINTs** – Describes in detail how to add, modify, delete, and set up Non ROUTE POINTs and Machines.

**Chapter 8, Generating MARLIN Reports** – Describes the different types of reports and how to display them for specific POINTs.

**Appendix A, Statistical Process Control** – Describes the SPC rules and lists all 18 SPC rules and their corresponding messages.

**Appendix B, Emmisivity** – Describes how to set a POINT's emmisivity rating in MARLIN or in the software.

**Appendix C, Firmware Security** – Describes how to upgrade the MARLIN Firmware to version 4.0.

**Appendix D, Work Notification** – Describes how to use the MARLIN work notification feature.

## What is the MARLIN?

---

The MARLIN (**MA**chine **ReL**iability and **IN**spection) data manager (MDM) is dedicated to monitoring plant process data and machinery condition data.

Machinery condition data and plant process data are easily recorded and automatically monitored for exceptions to normal conditions. When conditions change, the MARLIN System directs the operator toward appropriate corrective actions. MARLIN System components perform all of these functions in-the-field, or after uploading, on a host computer running SKF Machine Analyst (which facilitates easier set-up, provides long term data storage, and provides extensive reporting features).

Three components make up the MARLIN System:

**MARLIN** Condition Detector Probe (MCD, MCD-IS) – Monitors overall machine and rolling element bearing vibration and temperature.

**MARLIN** Quick Connect Stud (MQC) – Enhances data collection speed and accuracy, and provides very precise alarm control for MCD probe vibration and temperature POINTs.

**MARLIN** data manager (MDM) – A portable, hand-held computer dedicated to easy input, storage, display and alarming on machinery condition data and plant process data. These MARLIN System components are designed to work in concert (all components interacting) or independently of each other.

## How to Navigate MARLIN Displays

### How To Select Options in MARLIN Displays

MARLIN option selection methods are similar to those used in Microsoft Windows applications. Users familiar with MS Windows will recognize option buttons, check boxes, drop down lists, text boxes, and command buttons. Each option selection method is described as shown in the following figures.

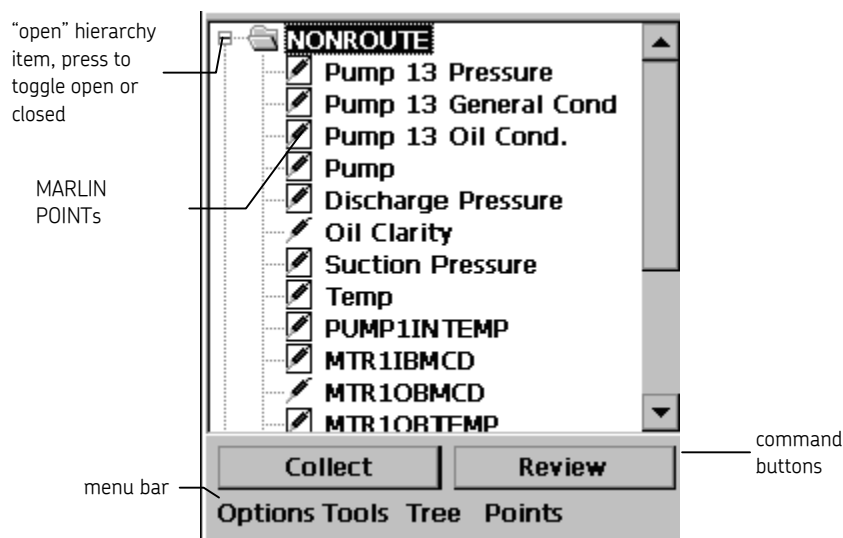


Figure 5. The Hierarchy Display.

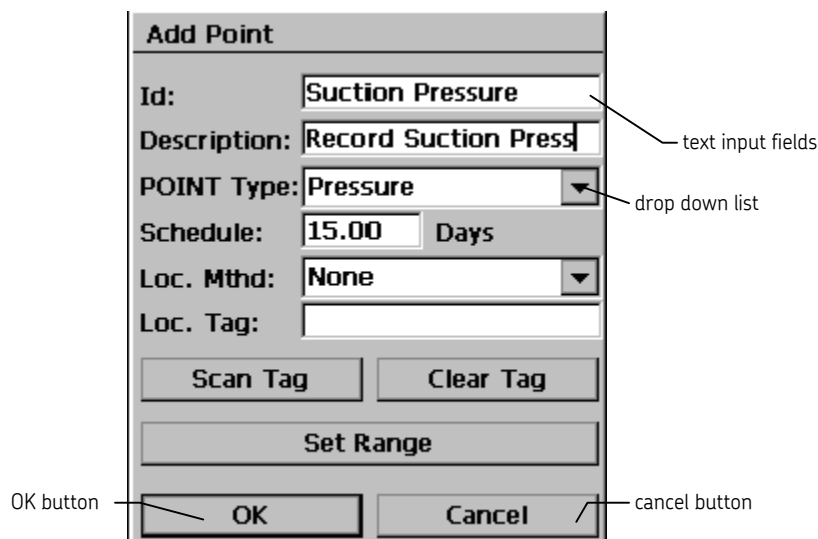


Figure 6. An Example Configuration Screen.

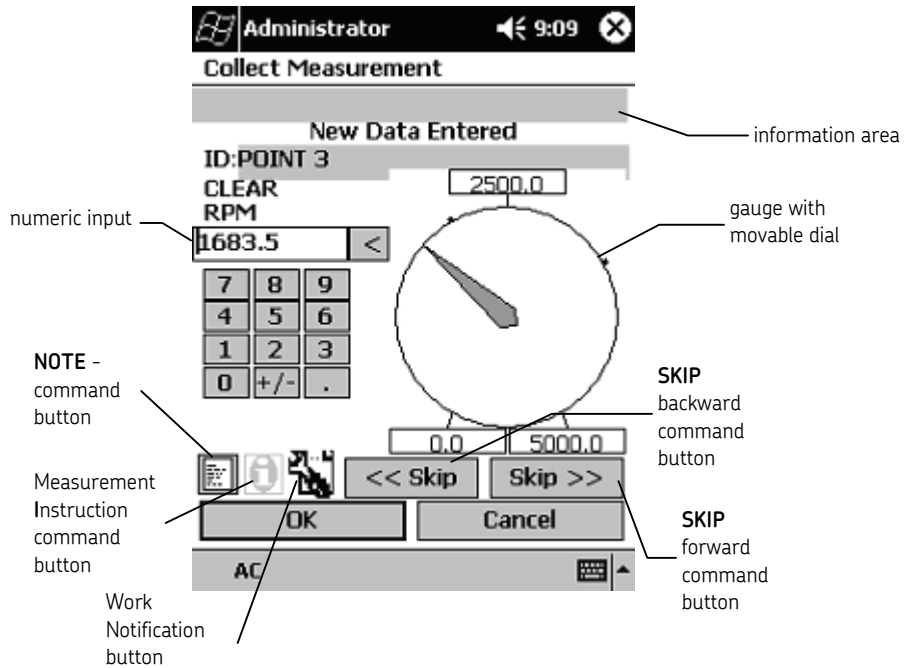


Figure 7. A “Gauge” Data Entry Display.

## Text/Numeric Input Boxes

“Type” information into text input boxes using the keyboard **Input Panel**. Use the keyboard’s editing keys to edit text already entered.

**TIP!**  
*To quickly highlight characters in text fields, use the pen to line through (draw a line through) the unwanted characters, and use the keyboard’s delete or backspace options.*

## List Boxes

Display a list of choices. Touch the pen on the item to select (highlighting the item) and, if necessary, press the appropriate command button. At times, more choices exist than can be viewed in the list box. In this case, a scroll bar appears on the right side of the box. MARLIN scroll bars operate similarly to all Windows scroll bars. With scroll bars, use the scroll arrows, scroll button, and areas above and below the scroll button to scroll the list until the desired item(s) comes into view.

## Option Buttons

A group of option buttons display options from which only one is available at a time. In a group of option buttons, you may only select one option at a time. Touch the pen to the appropriate option button to select it. The previously selected option automatically unselects.



## Check Boxes

In a group of check boxes, you may select as many options as needed. Touch the pen to appropriate check boxes to enable. A checkmark displays in each enabled check box.

## Command Buttons

Initiate the immediate response described on the command button, such as **Review** or **Collect**.

## OK and Cancel Command Buttons

OK and Cancel command buttons appear graphically as **OK** and **Cancel**.

## The Menu Bar

Access the MARLIN's various modes of operation from the Hierarchy Display, including the **Log Out** and **Exit** options.

## The Options Menu

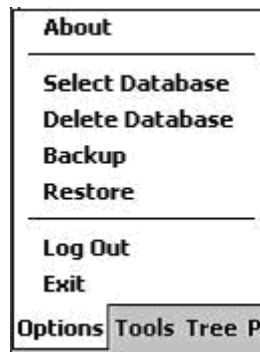


Figure 8. The Options Menu.

**About** - Displays the MARLIN's version number, UID, database size, and security key.

**Select Database** - Allows you to open previously created database hierarchies and create new database hierarchies on the MARLIN.

**Delete Database** - Deletes the current database hierarchy from the MARLIN.

**Backup** - Backs up the MARLIN database, saving all data to the FLASH memory.

- If the current database size exceeds the amount of available backup space, upload all data to Machine Analyst. Try to reduce the size of the database by removing a ROUTE. You may need to use the host software's **Clear** option to free more space.
- Ensure the backup procedure is completed correctly by exiting the MARLIN program. The backed up database may be corrupted if the battery drains prior to backup completion.

**Restore** - If the MARLIN program is re-installed, select the **Restore** option to restore the most recently backed up database. All changes made since the last **Backup** operation will not be maintained after the **Restore**.

**Log Out** – Returns to the title screen, so another operator may log in.

**Exit** – Properly exits the MARLIN program to Windows CE, closing and backing up all database files. Exiting safeguards from database corruption due to loss of battery power.

- The database is automatically backed up following a Log Out, Exit, or download operation.

### The Tools Menu

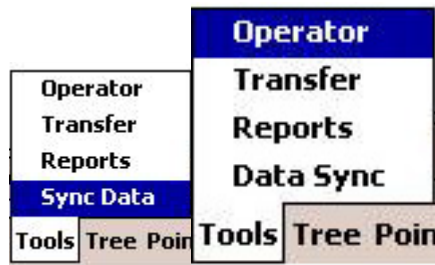


Figure 9. The Tools Menu.

**Operator** – Allows you to set up operator and hardware preferences.

**Transfer** – Initiates “Transfer” mode, and enables you to specify host computer configuration.

**Reports** – Allows you to generate reports.

**Sync Data** – Initiates “Sync Data” mode, and automatically begins uploading collected ROUTE data, re-downloading the ROUTE, and configuring operator settings.

**Work Notification** – Allows you to generate work notifications for Machines and POINTs that have not been downloaded to the MARLIN device. Refer to **Appendix D, Work Notification** for more information.

### The Tree Menu

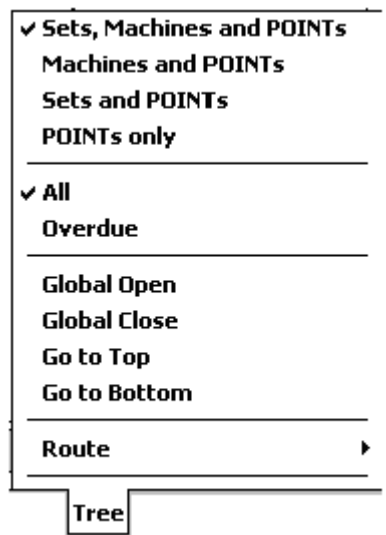


Figure 10. The Tree Menu.

**Sets, Machines and POINTs** – Shows all hierarchy items in the Hierarchy display.

**Machines and POINTs** - Shows only machine and POINT hierarchy items in the Hierarchy display.

**SETs and POINTs** - Shows only SET and POINT hierarchy items in the Hierarchy display.

**POINTs only** – Shows only POINT hierarchy items in the Hierarchy display.

**All** – Shows all hierarchy items in the Hierarchy display.

**Overdue** – Shows only items overdue for data.

**Global Open** – Opens all hierarchy items. All ROUTEs, SETs, and Machines open to display all measurement POINTs.

**Global Close** – Closes all hierarchy items.

**Go to Top** – Places the highlight on the **Non ROUTE** hierarchy item at the top of the list.

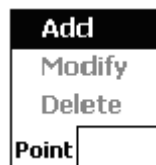
**Go to Bottom** – Automatically opens the last hierarchy ROUTE and its subsequent SETs, and places the highlight on the last POINT in the last SET.

**Route** – Select to place the highlight on either the **Next** or **Previous** ROUTE hierarchy item, or **Delete** the selected ROUTE.

- You may need to use the host software's **Clear** option to fully empty database memory. If the database outgrows the amount of available memory space, the following message will appear upon a backup operation:

**The current database size exceeds the amount of available backup storage space and therefore will not be backed up.**

### The Point Menu



**Figure 11.** The **Point** Menu.

**Add** – Adds a non-ROUTE POINT.

**Modify** – Modifies set-up of highlighted POINT or Machine.

**Delete** – Deletes the highlighted POINT.

---

## How to log on to MARLIN

When using MARLIN, the operator first “logs in” by selecting his or her name from a list of operator IDs.

**To open the MARLIN program:**

- From the Windows CE **Start** menu, select the MARLIN program, or double-click the MARLIN icon on the desktop. The MARLIN title screen appears.



**Figure 12.** The MARLIN “Title” Screen.

The MARLIN title screen displays the MARLIN’s version number and serial number, once entered.

- Touch the pen anywhere on the title screen to access the Log In display.

## Logging On to MARLIN

Logging on with your user name causes **Operator** preferences settings to default to your specified settings.

Also, the specified operator’s name is stored with measurement data collected by the operator, and uploaded back to Machine Analyst during the upload procedure, where it may be displayed using Machine Analyst reports. This provides a method to track which data is collected by specific operators.

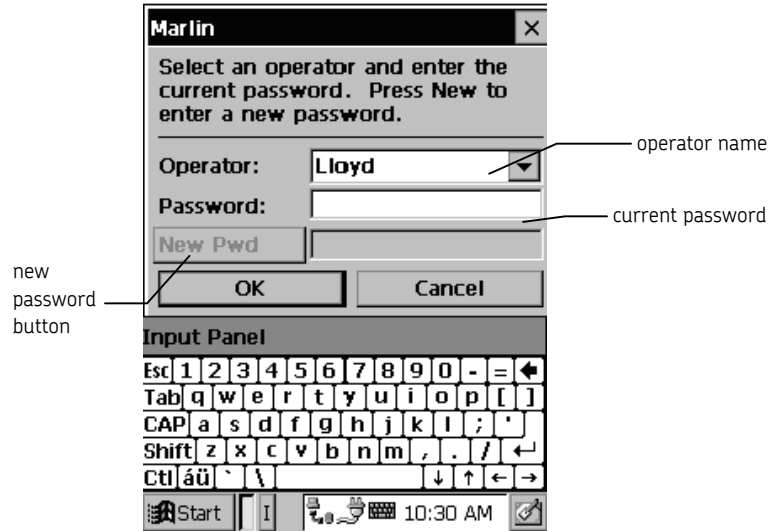


Figure 13. The Log In Display.

#### To log on to MARLIN:

- In the **Operator:** drop down list, use the pen to specify your operator name.
  - Upon initial shipment, log on as the **Administrator**.
- In the **Password:** field, use the keyboard to enter your password.
  - Upon initial shipment, specify the default password “SKF.”
  - All new operators (operators added to the list by the system administrator) are automatically issued the default password “SKF.”
  - Passwords are NOT case-sensitive.
  - For the Administrator, when the password is entered, but before pressing **OK**, a **Delete Database** button appears beneath the **OK** and **Cancel** buttons. Press this button to delete. You will be prompted to delete your database.
- Press **OK** to enter the selected operator and password, the Hierarchy display appears.
  - If necessary, press **Cancel** to cancel the Log In attempt.

#### How to Change Your Password

New operators almost always wish to change their password from “SKF” to one known only by themselves.

- The **Can change Password** operator preference must be enabled on the **Advanced Settings** display. If disabled, the **New Pwd** button is unavailable. Reference **Chapter 3, Setting MARLIN Preferences**, for more information on setting this preference.

#### To change your Log In password:

- On the Log In display, select your **Operator Name** and enter your **Current Password**.

## How to Navigate MARLIN Displays

### The MARLIN's Hierarchy Display

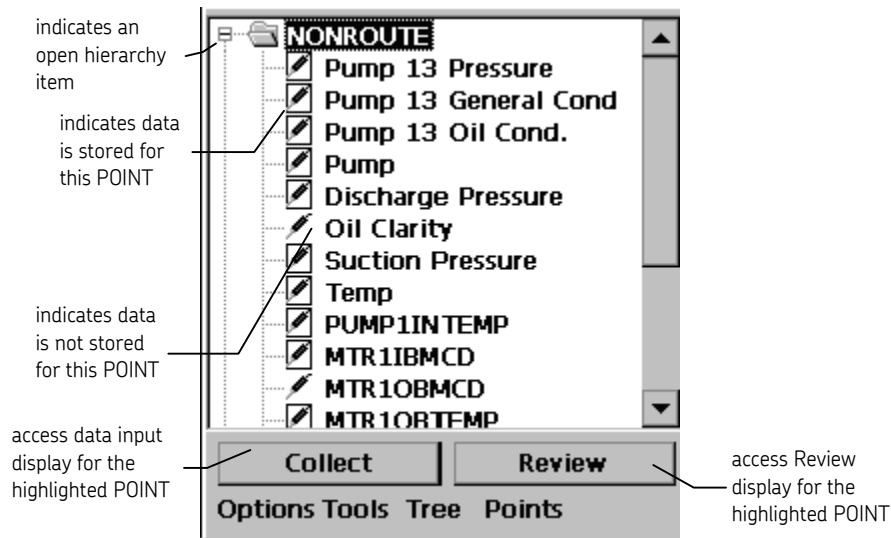
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- Press the **New Pwd** (New Password) button, and a cursor will appear in the **New Pwd** (New Password) text box. Enter the desired new password.
- Press **OK** to save the changes and launch the MARLIN program.

## The MARLIN's Hierarchy Display

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After logging on, MARLIN displays its Hierarchy list display. All MARLIN displays open from this Hierarchy display.



**Figure 14.** An Example Hierarchy Display.

## Setting MARLIN Preferences

### Overview

MARLIN **Operator/Hardware** preferences should be set up by the system administrator prior to using MARLIN.

To access the Operator Preferences display:



Figure 1. The Tools Menu's Operator Option.

- From the Hierarchy display, select the **Tools** menu's **Operator** option. The **Operator** display appears.

**Operator** options are detailed in the adjacent figure.

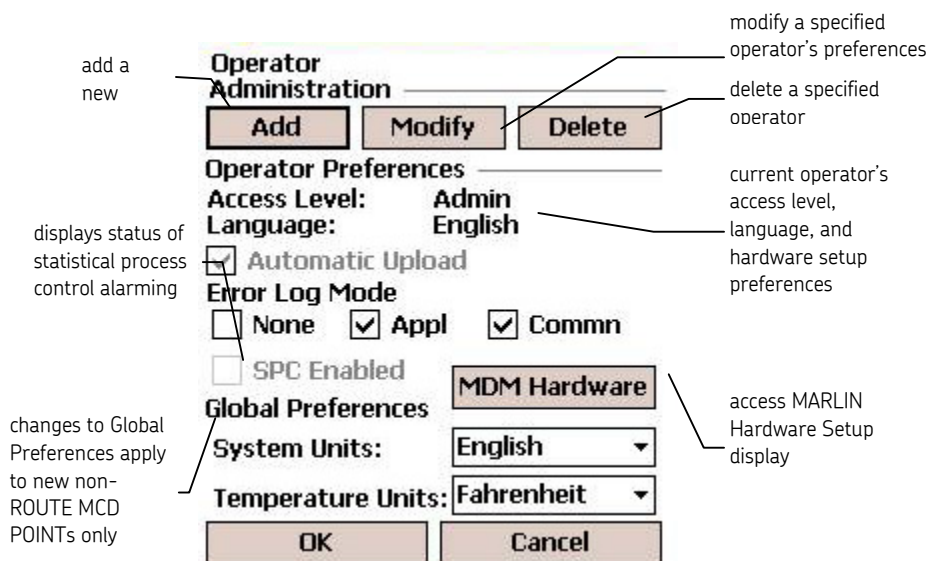


Figure 2. The Operator Display.

The **Operator** display is divided into three sections: **Administration**, **Operator Preferences**, and **Global Preferences**.

### Administration (Add, Modify, and Delete Operators)

**Add**, **Modify**, and **Delete** administration command buttons appear only when the current operator has the *Administration Access Level*.

- Any changes made to the operator settings are considered temporary. When operator settings are downloaded from the software, all current settings are automatically overwritten with new / updated MARLIN operator settings. Reference your software's user manual for more information.

## Adding Operators

Add

The **Add** command button accesses the **Add Operator** display, which allows the administrator to add and configure settings for new MARLIN operators.

The screenshot shows a Windows-style dialog box titled "Add Operator" within an "Administrator" window. The dialog has a title bar with standard window controls. Below the title bar, there are several configuration options: a text field for "Name:", a dropdown menu for "Access Level:" currently showing "Limited", a checkbox for "Scan required to collect data", a dropdown menu for "Verification mode:" showing "On Alarm", checkboxes for "SPC Enabled", "Enable Machine OK", and "Show Previous Data", a text field for "WN", and a dropdown menu for "Data Collection" showing "45 min.". At the bottom of the dialog are "OK" and "Cancel" buttons. The taskbar at the bottom of the screen shows "AC" and a keyboard icon.

Figure 3. The **Add Operator** Display.

**Add Operator** configuration fields include:

**Name** - Write in or type the new operator's name using the keyboard.

**Access Level** - Specify one of four access levels for the new operator:

**Admin** - Access to all MARLIN operations including the ability to add, modify, and delete operators.

**Full** - Access to all MARLIN operations with the exception of adding, modifying, and deleting operators.

**Operator** - Access to data collection operations only (data collection, review, and upload), and the ability to reset unit. Cannot add, modify, or delete hierarchy items. Cannot add, modify, or delete operators.

**Limited** - Access to data collection operations only (data collection, review, and upload). Cannot add, modify, or delete hierarchy items. Cannot add, modify, or delete operators.

**Review** - Access to data review operations only. Cannot collect data, add/modify/delete hierarchy items, add/modify/delete operators, or restore the database using the **Restore** option.



The following table indicates which operations are available for each access level.

Operation					
Add Item	Admin	Full			
Modify Item	Admin	Full			
Delete Item	Admin	Full			
Collect	Admin	Full	Operator	Limited	
Review	Admin	Full	Operator	Limited	Review
Reset	Admin	Full	Operator		
Report	Admin	Full	Operator	Limited	Review
Transfer	Admin	Full	Operator	Limited	
Operator / Admin.	Admin				
Operator / non-Admin	Admin	Full	Operator	Limited	Review
Back-up	Admin	Full	Operator	Limited	Review
Restore	Admin	Full	Operator	Limited	

**Scan Required to Collect Data** - When enabled, the operator must initiate data input using the MARLIN's barcode scan device, or an MQC computerized stud. This option requires the operator to visit each machine or POINT, and scan in the item's barcode to identify the item prior to performing measurements on the machine or POINT (or scan in the item's ID from its MQC stud).

- Not all documented features are available in all MARLIN data managers. Refer to your MARLIN data manager hardware manual for device specific information.

Typically, when enabling **Scan Required to Collect Data** for an operator, barcodes are used at the machine hierarchy level rather than the POINT hierarchy level. This requires the operator to visit the machine to initiate data collection, but facilitates an easy data collection routine.

**Verification Mode** – Use the drop down list to specify whether to display the Feedback review display during data collection. Choices are, **Always**, **On Alarm**, or **Never**.

**SPC Enabled** - When enabled, 18 **Statistical Process Control** rules apply to process trends.

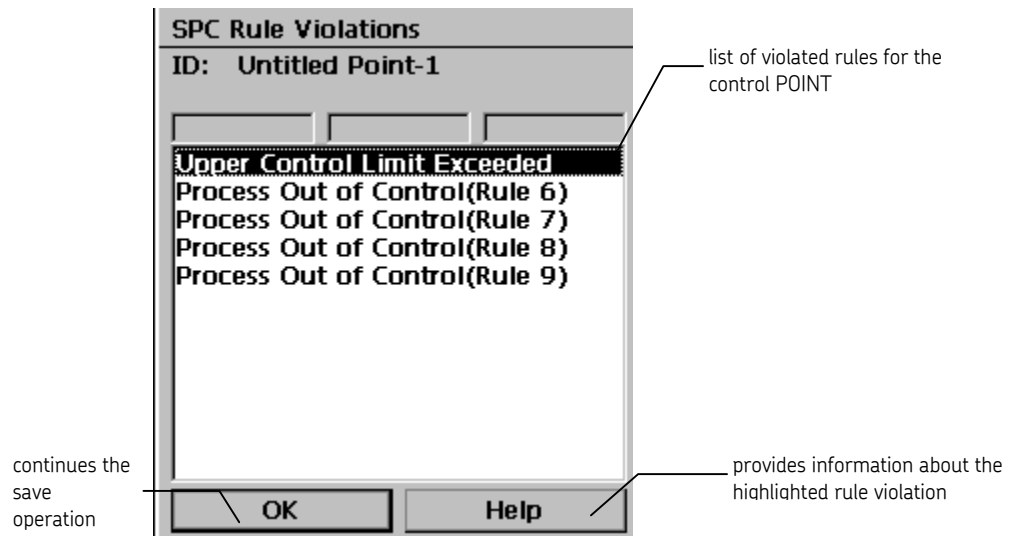
With SPC enabled, when the **Save** button is pressed during data collection to record the current measurement value, the POINT's value is automatically compared to 18 SPC rules. If any rules are violated, an **SPC** button automatically displays on the POINT's Feedback display (which displays depending on the **Modify Operator** display setting). Press this button to display all violated SPC rule messages for the POINT (i.e., Process out of control (Rule 4).

- See **Appendix A, Statistical Process Control** section for more information on SPC rules and their corresponding alarm messages.

## Setting MARLIN Preferences

Administration (Add, Modify, and Delete Operators)

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**Figure 4.** An Example SPC Rule Violations Display.

**Enable Machine OK** – When enabled in **Operator Preferences**, this button provides the operator a method to quickly describe the overall machine condition as "OK", without collecting current data on the machine's measurements. For machines with **Single** and **Multi-Select Inspection POINTs**, the **Machine OK** button specifies and stores the first non-alarm **Inspection Result** for each of the machine's Inspection POINTs, then displays the Machine display for the next machine at the same hierarchy level. If no more machines exist at the same hierarchy level, the hierarchy display appears with the current machine's ID highlighted.

**Show Previous Data** – Enable to allow the operator to view the previous data prior to collecting new data.

**Advanced** button – Press to display advanced operator settings.

The **Advanced Settings** display allows the administrator to set operator preferences from the MARLIN.



Figure 5. The Advanced Settings Display.

### Set the following preferences on the MARLIN:

**Transfer Ready** – When enabled, the **Transfer** display automatically launches upon docking the device. Default is enabled.

**Can change transfer ready** – When enabled, allows the operator to enable / disable the **Transfer Ready** preference on the **Modify Operator** display . Default is disabled.

**Can change Password** – When enabled, allows the operator to change the log in password on the **Log in** display. If disabled, the **New Pwd.** button on the **Log in** display is unavailable. Default is enabled.

## Modifying Operator Preferences

**Modify** The **Modify** command button accesses the **Modify Operator** display, which allows the system administrator to modify an existing operator’s settings.

All components of the **Modify Operator** display operate as previously described for the **Add Operator** display except:

**Name** - In the **Modify Operator** display, use this drop down list to specify the operator whose settings you wish to modify.

**Reset Password to default (SKF)** - Resets the specified operator’s log in password to the default MARLIN password, “SKF.” This option is useful when operators forget their password.

### Data Collection

The **Data Collection** limit field allows the administrator to customize the amount of time allowed between measurement data collected for the same POINT. The default setting is 45 minutes. For example, if you use the default **Data Collection** limit setting (45 minutes), and download a ROUTE, collect and save data for POINT 1, then collect another data sample for the same POINT within the specified 45-minute

limit, a warning displays. The warning indicates the previous measurement was saved less than 45 minutes ago, and prompts you to either overwrite the previous data with the newly collected data, or to cancel the action.

**To set the data limit:**

- Select the data collection limit from the drop down list's options (0-1500 seconds, in 15 minute increments). Enter "0" to disable the warning.

**WN (Work Notification) -**

**View H-WN** – Enable this option to allow the operator to view historical work notifications.

**Create** – Enable this option to allow the operator to create work notifications.

- Refer to **Appendix D, Work Notification** for more information on work notification.

## Deleting Operators

**Delete** The **Delete** command button accesses the **Delete Operator** display, which allows the system administrator to delete one or more existing operators from the operator list.

**To delete a MARLIN operator:**

- In the **Delete Operator** display, use the **Operator:** area to specify the operator to delete, then click the display's **Delete** button. You are prompted to confirm the deletion.
  - Pressing the stylus pen on several operator names in progression to select more than one operator. To deselect an operator, press the name again.

## Operator Preferences

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Figure 6. The Operator Preferences Area.

The **Operator Preferences** area allows all operators an opportunity to view their MARLIN Statistical Process Control Enabled settings (as previously described in the Add Operator section), and to configure their Error Log Mode and MDM Hardware setup preferences.. The Operator Preferences area's SPC Enabled checkbox is for viewing the current status only. To modify the SPC Enabled setting, access the Modify Operator display.

Operator Preferences fields include:

**Access Level** – Displays the current operator’s access level.

**Language** – Specifies current firmware language.

**Cond Pts Always Stop at Machine** – When enabled, forces conditional POINT data collection to stop on each hierarchical machine, even if the condition is not met. Default is enabled.

**Transfer Ready** – When enabled, operator can enable or disable the Transfer Ready option

**Error Log Mode** – (Admin access level only) Captures MARLIN errors in an error log text file to be used for engineering evaluation if there is a problem with the device. Check the box to select how the MARLIN logs errors. By default **Appl** and **Comms** are enabled.

**None** – Do not capture errors.

**Appl** – Capture firmware application errors.

**Comms** – Capture communication errors.

**SPC Enabled** - When enabled, 18 Statistical Process Control rules apply to process and MCD trends. To modify the **SPC Enabled** setting, access the **Modify Operator** display.

**MDM Hardware** **MARLIN MDM Hardware Preferences Settings**

**MDM Hardware Preferences**

Scanner

---

Serial #:

**Left Button**

Enter       Off

**Scan Button**

Scan       Off

Figure 7. The MARLIN MDM Hardware Preferences Display.

Use fields in the MARLIN **MDM Hardware Preferences** display to configure MARLIN hardware settings:

**Scanner** – Select the type of scanner that applies to your device from the drop down list.

**Serial #** - Editable for “Admin” Access Level users only - Enter the MARLIN’s serial number (located on the back of the MARLIN). The specified serial number displays on the MARLIN’s title screen, is stored with measurement

data collected by the MARLIN, and is uploaded back to Machine Analyst during the upload process, where it may be displayed using Machine Analyst reports.

**Left Button** – Select **Enter** to use the left trigger button to advance through data collection displays, or select **Off** to turn the button off.

**Scan Button** – Select **Scan** to use the scan trigger button to perform the scan, or select **Off** to turn the button off.

- Reference the **Windows CE Operating System / System Settings** section of your Hardware User Manual for more information on system settings.

## Global Preferences

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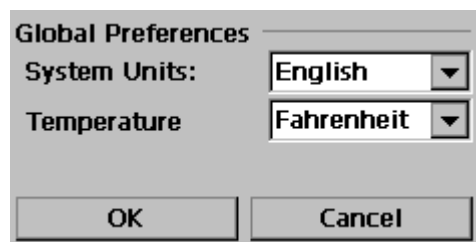


Figure 8. Global Preferences Fields.

Global preference settings apply for all MARLIN operators. **Global Preferences** fields include:

**System Units** - Using the drop-down list, specify whether vibration measurement units for MCD POINTs display in English or Metric. Modifications of the **System Units** setting do not affect existing MCD POINTs.

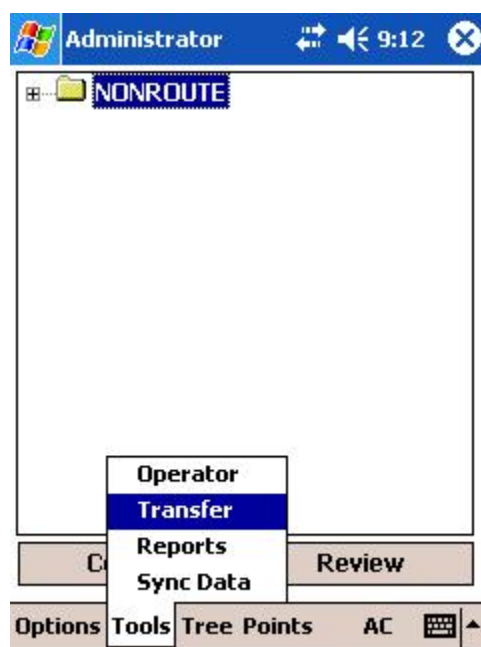
**Temperature** - Using the drop-down list, specify whether temperature units display in degrees Celsius (Centigrade) or Fahrenheit for MCD POINTs. Modifications of the **Temperature** setting do not affect existing MCD POINTs.

## Transferring Data Between MARLIN and Software

### What Is a Data Collection “ROUTE”?

A data collection ROUTE is a list of measurement POINTs arranged in sequence for the most efficient data collection as you walk through the plant. Machine Analyst software allows you to easily set up measurement collection ROUTEs to help you perform the most efficient MARLIN data collection.

- Reference your Machine Analyst software’s User Manual for more information on creating and downloading Machine Analyst measurement collection ROUTEs.



**Figure 1.** The **Tools** Menu’s **Transfer** Option.

The MARLIN’s **Tools** Menu’s **Transfer** option allows the operator to modify MARLIN data communications settings, and to initiate data transfer operations between MARLIN and the host computer running Machine Analyst software, or a specified LAN location.

## How to Perform Download/Upload Operations

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MARLIN/Machine Analyst data transfer operations (uploading/downloading) are initiated on the MARLIN, then controlled using Machine Analyst software **Transfer** options.

**IMPORTANT -**  
*The communication Baud Rate setting must be the same in the MARLIN and Machine Analyst software.*

The MARLIN features two ways to communicate with Machine Analyst:

**Serial**

**USB**

### Serial Communication

**IMPORTANT -**  
*To set up MARLIN for serial communication with Machine Analyst, any desktop application occupying the serial port, such as ActiveSync, must be terminated or disabled on the serial port.*

#### To disable desktop ActiveSync:

- Right click on the ActiveSync tray icon on your desktop computer and select the **Connection Settings** option.
- Disable the **Allow serial cable or infrared connection to this COM port** checkbox. Click **OK**.
  - The ActiveSync tray icon on your desktop computer should turn from green to gray, to indicate the disconnection.

#### To ready MARLIN for Machine Analyst download / upload operations using serial communication:

- If the desktop application occupying the serial port, such as ActiveSync, is using the same communications port as the host software, ensure that it has been disabled.
- With the MARLIN off (in suspend mode), connect the supplied MARLIN Data Transfer cable set between the host computer's RS232 serial port connector and the MARLIN.
- Turn MARLIN on (resume mode), and from MARLIN's Hierarchy display, select the **Tools** Menu's **Transfer** option. The **Transfer** display appears.
- Press the **Setup** button to edit **Transfer Setup** options.



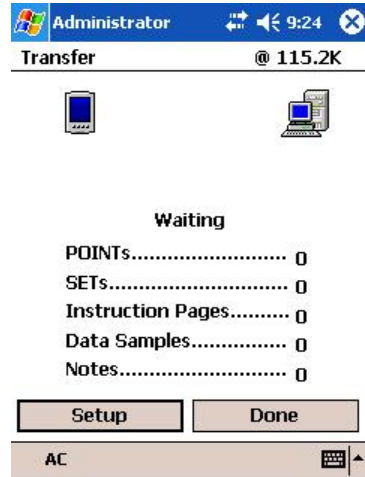


Figure 2. The Transfer Setup Display Using Serial Communication.

- Set the **Baud Rate** to match the baud rate setting in Machine Analyst. .
- Select the **Serial** communication type. Press **Done**.
- The MARLIN is ready to communicate with the host (continue data transfer operations from the host computer), or to upload data to the specified LAN location.
  - For more information on uploading data to a LAN location, reference the **Local Area Network (LAN) Upload Procedures** section.

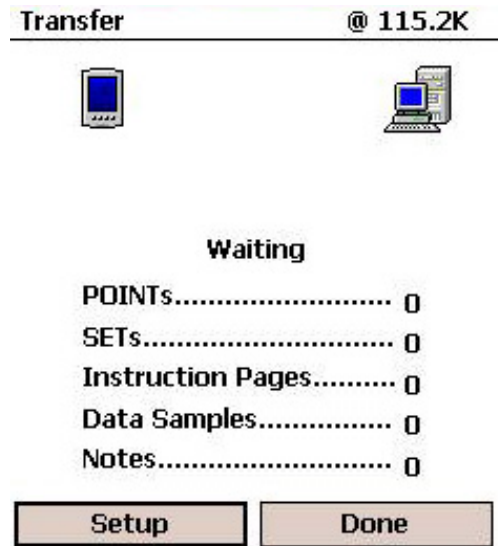


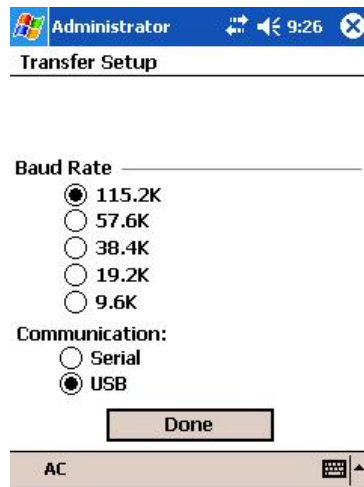
Figure 3. The Transfer Display Using Serial Communication.

- During the download/upload process, if the host computer cannot establish communications, verify that ActiveSync is disabled, communications settings are properly configured in the Machine Analyst software, and the **Baud Rate** setting is identical in the Machine Analyst software and the MARLIN. Reference your Machine Analyst User Manual for details.

## USB Communication

### To ready MARLIN for Machine Analyst download / upload operations using USB communication:

- With the MARLIN off (in suspend mode), connect the supplied USB cable between the host computer's USB port connector and the MARLIN.
- On the host computer, enable ActiveSync for USB connection.
  - Reference Microsoft ActiveSync help for more information.
- Turn MARLIN on (resume mode), and from MARLIN's Hierarchy display, select the **Tools** Menu's **Transfer** option. The **Transfer** display appears.
- Press the **Setup** button to edit **Transfer Setup** options.



**Figure 4.** The **Transfer Setup** Display Using **USB** Communication.

- Set the **Baud Rate** to match the baud rate setting in Machine Analyst. .
- Select the **USB** communication type. Press **Done**.
- The MARLIN is ready to communicate with the host (continue data transfer operations from the host computer), or to upload data to the specified LAN location.



Figure 5. The Transfer Display Using USB Communication.

During the download/upload process, if the host computer cannot establish communications, verify that ActiveSync is properly connected, communications settings are properly configured in the Machine Analyst software, and the **Baud Rate** setting is identical in the Machine Analyst software and the MARLIN. Reference your Machine Analyst User Manual for details.

### Transfer Ready

- The transfer ready feature is only available using the USB communication type.

When the **Transfer Ready** operator preference is enabled, the MARLIN's **Transfer** display automatically launches upon docking the device. Proceed with data transfer operations from the host computer.

### Host Software Procedures

- On the host computer, use Machine Analyst data **Transfer** menu procedures to initiate the download/upload procedure to your MARLIN.
  - Reference your Machine Analyst User Manual for more information on accessing the **Transfer** dialog.
  - To free up MARLIN memory, occasionally "clear" the data from within the Machine Analyst software. Reference the Machine Analyst User Manual for details.

As data transfer proceeds, the status on the **Transfer** screen changes to reflect information transferred to/from the host computer. The number of POINTs and SETs transferred are reported along with the number of Instruction Pages, Data Samples, and Notes.

- "SET" refers to both SET and machine hierarchy items in the Machine Analyst database.
- After data transfer completes, press the display's **Done** button to leave transfer mode.

- **Important** - After downloading, MARLIN automatically performs a system back-up. This may take some minutes depending on the number of measurements in MARLIN.  
DO NOT SUSPEND OR TURN OFF THE MARLIN DURING THIS AUTOMATIC BACKUP.

## Local Area Network (LAN) Upload Procedures

MARLIN's LAN option allows you to upload data from the MARLIN to a specified LAN location. This LAN location must be accessible by both a PC running Machine Analyst software and the MARLIN DAD. Machine Analyst automatically detects the upload to the specified network location and begins processing the data. The LAN support feature allows you to quickly upload data to the network instead of having to physically return to a PC running Machine Analyst software to initiate the upload. This allows multiple users to upload their data without "tying up" the dedicated Machine Analyst PC.

### To upload data to the specified LAN location:

- On the **Tools** menu, select the **Transfer** option. The **Transfer** screen displays. MARLIN automatically checks for the existence of the specified network drive and directory. If MARLIN locates the specified LAN location, the **LAN** button is enabled.
  - The LAN location must be specified in Machine Analyst. If the **LAN** button is unavailable, then no LAN location has been specified.
- On the MARLIN's **Transfer** display, press the **LAN** button.
- Select the items to upload to the LAN location.
- Use the **Brute Force** check box to select whether to use brute force to create new database POINTs for the uploaded data.
  - 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 database) and uploads all data into these new POINTs.
- Click the **Upload** button to initiate the upload process. The selected ROUTE uploads to the specified LAN location, and is then automatically detected and processed by Machine Analyst.

LAN

## Windows CE Services / ActiveSync Software

If SKF's Machine Analyst software is not being utilized with the MARLIN unit, then use ActiveSync technology to fully synchronize the information on your MARLIN with the information on your computer. Changes you make on your MARLIN or desktop computer appear in both places after you synchronize.

### Performing an ActiveSync Operation For The First Time

**IMPORTANT** – You must perform your first ActiveSync operation with a local, direct connection, rather than using a modem.

### To Perform an ActiveSync Operation For The First Time:

- After installing the Windows CE Services / ActiveSync Software, restart your desktop computer.
- Turn on your MARLIN unit and connect to the host computer via an RS232 connection cable or USB connection cable.
- On the desktop computer, enter a name for your MARLIN terminal and click the **Next** button. Follow the instructions on the screen to set up a partnership that allows synchronization of information between the two computers. Items to be synchronized may be customized, and you may select to synchronize automatically upon connection.

**IMPORTANT** – Every MARLIN terminal should have a unique name if you use synchronization. Otherwise, you do not need to set up a partnership. Never try to synchronize more than one MARLIN terminal to the same user name.

### Conducting a Local ActiveSync Operation

After you complete the first ActiveSync operation, you just need to place the terminal in the connected cradle and synchronization occurs automatically.

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## Sync Data

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The MARLIN's **Tools** menu's **Sync Data** option allows the operator to automatically upload collected data to Machine Analyst, re-download ROUTEs from Machine Analyst, and configure the MARLIN with the latest operator and work notification settings, all in a single process.

- In order for data synchronization to take place, the **MARLIN sync data** preference must be enabled in the software. Reference your software's user manual for more information.

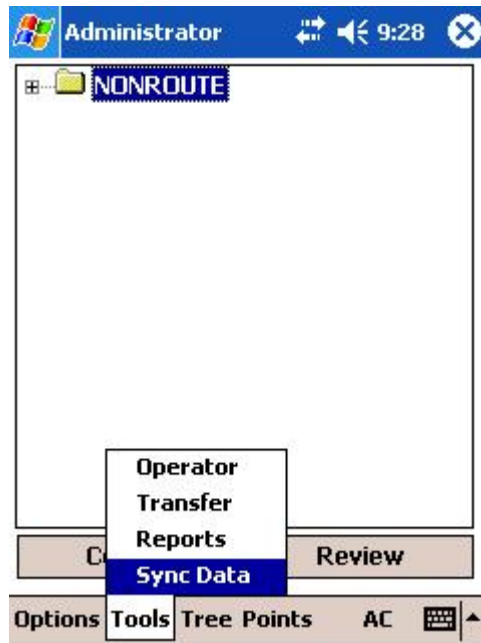


Figure 6. The Tools menu Sync Data Option.

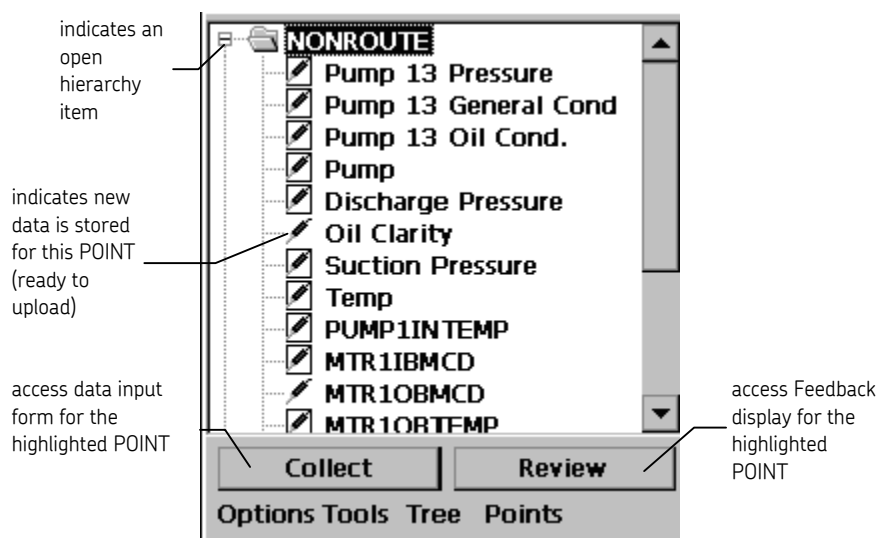
**To start data synchronization:**

- Dock the MARLIN in its docking station.
- Select the **Tools** menu's **Sync Data** option to launch the **Sync Data** display.
- Click the **Setup** button to set the baud rate and communication type, if not previously set. The MARLIN automatically establishes communication with the software and begins the data synchronization process.
- The message, "**Synchronization complete,**" displays once data synchronization has finalized.
- Click **Done** to exit the **Sync Data** display.

# How To Collect MARLIN Measurements

## Overview

Again, the Hierarchy display appears after logging in to MARLIN. All MARLIN operations initiate from the Hierarchy display.



**Figure 1.** Hierarchy Display Data Collection Items.

At the top of the display's hierarchy list is the **Non ROUTE** hierarchy item. The **Non ROUTE SET** stores all measurement POINTs set-up on the MARLIN (all POINTs that were not downloaded from Machine Analyst software).

- Non ROUTE POINT setup is described in the following **Adding New Non ROUTE POINTs** section. All POINTs within ROUTEs must be added or modified from Machine Analyst.

Beneath the **Non ROUTE SET**, the hierarchy list displays ROUTE hierarchy items downloaded from Machine Analyst software.

## ROUTE Instructions

Using Machine Analyst software, ROUTE instructions explaining the ROUTE may be created and stored with the ROUTE. When the ROUTE is downloaded to MARLIN for data collection, these ROUTE instructions accompany the downloaded ROUTE.

If ROUTE instructions are downloaded with the ROUTE, an **"Instruction Page"** hierarchy item with a triangle indicator appears for each instruction page on the MARLIN hierarchy list just below the downloaded ROUTE name.

- Highlight this **Instruction Page** hierarchy item and press the **Collect** button to view the downloaded ROUTE Instructions.

## Selecting a Database

---

From the MARLIN's Hierarchy display, you can create new database hierarchies or open existing database hierarchies.

### To create a new database hierarchy:

- From the **Options** menu, press **Select Database**.
- On the database selection screen, press the **Browse** button (...).
- In the file browser, press the new folder button and name the folder with a unique name.
- Click **OK**. You are automatically logged out of MARLIN. The newly created database hierarchy opens the next time you log in to MARLIN.

### To open an existing database hierarchy:

- From the **Options** menu, press **Select Database**.
- On the database selection screen, press the **Browse** button (...).
- In the file browser, select the database hierarchy you wish to open.
- Click **OK**. You are automatically logged out of MARLIN. The selected database hierarchy opens the next time you log in to MARLIN.

## Navigating the Hierarchy List

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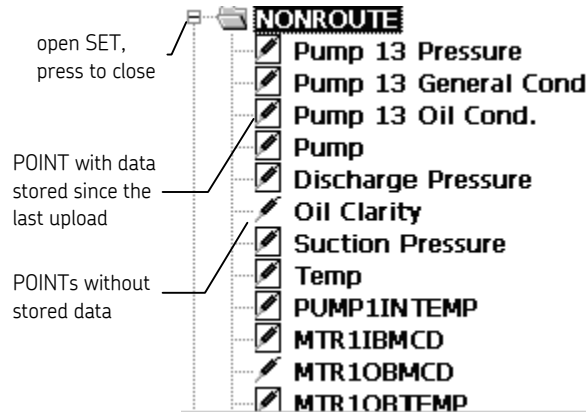


Figure 2. Hierarchy List Navigation Tools.

### The Tree Menu

In the hierarchy display, the **Tree** menu gives you access to several options for hierarchy navigation. Options in this menu allow you to quickly navigate the hierarchy list.



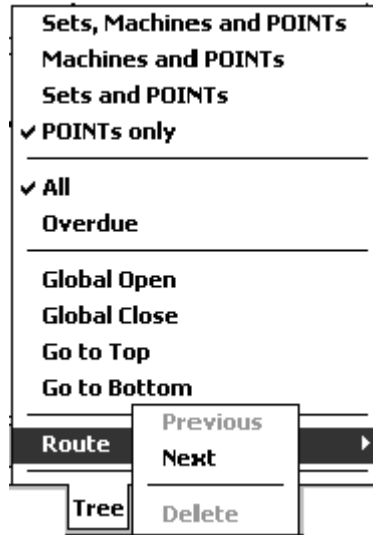


Figure 3. The **Tree** Menu's Hierarchy Navigation Options.

**Tree** Menu Options are:

**Sets, Machines and POINTs** – Shows all hierarchy items in the Hierarchy display.

**Machines and POINTs** - Shows only machine and POINT hierarchy items in the Hierarchy display.

**SETS and POINTs** - Shows only SET and POINT hierarchy items in the Hierarchy display.

**POINTs only** – Shows only POINT hierarchy items in the Hierarchy display.

**All** – Shows all items in the Hierarchy display.

**Overdue** – Shows only items overdue for data.

**Global Open** – Opens all hierarchy items. All ROUTEs, SETs, and Machines open to display all measurement POINTs.

**Global Close** – Closes all hierarchy items.

**Go to Top** – Places the highlight on the **Non ROUTE** hierarchy item at the top of the list.

**Go to Bottom** – Automatically opens the last hierarchy ROUTE and its subsequent SETs, and places the highlight on the last POINT in the last SET.

**Route** – Select to place the highlight on either the **Next** or **Previous** ROUTE hierarchy item, or **Delete** the selected ROUTE.

## SETs

SET open/close indicators (minus sign or plus sign in the square symbols) appear to the left of all SET and ROUTE icons in a hierarchy list.

The square with a minus sign indicates that a SET is open, displaying its subSETs and/or POINTs. The square with a plus sign indicates that the SET is closed, concealing all subSETs and POINTs.

## Measurement POINTs

With measurement POINT hierarchy items, a square around the POINT icon to the left of the POINT indicates data has been stored for the POINT since the last upload (these POINTs have been collected and are ready for the next upload).

An icon without a square indicates POINTs without stored data, or with stored data that has already been uploaded.

This method for displaying data collection status allows you to quickly see where you've been (squares around icons), and where you need to go (no squares).

## General Data Collection Steps

---

The MARLIN utilizes a variety of data input displays depending on the type of measurement (MCD, VibPak, process, single-select or multi-select inspection), and your preferred method for entering process data (slider, bar, gauge or keyboard data input displays).

MARLIN data collection is easy:

1. Identify the SET, machine, or measurement POINT for which you wish to record data, and initiate its **SET** or **Machine** display, or data input display.
2. On the data input display, record and store the POINT's data.
3. Review the measurement's results (if **Verification Mode** is enabled in **Operator Preferences**).
4. Advance to the next measurement.
  - The MARLIN automatically advances to the next measurement within each ROUTE.

We first describe general methods for identifying and initiating data collection for any MARLIN POINT, then describe the MARLIN's various data input displays in detail.

## How To Identify Measurement POINTs and Initiate Data Collection

There are two general methods to identify machines and POINTs, and initiate MARLIN data collection: manual and automatic.

**“Manual” Hierarchy List Identification** - Use the pen and touch sensitive hierarchy controls on the Hierarchy display to locate the SET, machine, or POINT in the hierarchy list. When the desired hierarchy item is highlighted, press the Hierarchy display's **Collect** button (or press the “Next” hardware button, if configured) to initiate data collection. The SET, machine, or POINT's data input display appears.



- Once data collection is initiated, you may sequence through hierarchy list data collection using the stylus pen and **Skip** buttons on MARLIN displays, or use the “Next” hardware button (user defined).

**“Automatic” Measurement Identification** - Use barcodes or MQC computerized studs to automatically identify the machine or measurement POINT.

**MARLIN Quick Connect (MQC) Studs** - An MQC computerized stud connection automatically locates and identifies the POINT in MARLIN's hierarchy list, and automatically initiates the POINT's data input display.

**Barcode Scanner** – {XE "scanner"}{XE "barcode scanner"}The MARLIN's barcode scanner is used to automatically locate and identify the machine / POINT in the MARLIN hierarchy list. If the *machine* is scanned, MARLIN automatically locates and initiates the machine's data input display. If the *POINT* is scanned, MARLIN automatically locates the POINT in the hierarchy list and initiates the POINT's data input display.

**Radio Frequency Identification (RFID)** – {XE "radio frequency identification"} If your MARLIN device is equipped with an RFID scanner, you may collect data by scanning RFID tags, sometimes known as contactless smart cards. This allows you to automatically locate and identify the machine / POINT in the MARLIN hierarchy list. If the *machine* is identified, MARLIN automatically locates and initiates the machine's data input display. If the *POINT* is identified, MARLIN automatically locates the POINT in the hierarchy list and initiates the POINT's data input display.

- Not all documented features are available in all MARLIN data managers. Refer to your MARLIN data manager hardware manual for device specific information.

## SET Display

- A "SET" hierarchy item is any hierarchy item from which machines and measurement POINTs branch.

### To view the SET Display:

Highlight a SET hierarchy item and press the **Collect** button, or

Progress from the last POINT of the previous SET at the same hierarchy level (during data collection, press the **OK** button or press the **[Skip >>]** button on the last POINT of the previous SET).

The SET display is split into two sections:

The top of the screen displays the SET's ID and description (i.e., "NONROUTE," or "SKF Motor: 100").

The bottom of the screen displays Action buttons for specifying the SET's condition during data collection. **SET Action** buttons include:

**Collect** – Displays the first Machine's display, allowing the operator to view Machine information.

**Cancel** – Closes the SET display, displaying the hierarchy list.

**Skip** - You may sequence through SET displays using the **<< Skip** and **Skip>>** buttons.

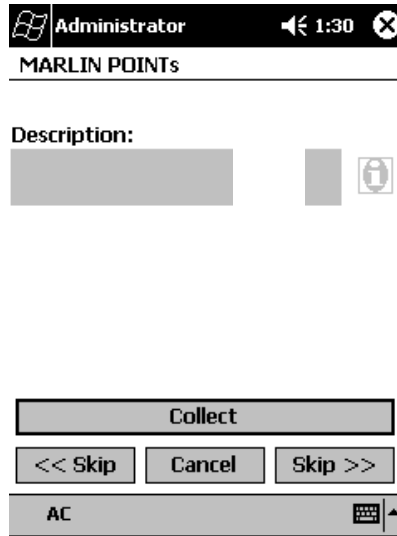


Figure 4. The SET Display.

### SET Feedback Display

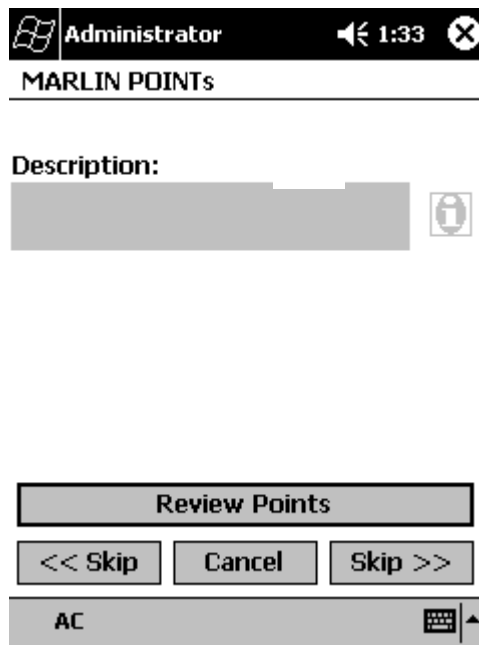


Figure 5. The SET Feedback Display.

To review a SET's collected data, highlight the SET's hierarchy item and press the **Review** button. The SET's Feedback review display displays. The top of the Feedback display again shows SET ID and description. However, the bottom of the display now offers a **Review POINTs** action button which, when pressed, displays the Feedback review display for the first Machine branching from the SET. With the first Machine's Feedback display on the screen, you may sequence through Feedback displays for the SET's other Machines using the *left/right* arrow **Skip** buttons located at the bottom of the display.

## Machine Display

- A “machine” hierarchy item is any hierarchy item from which ONLY measurement POINTs branch. For example, the **Non ROUTE** hierarchy item is considered a “machine” hierarchy item as only POINTs branch from it.

### To view the Machine Display:

Highlight a machine hierarchy item and press the **Collect** button, or

Progress from the last POINT of the previous machine at the same hierarchy level (during data collection, press the **OK** button or press the [**Skip >>**] button on the last POINT of the previous machine), or

Scan a location tag associated with a machine hierarchy item.

The Machine display is split into three sections:

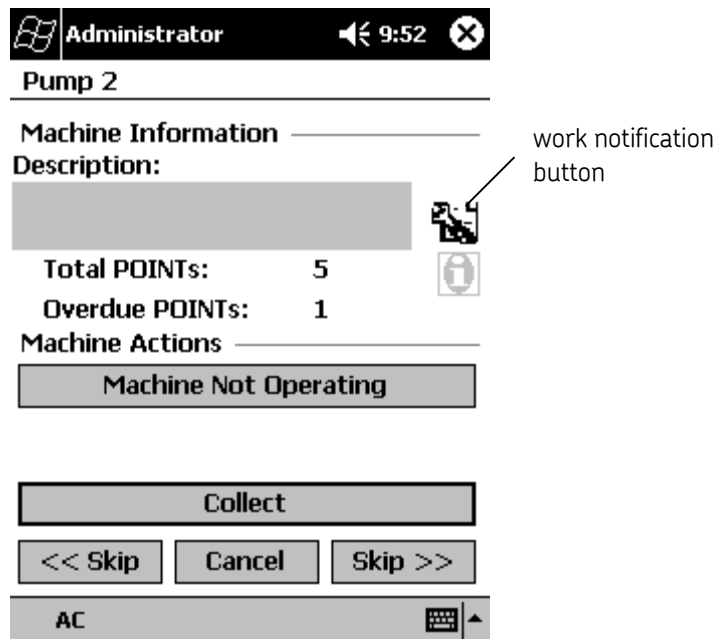


Figure 6. The Machine Display.

The top of the screen displays the machine’s ID and description (i.e., “NONROUTE,” or “SKF Motor: 100”).



Click the **Work Notification** button to display the **Work Notification Entry Form**, allowing you to create a work notification for the current machine.

- The work notification icon is also available from the POINT display.
- Refer to **Appendix D, Work Notification** for more information on the MARLIN work notification feature.

The middle of the screen displays the **Machine Information**, including the total number of measurement POINTs set up for the machine, and how many POINTs have an “overdue” collection status.

The bottom of the screen displays Action buttons for specifying the machine’s condition during data collection. **Machine Action** buttons include:

**Machine not Operating** – Saves a “Machine Not Operating” coded note for all measurement POINTs in the machine and automatically displays the Machine display for the next machine at the same hierarchy level. This selection provides a method for specifying the machine is not operating at the time of data collection, and sets up data collection at the next machine.

**Machine OK** – When enabled in **Operator Preferences**, this button provides the operator a method to quickly describe the overall machine condition as “OK”, without collecting current data on the machine’s measurements. For machines with **Single** and **Multi-Select Inspection** POINTs, the **Machine OK** button specifies and stores the first non-alarm **Inspection Result** for each of the machine’s Inspection POINTs, then displays the Machine display for the next machine at the same hierarchy level. If no more machines exist at the same hierarchy level, the hierarchy display appears with the current machine’s ID highlighted.

- Process POINTs and MCD POINTs are not affected by the **Machine OK** button (no data is stored). Therefore, on the MARLIN hierarchy list, their icon does not get a square around it (indicating data has not been collected), and they produce a “skipped POINT” result in Machine Analyst.

**Collect** – Displays the first POINT’s data collection display, allowing the operator to begin data collection on the machine.

**Cancel** – Closes the Machine display, displaying the hierarchy list.

**Skip** - You may sequence through Machine displays using the << **Skip** and **Skip**>> buttons.

## Machine Feedback Display

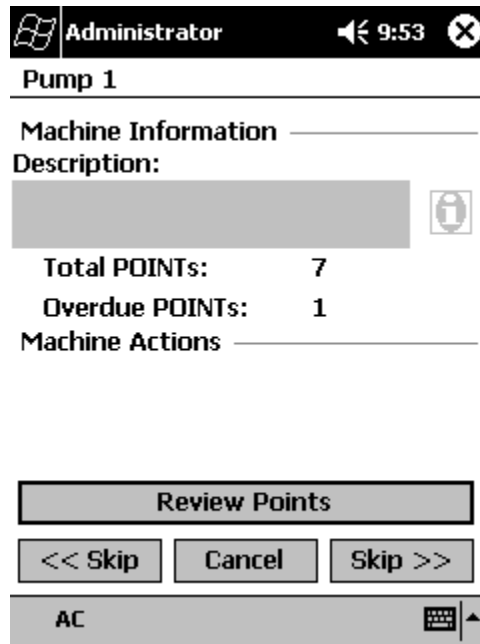


Figure 7. The Machine Feedback Display.

To review a machine's collected data, highlight the machine's hierarchy item and press the **Review** button. The machine's Feedback review display displays. The top and middle of the Feedback display again show machine ID and total POINT information. However, the bottom of the display now offers a **Review POINTs** action button which, when pressed, displays the Feedback review display for the first POINT branching from the machine. With the first POINT's Feedback display on the screen, you may sequence through Feedback displays for the machine's other POINTs using the *left/right* arrow **Skip** buttons located at the bottom of the display.

## MARLIN Data Input Displays

Again, the MARLIN uses a variety of data input displays depending on the type of measurement (MCD, process, or inspection), and depending on your preferred input display for recording process data (slider, bar, gauge, or keyboard).

## Process POINT Data Input Displays

Depending on the process POINT's setup, one of four data input displays appear when data collection is initiated for the POINT (slider, bar, gauge or keyboard). Each input display is described below.

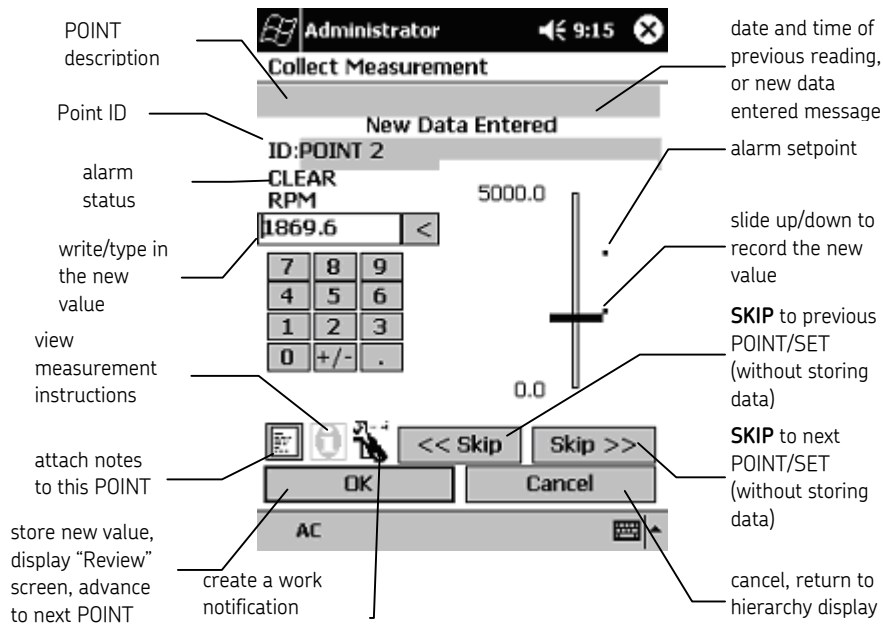


Figure 8. The “Slider” Data Input Display.

As with all data input displays, the previous recorded value and its alarm status show when the display initiates, if **Show Previous Data** is enabled in **Operator Preferences**.

**SKIP Buttons** - Use the **SKIP** buttons to skip data collection for the displayed measurement and advance to the previous (<<) or next (>>) POINT's data input display.

#### Measurement Instructions

Using Machine Analyst software, pre-measurement instructions may be created and assigned to the POINT.

**Pre-measurement Instructions** – If a pre-measurement instruction has been assigned to the POINT, the **Instruction** button (i) is enabled on the data collection form. Click the **Instruction** button (i) to view the pre-measurement instruction before collecting data on the POINT.

Two measurement instruction formats are supported in the MARLIN:

**Freeform** – Display in MARLIN's text viewer. Press **Done** when you have finished viewing the freeform instruction.

**Hyperlink** – Previously downloaded instructions that display using the originating application. For example, a link may be created for an instruction file in “.doc” file format, and displayed if the instruction file and Microsoft Word are available on the MARLIN.

- The linked document must be downloaded to the MARLIN using ActiveSync. For details on downloading hyperlink instruction files to the MARLIN, reference your ActiveSync User Manual.



**To input the new POINT value:**

- Using either the touch-screen alphanumeric keyboard or the hardware keypad buttons, type in the new value directly in the numeric data entry box, the slider bar moves to represent the entered value and show its proximity to alarm set points, or
- Using the pen, move the slider bar up/down to the desired value. The numeric data entry box at the bottom of the display updates to show the numerical equivalent of the slider position.
  - Not all documented features are available in all MARLIN data managers. Refer to your MARLIN data manager hardware manual for device specific information.

The display's alarm status indicator immediately updates to reflect the new value's alarm status.

**To store the new value and advance to the next POINT:**

- Press the data input display's **OK** command button (or press the "Next" hardware button (user defined)). The new value is stored and the Feedback display automatically initiates (if the **Verification Mode** option is set to **"Always"** in Operator Preferences), allowing you to view current, last, and baseline information for the measurement and the measurement's trend plot.
- In the Feedback display, evaluate the measurement's validity (compare its current value to its baseline and previous values) and note the measurement's severity level, then press the Feedback display's **Done** button (or press the "Next" hardware button (user defined)) to exit the review mode and automatically initiate the next measurement's data input display.
  - Feedback display information and controls are fully described in the next section.

**To attach a note to the POINT during data collection:**

During data collection, operators may attach notes to POINTs. The MARLIN provides two methods for entering notes:

Text **Notes** - Use the stylus pen to write in or type a note.

- Press the **Clear Text** button to remove all text notes from the text box.

**Codes** - Use the checkboxes to quickly enable one or more user defined notes downloaded from Machine Analyst.

- Press the **Clear Codes** button to disable all **Codes** area checkboxes.

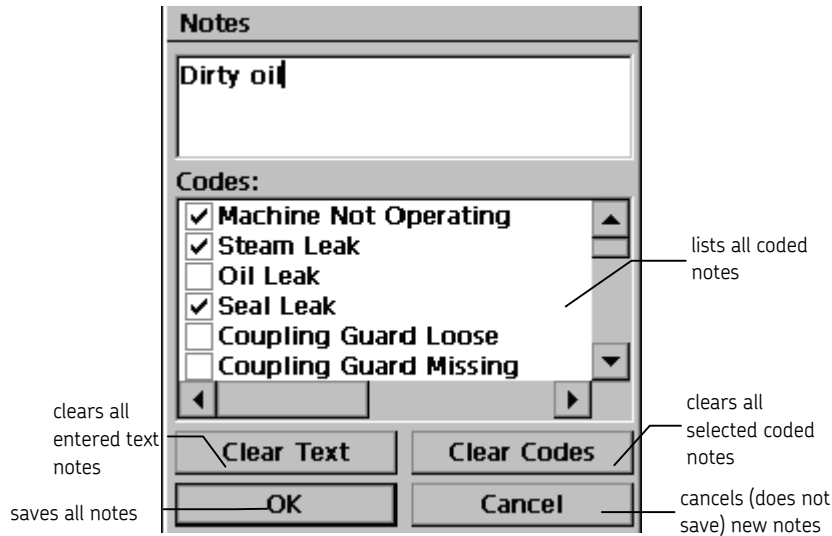


Figure 9. The Notes Display.

### Text Notes

Text notes allow you an opportunity to attach *any* text to a measurement during data collection. The attached note may be viewed in the MARLIN's Feedback mode, or after uploading, in Machine Analyst.

#### To attach a "text" note to a POINT:

- From the data input display, press the **Note** button. The Notes display appears.
- In the Notes display, press the stylus pen in the text area, and press the keyboard icon to activate the keyboard.
- Type in the text note.
- If you wish to delete an entered text note, press the display's **Clear Text** button.

### Coded Notes

Coded notes allow you to easily select a "standard" note from a list of notes previously downloaded from Machine Analyst software. Again, the attached note may be viewed in the MARLIN's Feedback mode, or in Machine Analyst, after uploading.

#### To attach a coded note to a POINT:

- From the data input display, press the **Note** command button. The Note Input display appears.
- In the Note Input display, press the checkboxes to enable one or more coded notes. Press an enabled checkbox once more to disable.
  - Coded notes previously assigned to the POINT are already checked.
  - If desired, use the **Clear Codes** button to quickly disable all checkboxes.

- Use the pen to (select) one or more coded notes to the POINT.

When all applicable notes have been selected, press the display's **OK** command button to return to the previous display.

- You can also review or modify notes from the POINT's Review display.

## Work Notifications

Work notifications may be generated from the MARLIN device, allowing machinery maintenance personnel to walk a ROUTE, and create work notification(s) immediately as problems are detected or observed.

- The MARLIN work notification features are only operable if the host computer is running Machine Analyst software version 3.1 or higher, with the work notification plug-in installed.

**To create a work notification:**



Click the **Work Notification** button to display the **Work Notification Entry Form**, allowing you to create a work notification for the current machine.

- The work notification icon is also available from the Machine display.
- Refer to **Appendix D, Work Notification** for more information on the MARLIN 4.1 work notification feature.

## “Bar” Data Input Display

Controls in the “bar” data input display operate as previously described for the “slider” data input display, except values and alarm setpoints are graphically displayed in bar form instead of slider form.

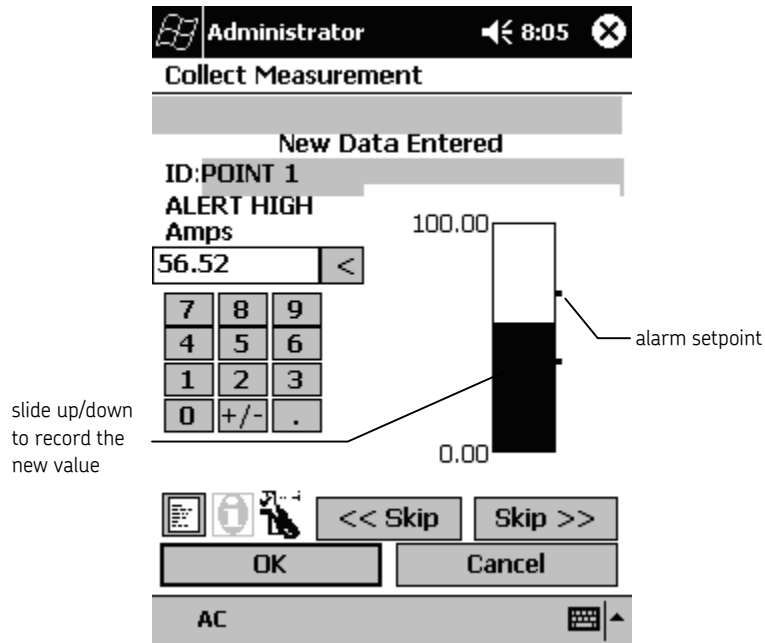


Figure 10. Example of a Bar Data Input Display.

### “Gauge” Data Input Display

Controls in the “gauge” data input display also operate as previously described for the “slider” data input display, except values and alarm setpoints are graphically displayed in gauge form instead of slider/bar form.

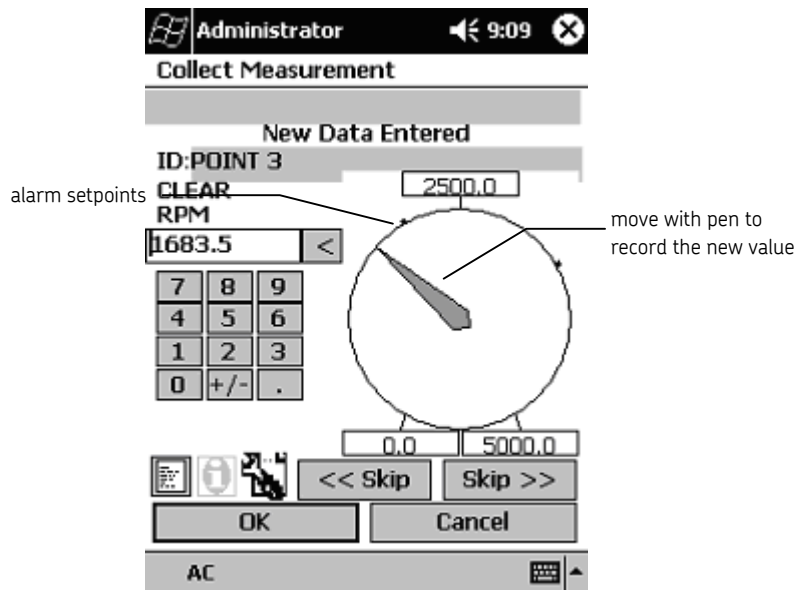


Figure 11. Example of a Gauge Data Input Display.

## “Keypad” Data Input Display

Keypad data input displays dispense with graphic input and display methods (slider, bar, gauge). They offer numeric input and display only. Controls in “keypad” data input displays operate as previously described “slider” data input displays.

- A disadvantage to using the keypad data input display is its inability to display alarm setpoints.

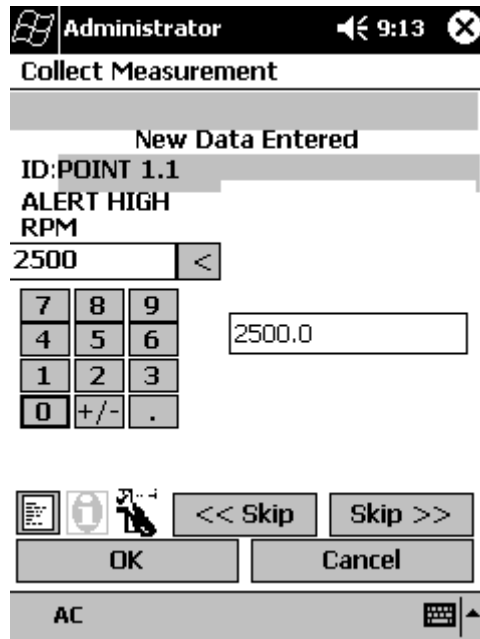


Figure 12. A Keypad Data Input Display.

## Derived POINT Data Input Display

A derived POINT provides data from an operator created formula that uses previously collected MARLIN measurement POINT data in its calculation. Derived POINTs are set up in Machine Analyst software and downloaded to the MARLIN DAD.

- In a ROUTE or Hierarchy list, a derived POINT must follow all POINTs used in its calculation.
- Reference your Machine Analyst User Manual for more information on setting up derived POINTs.

### To calculate a derived POINT:

- Ensure data has been collected within the specified time range for all POINTs referenced in the derived POINT’s calculation (see above note). Once data has been collected for all POINTs referenced in the derived POINT’s calculation, MARLIN can calculate the derived POINT.
- Continue collecting data for the POINTs in the hierarchy. As you approach the derived POINT, MARLIN does not display a data input screen for the derived POINT, but appears to skip the derived POINT and advances to the next POINT in the hierarchy. It is at this time that MARLIN performs the derived POINT

calculation. Note that the derived POINT's feedback screen does not display automatically.

**To review the derived POINT's feedback display:**

- Return to the hierarchy and highlight the derived POINT from the hierarchy list.
- Press the **Review** button. The derived POINT's feedback screen displays the calculated data.

**How to Collect Routine Inspection Data**

MARLIN "Inspection" POINTs allow the operator to use the MARLIN to routinely record visual observations or perform and record a physical test of some sort.

During setup, alert and danger alarms settings can be assigned to specific inspection results. When the operator selects an inspection result associated with an alarm condition, pre-determined alarm messages provide immediate feedback to the operator.

Depending on the inspection POINT's setup, one of two data input displays appear when data collection is initiated for the POINT (single-select inspection POINT or multi-select inspection POINT).

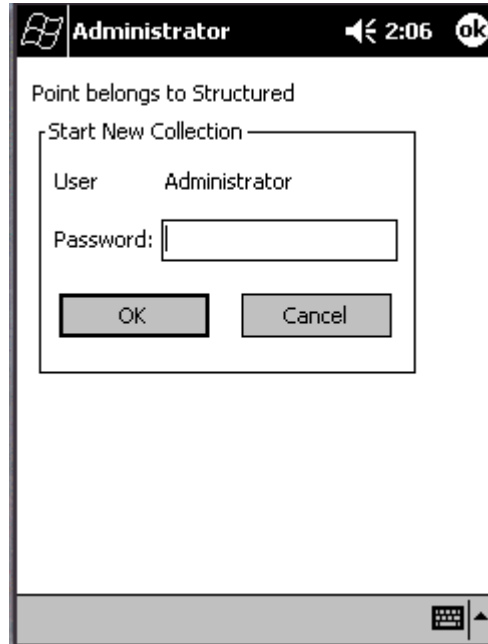
**How to Collect Structured ROUTE Data**

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.

Before data can be collected for a structured ROUTE, the user is required to log in. The specified operator name and password is stored with the structured ROUTE.

**To log in to a structured ROUTE:**

- Highlight a structured ROUTE hierarchy item from the Hierarchy display.
- Press the **Collect** button. The structured ROUTE log in screen displays.



**Figure 13.** Structured ROUTE Log In Display.

- Enter your password in the **Password** text box.
- Press **OK** to begin data collection.

During structured ROUTE collection, you may wish to suspend ROUTE collection and resume collection later.

**To suspend ROUTE collection:**

- Press **Cancel** from the data input or feedback displays.
- The **Suspend ROUTE Collection** screen displays.

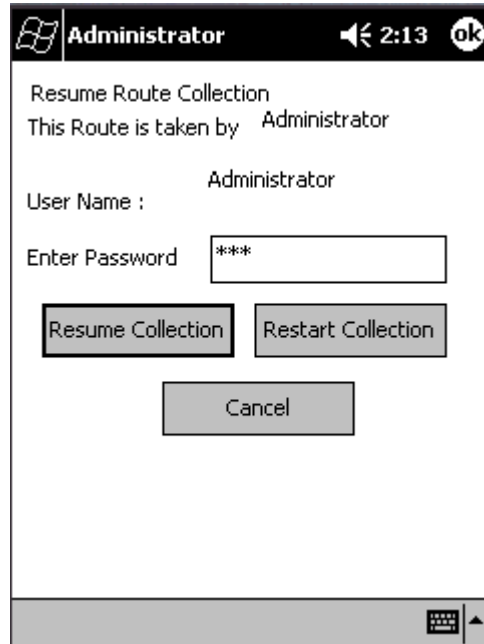


- Press the **Suspend** button to suspend ROUTE collection, or press the **Resume** button to continue collecting data without suspending the ROUTE.
  - The structured ROUTE POINTs must be collected in order. If you attempt to collect measurements out of sequence, the **Suspend ROUTE Collection** screen displays. To continue collecting data, press the **Resume** button.

**To resume data collection on a suspended ROUTE:**

- Highlight a structured ROUTE hierarchy item from the Hierarchy display and press **Collect**.
- The **Resume ROUTE Collection** screen displays.





- Enter your password in the **Enter Password** text box.
  - The password entered must be the same as the initial password entered on the initial **Structured ROUTE Login** display.

Press the **Resume Collection** button to begin collecting data from where you left off, or press the **Restart Collection** button to start collecting data from the beginning of the ROUTE.

### Single-Select vs. Multi-Select Inspection POINTs

Single-Select Inspection POINTs and Multi-Select Inspection POINTs both display up to five **Inspection Results** fields. The difference between the two inspection POINT types is the number of results the operator is allowed to select.

- During inspection POINT setup, you define up to five expected results for the specific inspection or test POINT.

**Single-Select Inspection POINTs** - The operator may select only one of the five pre-defined **Inspection Results** as the one most accurate for the inspection POINT condition.

**Multi-Select Inspection POINTs** - The operator selects as many of the five pre-defined **Inspection Results** as are appropriate to describe the inspection POINT condition.

### Single-Select Inspection - Data Input Display

In single-select inspection data input displays, the expected inspection results (up to five) appear as option buttons.

- Use the stylus pen to select the inspection result that best matches current conditions.

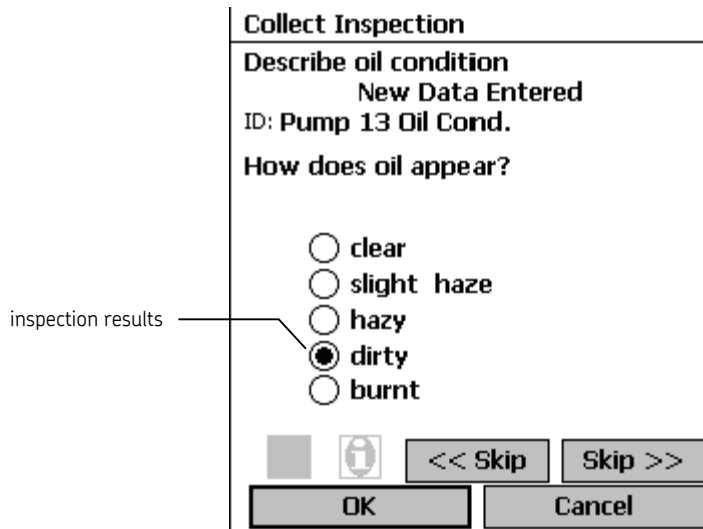


Figure 14. A “Single-Select” Inspection Data Input Display.

Other controls in the “single-select inspection” data input display, such as the **SKIP** buttons, operate the same as previously described “slider” process POINT data input display.

**To store the inspection result and advance to the next POINT:**

- Press the data input display’s **OK** command button (or press the "Next" hardware button (user defined)). The inspection result is stored and the Feedback display automatically initiates (if the **Verification Mode** option is set to “Always” in Operator Preferences).

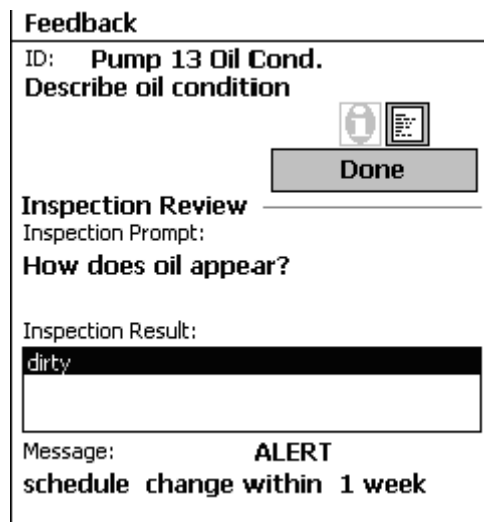


Figure 15. A Single-Select Inspection Feedback Display.

- In the Single-Select Inspection POINT Feedback display, observe the inspection result’s alarm status and, if applicable, the alarm message.
- Press the Feedback display’s **Done** button (or press the "Next" hardware button (user defined)) to exit the Feedback mode and automatically initiate the next POINT’s data input display.

## Multi-Select Inspection - Data Input Display

In multi-select inspection data input displays, the expected inspection results (up to five) appear as check boxes.

- Use the pen to select as many inspection results as are currently applicable.

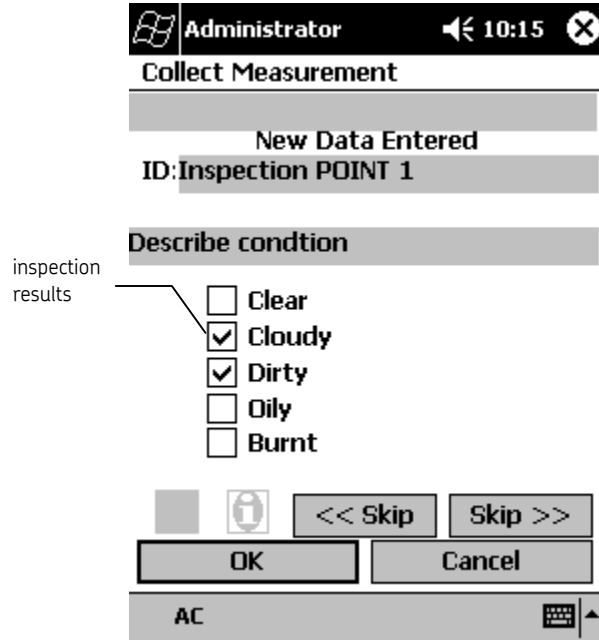


Figure 16. A “Multi-Select” Inspection Data Input Display.

- Other controls in the “multi-select inspection” data input display operate the same as previously described “slider” process POINT data input display.

### To store the inspection results and advance to the next POINT:

- Press the data input display’s **OK** command button (or press the “Next” hardware button (user defined)). The inspection results are stored and the Feedback display automatically initiates, if configured in **Operator Preferences**.

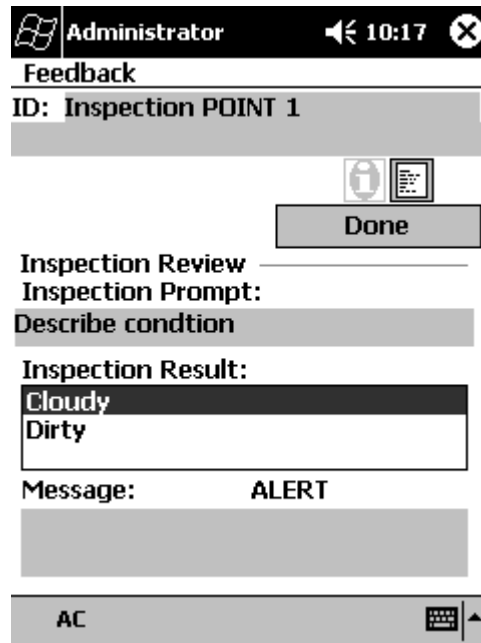


Figure 17. A Multi-Select Inspection Feedback Display.

- In the Multi-Select Inspection POINT Feedback display, use the pen to highlight each result and observe the result's alarm status and, if applicable, its alarm message.
- Press the Feedback display's **Done** button (or press the "Next" hardware button (user defined)) to exit the Feedback review mode and automatically initiate the next POINT's data input display.

## How to use Inspection Data Input Displays for Recording Process Data

Single and Multi-Select Inspection POINTs are unique in their ability to immediately display pre-defined alarm messages for specific inspection conditions. These messages provide the operator with immediate, accurate corrective actions for alert or danger conditions.

With some plant processes, it is possible to set up process data collection POINTs that utilize these alarm messages. To apply alarm messages to process POINT types (POINTs for which you enter numeric process data), set up the process POINTs as inspection POINTs (using incremental ranges for numeric process data input).

The following two figures exemplify using a Single-select inspection data input display to enter plant process data, and the resulting alarm message(s).

In this example, the pump's pressure should always run below 150 PSI. In the POINT's Setup, the "less than 150" **Inspection Result** is not assigned an alarm, the "150-160" **Result** is assigned the alert alarm, and the "higher than 160" **Result** is assigned the danger alarm. An example **Inspection Feedback** display follows.

**Collect Inspection**

New Data Entered  
ID: Pump 113 Pressure  
Select pressure range (PSI)

less than 150  
 150-160  
 higher than 160

<< Skip Skip >>  
OK Cancel

**Figure 18.** A Single-Select Inspection Data Input Display for Entering Plant Process Data.

In this example, the POINT's danger **Alarm Message** instructs the operator to switch to the spare pump and call his supervisor "Bill."

**Feedback**

ID: Pump 113 Pressure

Done

**Inspection Review**

Inspection Prompt:  
Select pressure range (PSI)

Inspection Result:  
higher than 160

Message: **DANGER**  
Switch to spare, call Bill M.

danger inspection result  
danger alarm message

**Figure 19.** Example of a Process/Inspection Feedback Display.

It should be noted that Inspection POINTs do not provide trend capabilities. If both trending and alarm messages are required, set up two POINTs, a standard process POINT for exact numerical data entry and trending, and a process/inspection POINT that provides alarm messages.

### How to Collect MCD Probe Vibration and Temperature Measurements Using the MARLIN

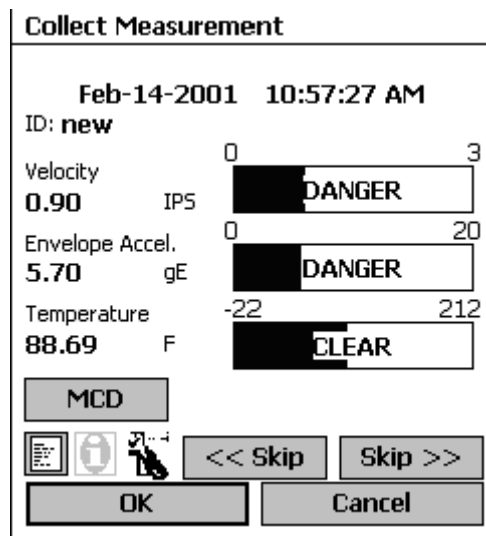
Combining the MARLIN with an MCD probe provides more powerful vibration and temperature monitoring. As mentioned earlier, vibration measurements include vibration velocity for general purpose machinery monitoring, and enveloped acceleration vibration for bearing and gear monitoring.

- You must attach the temperature magnet probe tip to the MCD probe to monitor temperature, or use an MQC computerized stud.

**To begin MCD Probe data collection with the MARLIN:**

- Using the provided cable, connect the MCD probe to the MARLIN's RS232 serial communications port or the MCD cup adapter.
- Attach the MCD's temperature magnet probe tip to the machine measurement POINT.
- In the MARLIN's Hierarchy display, highlight the MCD POINT for which you wish to collect data.  
 Or, scan the POINT's barcode, or attach the probe to an MQC computerized stud and press the MARLIN's "Scan" hardware button to scan the barcode / MQC stud. The MARLIN automatically identifies the POINT and initiates its data input display.
  - When using MQC smart studs, you must always connect the MCD probe to the stud prior to initializing the data input display.
- On the MARLIN, press the **Collect** command button (or press the "Next" hardware button (user defined)). The MCD POINT's data input display appears.

Collect



**Figure 20.** An MCD Data Input Display.

- As with all data input displays, the POINT's previous recorded values and their alarm status show when the display initiates only if **Show Previous Data** is activated in the **Operator Preferences**.
- Press the display's **MCD** button to initiate data collection (or press the "Next" hardware button, if configured). The display updates to show new vibration and temperature values and their alarm status.
  - If you suspect data collection was not accurate, press the **MCD** button again to retake the POINT's measurements.

### To store the collected vibration/temperature values:

- Press the data input display's **OK** button (or press the "Next" hardware button, if configured). The new value is stored and the POINT's Feedback display initiates, as specified in the **Operator Preferences' Verification Mode** option, allowing you to view current vs. last vs. baseline information for the POINT's velocity measurement and the velocity measurement's trend plot.
  - Each measurement in the MCD POINT is reviewed in sequence (velocity, enveloped acceleration, and temperature).
  - The Feedback display is fully described in the following **How to Review Collected Data** section.
- Press the velocity Feedback display's **Done** button (or press the "Next" hardware button (user defined)) to view the POINT's enveloped acceleration measurement Feedback display.
- Press the enveloped acceleration Feedback display's **Done** button (or press the "Next" hardware button, if configured) to view the POINT's temperature measurement Feedback display.
- Press the temperature Feedback display's **Done** button (or press the "Next" hardware button, if configured) to exit the Feedback mode and automatically initiate the next POINT's data input display.

### Conditional POINTs

Conditional POINTs allow data collection only when a specified condition exists. As an example, let's assume Inlet Pressure is specified as the conditional POINT for Outlet Pressure (dependent POINT). In order for Outlet Pressure to be collected, Inlet Pressure must have a reading of 1000 PSI or greater (condition).

- Conditional POINTs are set up in Machine Analyst software and downloaded to the MARLIN DAD.

### To collect conditional POINT data:

- Take data for the conditional POINT as normal (Inlet Pressure). Data collection for the conditional POINT must precede data collection for the dependent POINT.
- Continue collecting data until you approach the dependent POINT (Outlet Pressure). If the specified condition is met (Inlet Pressure reading is 1000 PSI or greater), data collection for the dependent POINT occurs as normal. If the specified condition is not met, MARLIN automatically skips the dependent POINT and advances the next POINT in the hierarchy.





## How to Review Collected Data

### Overview

During data collection, Feedback review displays appear (if configured in **Operator Preferences**) after each POINT is recorded, allowing the operator to:

- Observe updated alarm indicators to monitor the recorded POINT's severity level (and alarm messages with Inspection POINTs).
- Evaluate the accuracy (validity) of the measurement (by comparing it to its previously recorded value).
- Observe the measurement's trend plot.
- View alarm instructions.

These same Feedback displays may be accessed at any time from the MARLIN's Hierarchy display.

### How to Access Feedback Displays

To initiate Feedback displays from the hierarchy:

- In the MARLIN's Hierarchy display, highlight the POINT whose collected data you wish to review.

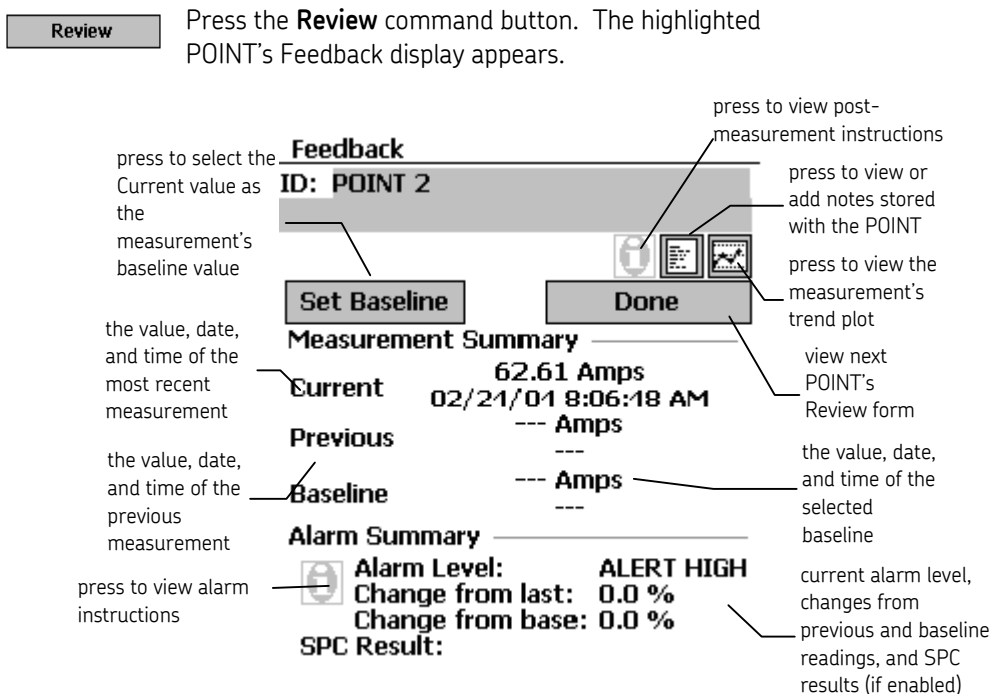


Figure 1. A Feedback Display.

- Use the **Feedback** display's information to analyze the measurement's status.

- Press the **Feedback** display's down arrow button to advance to the next measurement's Feedback display.
  - **SPC Results** are discussed in the **Statistical Process Control** section.
  - **Note** button operations are identical to those previously described in data input fields.

**Post-measurement Instructions** – If a post-measurement instruction has been assigned to the POINT, the **Instruction** button (**i**) in the POINT description area is enabled on the Feedback form. Click the **Instruction** button (**i**) to view the post-measurement instruction.

**Alarm Instructions** – If an alarm instruction has been assigned to the POINT, the **Instruction** button (**i**) in the **Alarm Summary** area is enabled. Click the **Instruction** button (**i**) to view the alarm instruction.

Two formats of measurement/alarm instructions are supported in the MARLIN:

**Freeform** – Display in MARLIN's text viewer. Press **Done** when you have finished viewing the freeform instruction.

**Hyperlink** – Previously downloaded instructions that display using the originating application. For example, a link may be created for an instruction file in ".doc" file format, and displayed if the instruction file and Microsoft Word are available on the MARLIN.

The linked document must be downloaded to the MARLIN using ActiveSync. For details on downloading hyperlink instruction files to the MARLIN, reference your ActiveSync User Manual.

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## How to View a POINT's Trend Plot

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Trend plots allow you to easily compare a measurement's most recent reading to its previous readings and alarm setpoints, allowing you to see how the POINT is "trending" over time. Trend plots are an easy and accurate method of detecting gradual changes in machinery condition, changes that might otherwise be overlooked.

### To view a measurement's trend plot:

- Initiate the measurement's **Feedback** display.
- Press the **Feedback** display's trend plot button next to the POINT ID and description. The **Trend Feedback** display appears.

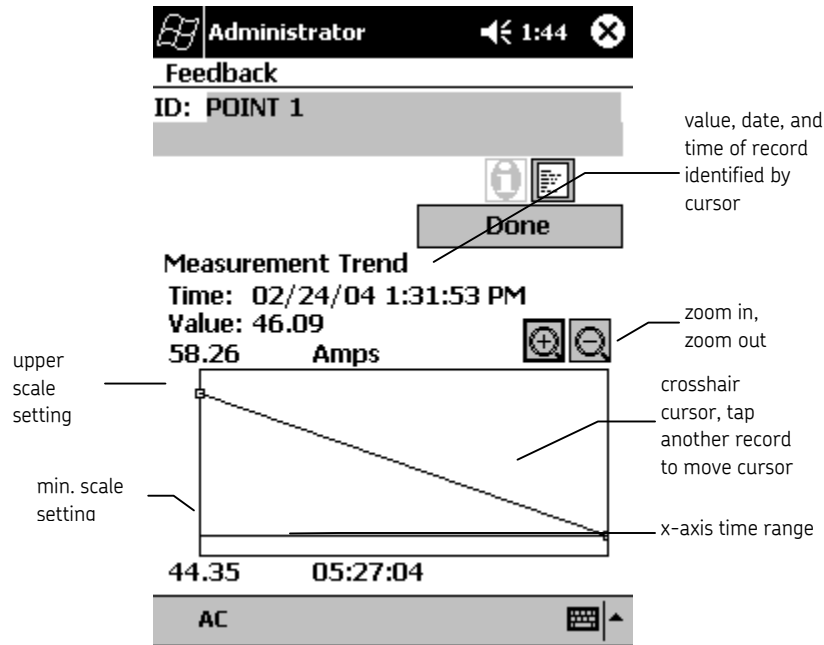


Figure 2. A Trend Display.

**To move the plot's cursor:**

- Press the pen to the data record whose information you wish to display above the trend plot.

**To zoom in on the trend display:**

- Press the zoom in button to initiate zoom mode. The zoom in button dims to indicate zoom mode is active.
- Drag the pen tip from the left of the first record to the right of the last record you wish to display in the zoomed plot. The trend plot updates (the selected POINTs fill the trend plot area). The plot's amplitude and time axes adjust accordingly.
- Repeat this procedure to continue zooming in.
- Press the zoom out button to return to the original trend plot (showing all records).

**To view trend plots for other POINTs/measurements:**

- Press the display's **Done** button to return to the POINT's **Feedback** display.
- Press the up and down arrows to advance to the next POINT's **Feedback** display, and then press the trend button.

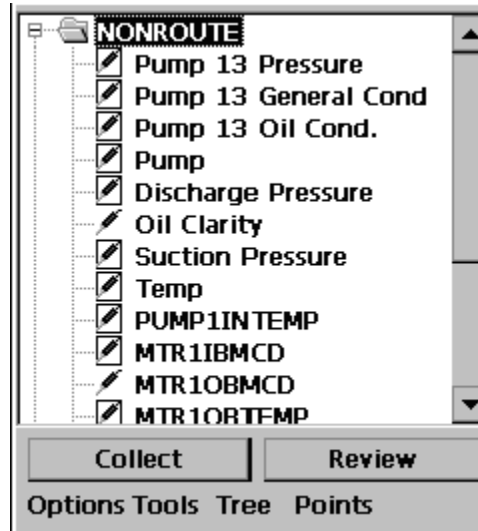


## Adding Non ROUTE POINTs

### Overview

---

Always displayed at the top of the hierarchy list, the **Non ROUTE SET** stores all measurement POINTs set up on the MARLIN (all POINTs that were not downloaded from Machine Analyst software).



**Figure 1.** The Highlighted Non ROUTE SET.

When uploading MARLIN data to Machine Analyst software, the software prompts whether to upload all Non ROUTE POINTs. If enabled, the Machine Analyst software uploads all Non ROUTE POINTs into a Non ROUTE SET in the software.

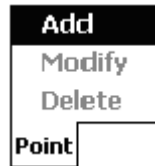
- Non ROUTE data collection and review operations are identical to those already described.

## Adding Non ROUTE POINTs

---

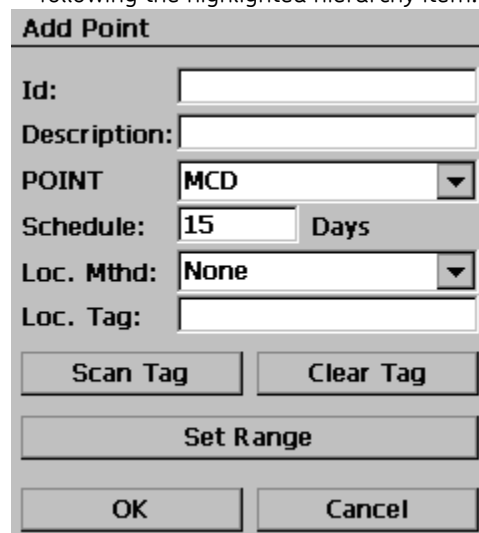
The operator's access level must be **Admin** or **Full** to add, modify, or delete POINTs on the MARLIN.

To add a Non ROUTE POINT:



**Figure 2.** The **Point** Menu's **Add** Option.

- In the Hierarchy display, highlight the **Non ROUTE** SET, or any non-ROUTE POINT, and select the **Point** menu's **Add** option. The POINT setup display appears.
  - When adding a new POINT, the new POINT is inserted immediately following the highlighted hierarchy item.

A screenshot of the 'Add Point' setup display. It features several input fields and buttons. The fields are: 'Id:' (text input), 'Description:' (text input), 'POINT' (dropdown menu with 'MCD' selected), 'Schedule:' (text input with '15' and 'Days' label), 'Loc. Mthd:' (dropdown menu with 'None' selected), and 'Loc. Tag:' (text input). Below the fields are three buttons: 'Scan Tag', 'Clear Tag', and 'Set Range'. At the bottom are 'OK' and 'Cancel' buttons.

**Figure 3.** The MARLIN POINT Setup Display.

POINT setup fields are:

**Id** - Enter up to 20 characters that identify the POINT. The specified POINT ID appears in the **Non ROUTE** hierarchy list.

**Description** - Enter up to 32 characters that help identify the POINT.

- When interfacing the MARLIN with SKF's CMAC4200 Infrared Thermometer, use the **Description** field to specify the measured material's emmissivity rating. For more information on setting emmissivity ratings, reference the **Setting Emmissivity** section at the end of this your hardware's user manual.
- Since the POINT description appears on MARLIN data collection displays, it may be useful to issue specific instructions to the

operator (for example, “judge oil condition from spigot”) using the **Description** field.

**POINT Type** - Select the POINT’s measurement type(s) from the drop down list.

- The **Wild Card** POINT type allows the operator to select any input display and type in a custom units string, providing a means to input and trend any process type variable.

**Schedule** - Specify how often data should be collected.

**Location Method** - Specify the method used to identify the POINT. Choices are: **None**, **Barcode**, or **MQC ID**.

**None** - While collecting data, the POINT is manually identified using hierarchy list controls.

**Barcode** - The MARLIN’s barcode scanner is used to automatically locate and identify the machine / POINT in the MARLIN hierarchy list. If the *machine* is scanned, the MARLIN automatically locates and initiates the machine’s data input display. If the *POINT* is scanned, the MARLIN automatically locates the POINT in the hierarchy list and initiates the POINT’s data input display.

- Not all documented features are available in all MARLIN data managers. Refer to your MARLIN data manager hardware manual for device specific information.

**MQC ID** - An MQC computerized stud connection automatically locates and identifies the POINT in the MARLIN hierarchy list, and automatically initiates the POINT’s data input display.

- On the MARLIN I-Pro, the **Location Method** options include **Barcode / RFID**. The SKF I-Pro RF Interrogator scanner (Model Number CMRF 6100) is an available I-Pro optional accessory that allows the MARLIN I-Pro to use either barcode or RFID labels.

**Location Tag** - Enter a unique identifier that links the POINT to a specific machine location.

POINT Setup display's first page command buttons are:

Scan Tag

**Scan Tag** - Press to automatically read and store the POINT's **Location Tag** (using the specified **Location Method** process). The scanned **Location Tag** is stored with the MARLIN POINT and automatically uploads to the Machine Analyst database during an upload. This is the fastest and most accurate method for entering each POINT's **Location Tag** into the database.

- If the **Location Method** is set to **MQC ID**, connect the MCD probe to the MQC stud prior to pressing the **Scan Tag** button.

Clear Tag

**Clear Tag** - Clears the POINT's **Location Tag**, allowing you to correctly reenter the tag.

Set Range

**Set Range** - Displays the POINT setup **Set Range** display where you specify alarm settings, input display type, etc. for the POINT.

- Fields on **Set Range** setup displays vary depending on the type of POINT being configured (process POINT, MCD probe POINT, or Inspection POINT). Each is discussed below.

### “Process” POINT Set Limits Setup Display

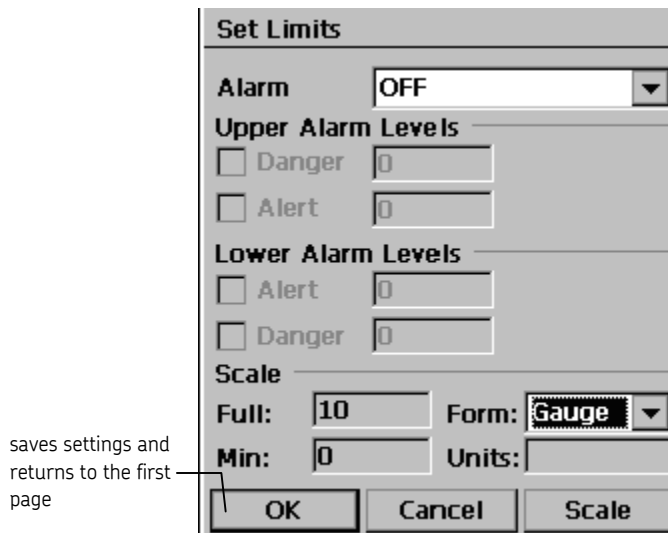


Figure 4. A Process POINT **Set Limits** Setup Display.

**Set Limits** Setup fields are:

**Alarm Type** - Determines when an alarm is registered in relation to alert and danger alarm levels.

- Press the list box to view the choices (**OFF, LEVEL, IN WINDOW, OUT OF WINDOW**).

**OFF** - Disables the process POINT's alarms. Both the **Upper** and **Lower Alarm Levels** setup areas are dimmed (unavailable for this selection).



**LEVEL** - Provides two alarm levels (**Alert High** and **Danger High**). The appropriate alarm is registered if the measured value is greater than either. When selected, the display's **Upper Alarm Levels** area is enabled. The display's **Lower Alarm Levels** fields are dimmed.

**To set "level" alarms:**

- Ensure the check box to the right of the numeric entry box is enabled.
- Write or type in the alarm setpoint value in the numeric entry box.

**IN WINDOW** - Provides four alarm levels. An appropriate alarm is registered if the measured value is between the **Upper / Clear** and the **Lower / Clear** values. Use the previously described method for enabling and setting each alarm level.

-----  
*This is the "OK" area*  
-----**Upper / Clear**-----  
*This is the Alert area*  
-----**Upper / Alert**-----  
*This is the Danger area*  
-----**Lower / Alert**-----  
*This is the Alert area*  
-----**Lower / Clear**-----  
*This is the "OK" area*  
-----

- The **Upper / Clear** and **Lower / Clear** setup fields are always enabled; you must set appropriate values for these fields. **Upper / Alert** and **Lower / Alert** setup fields are optional.

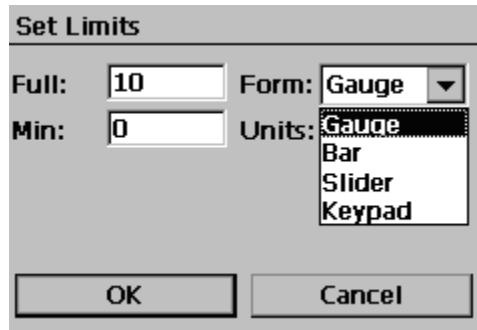
**OUT OF WINDOW** - Provides four alarm levels. An appropriate alarm is registered if the measured value does not fall between the upper / alert and lower / alert alarm settings. Typically used for temperature measurements. Use the previously described method for enabling and setting each alarm level.

-----  
*This is the Danger area*  
-----**Upper / Danger**-----  
*This is the Alert area*  
-----**Upper / Alert**-----  
*This is the "OK" area*  
-----**Lower / Alert**-----  
*This is the Alert area*  
-----**Lower / Danger**-----  
*This is the Danger area*  
-----

- Upper and Lower alarm settings may be negative as well as positive.

To edit the **Scale** area settings:

- Click the **Scale** button at the bottom of the screen. The following display launches:



The image shows a 'Set Limits' dialog box with the following fields and values:

Full:	10	Form:	Gauge
Min:	0	Units:	Gauge

The 'Units:' dropdown menu is open, showing the following options:

- Gauge
- Bar
- Slider
- Keypad

At the bottom of the dialog are two buttons: 'OK' and 'Cancel'.

**Figure 5.** The Process POINT Set Limits Scale Display

**Scale** - Determines the full scale and minimum scale settings for process type POINTs. These settings display at the top and bottom of data input displays (gauge, slider, and bar displays).

**Full Scale** - Enter the maximum value to display on the input graphic display (may be positive, negative, or zero).

**Min. Scale** - Enter the minimum value to display on the input display graphic display (may be positive, negative, or zero). This value must be less than full scale.

**Form Type** - Determines which data input display is used when collecting process data. Input display form options are:

- Gauge**
- Slider**
- Bar**
- Keypad**

**Units:** Write in or type the process POINT's measurement units.

- Click **OK** to save **Scale** settings return to the **Set Limits** display. The new **Scale** settings will display in the **Scale** area. Click **Cancel** to return to the **Set Limits** display without saving.
- After configuring **Set Range** settings, press the display's **OK** button to save and return to the first page, or press **Cancel** to return to the first page without saving settings.

### **“Inspection” POINT Set Range Setup Display**

Set Range setup fields are identical for single and multi-select Inspection POINTs.

Figure 6. An Inspection POINT Set Range Setup Display.

### Understanding Inspection Alarms and Alarm Messages

Alert or danger **Alarms** may be assigned to each of the five pre-defined **Inspection Results**. In addition, an **Alert Message** may be assigned to alert alarms, and a **Danger Message** may be assigned to danger alarms. During data collection, if the operator selects an **Inspection Result** that is assigned an alert or danger **Alarm** status, the MARLIN displays the appropriate **Alert** or **Danger Message** to the operator. This method provides a means of controlling actions in specific conditions.

Inspection POINT **Set Range** setup fields are:

**Inspection Prompt** - Enter a prompt that instructs the operator to perform the specific test or inspection. Examples are: "Check pH level" or "Describe lubricant condition."

**Insp. Result** - Enter up to five expected results for the inspection or test. These should be the most likely results of the test or inspection. Examples are: possible lubricant conditions, a range of pH litmus test colors, machine operating/machine not operating choices, normal/louder than normal/extremely loud noise levels, etc.

- On the Machine display, the **Machine OK** button specifies and stores the first non-alarm Inspection Result for each of the machine's Inspection POINTs. Therefore, when listing the POINT's Inspection Results, ensure the first non-alarm inspection result is the preferred default result.

**Yes/No** - Single-select inspection POINTs only. Enable when using a yes/no question to automatically set the first two choices to choices to "Yes" and "No" respectively. The other choices become unavailable.

**Alarms** - Set each **Inspection Result's** alarm assignment. Options are **None**, **Alert**, or **Danger**.

To access the alert and danger messages fields, press the **Messages** button:

**Alert Message** - This message associates with all **Inspection Results** assigned an alert alarm. Enter a message that displays to the operator when

**Inspection Results** with an alert alarm assignment are selected by the operator. This message should inform the operator of his immediate actions in this “alert” situation.

**Danger Message** - This message associates with all **Inspection Results** assigned a danger alarm. Enter a message that displays when **Inspection Results** with a danger alarm assignment are selected by the operator. This message should inform the operator of his immediate actions in this “danger” situation.

- After configuring the Inspection POINT **Set Range** settings, press the display's **OK** button to save and return to the first page, or press **Cancel** to return to the first page without saving settings.

### “MCD Probe” POINT Set Limits for MCD Setup Display

MCD probe POINTs store up to three measurements (vibration velocity, enveloped acceleration vibration, and temperature). Alarm settings and units for each data type are set in the MCD probe **Set Limits for MCD** setup display's three different measurement types.

The screenshot shows a dialog box titled "Set Limits for MCD". It contains three radio button options: "Accel. Enveloping" (which is selected), "Velocity", and "Temperature". Below the "Accel. Enveloping" option, there are two checked checkboxes: "Danger" with a value of 5 and "Alert" with a value of 2. The units are set to "gE". At the bottom of the dialog are "OK" and "Cancel" buttons.

**Figure 7.** The MCD Probe POINT **Set Limits for MCD** Setup Display – Accel. Enveloping Settings.

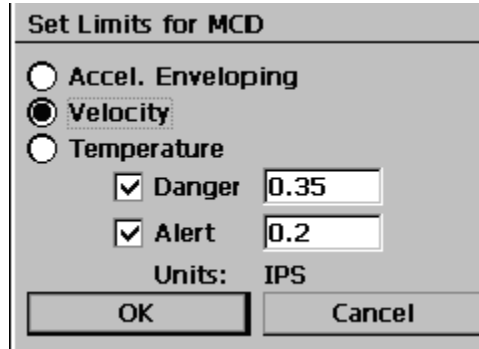


Figure 8. The MCD Probe POINT Set Limits for MCD Setup Display – Velocity Settings.

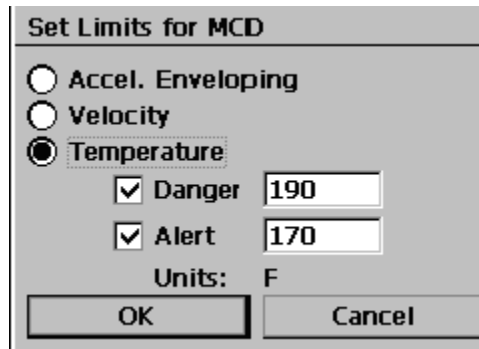


Figure 9. The MCD Probe POINT Set Limits for MCD Setup Display – Temperature Settings.

### Alarms

Each measurement allows two “level” alarm settings, Alert and Danger. An appropriate alarm is displayed if the measured value is greater than either.

#### To set MCD measurement alarms:

- **Accel. Enveloping, Velocity, and Temperature** are configured individually in sequence.
- Select the measurement type (**Accel. Enveloping, Velocity, or Temperature**) using the option buttons to configure each one in turn.
- Enable the alarm setting using the checkboxes to the left of each measurement’s numeric input fields. A numeric input box is made available.
- Place the cursor in the alarm input field and press the keyboard icon to access the keyboard input, or use the MARLIN’s built-in hardware keypad.
  - Not all documented features are available in all MARLIN data managers. Refer to your MARLIN data manager hardware manual for device specific information.
- Type in the alarm setting and press the **OK** button.
- Repeat these steps to set alarm levels for all appropriate measurements.

### Units

For *enveloped acceleration* measurements, units are displayed as **gE**.

For *velocity* measurements, units are displayed as **IPS** (English) or **mm/s** (metric).

For *temperature* measurements, units are user defined. Default is **Fahrenheit** (English), or **Celsius** (metric).

- Access the **Operator** display's **Global Preferences** area to modify unit settings (metric or English, and Fahrenheit or Celsius for temperature.)

**IMPORTANT -**  
***MCD POINT units are set when the MCD POINT is created and cannot be modified.***

- After configuring **Set Range** settings, press the display's **OK** button to save and return to the first page, or press **Cancel** to return to the first page without saving settings.

## Modifying POINTs/SETs

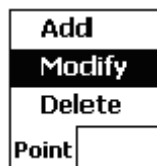
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- The operator's access level must be **Admin** or **Full** to add, modify, or delete POINTs.

Modifying *Non ROUTE POINTs* is the primary **Modify** function. You cannot modify the setup of POINTs downloaded from Machine Analyst software except to scan in the SET or POINT's **Location Tag**.

- If data has previously been collected for the POINT (or the POINT was downloaded from Machine Analyst), the **POINT** drop-down list is unavailable for modification.

To modify POINTs/SETs:



**Figure 10.** The **Point** Menu's **Modify** Option.

- In the Hierarchy display, highlight the POINT or SET whose configuration you wish to modify and select the **Point** menu's **Modify** option. The specified POINT's setup display appears.

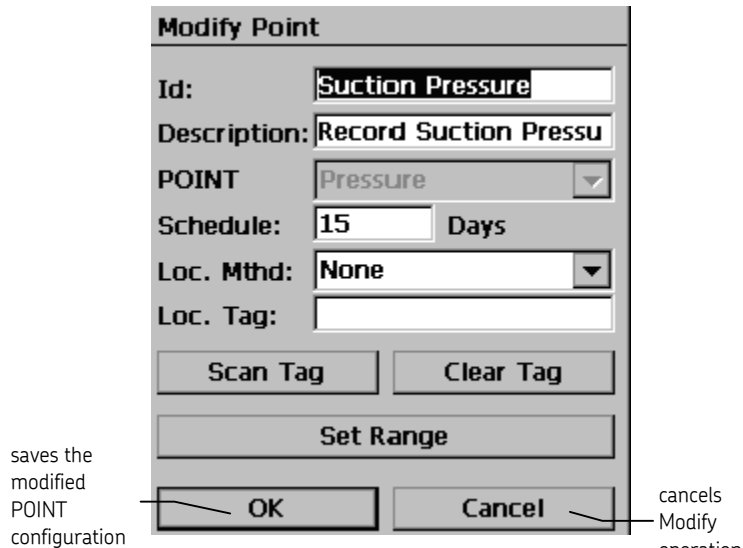


Figure 11. The Modify POINT Setup Display.

Setup display fields operate as previously described in the section titled **Adding Non ROUTE POINTs**.

- Using both POINT setup and **Set Range** parameters, modify the POINT's setup as desired (**Location Tag** only for downloaded POINTs) and press the first page's **OK** button to save your changes.
  - If data has previously been collected for the POINT (or the POINT was downloaded from Machine Analyst), the **POINT** drop-down list is unavailable for modification.

## Deleting Non ROUTE POINTs

- The operator's access level must be **Admin** or **Full** to add, modify, or delete POINTs.

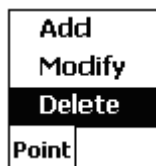


Figure 12. The Point Menu's Delete Option.

### To delete Non ROUTE POINTs:

- In the Hierarchy display, highlight the Non ROUTE POINT you wish to delete and select the **Point** menu's **Delete** option. You are prompted to confirm the deletion.
  - To free up MARLIN memory, occasionally "clear" the data from within the Machine Analyst software. Reference the Machine Analyst user manual for details.

## Modifying Machines

---

Machines that are set up and downloaded to the MARLIN from Machine Analyst (in ROUTEs) can be modified on the MARLIN.

To modify a Machine:

- Highlight the desired Machine in the hierarchy list.
- Select the **Point** menu's **Modify** option. The **Modify Set** display appears.



The screenshot shows a window titled "Modify Set" with the following fields and buttons:

- Id:** MARLIN Demo Machine
- Descr:** Demo Machine MARLIN
- Last Modified:** 12/4/01 4:15:35 PM
- Loc. Mthd:** A drop-down menu currently showing "None".
- Loc. Tag:** An empty text input field.
- Buttons:** "Scan Tag" and "Clear Tag".

**Figure 13.** The Modify Set Display.

The following fields are available in the **Modify Set** display:

**Id:** - Displays the Machine name.

**Description:** - Displays the Machine description.

**Last Modified:** - Displays the data and time at which the Machine was last modified.

**Location Method:** - Select the appropriate Location Method from the drop-down list.

**Location Tag:** - Enter the barcode tag.



## Generating MARLIN Reports

### Overview

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- Standard reports can be displayed in the MARLIN data manager as described below. Alternatively, reports can also be displayed using the database software (Machine Analyst or Machine Inspector) on a PC.

#### To ready the MARLIN for Reports:

- Launch the MARLIN program.
- From the MARLIN's Hierarchy display, select the **Tools** menu's **Reports** option. The **Reports** display appears, allowing you to specify which POINTs to include in the report (**Report Scope**), the **Report Type**, and the **Report Title**.

### Generating MARLIN Reports

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Specify information to include in the Report in the following fields:

**Title** - Allows you to input report title to appear at the top of the printed report.

- Place the cursor in the **Title:** text field and press the keyboard icon to activate the alphanumeric keyboard.
- Type in the desired title. This will display on the report.

#### Report Scope

Select which POINTs to include in the report using the option buttons. Select one choice only.

The screenshot shows a dialog box titled "Reports". It has a "Title:" label followed by a text input field. Below that is a "Scope" section with three radio button options: "All" (which is selected), "Open Item(s)", and "Selected Item". Underneath is a "Type" section with six radio button options: "Exception" (selected), "Last Measurement", "Overdue", "End of Shift", "History", and "Statistics". At the bottom of the dialog are two buttons: "View" and "Done".

Figure 1. The Report Selection Screen.

Options are:

**All** – Reports on all POINTs stored in the MARLIN, including Non-ROUTE POINTs.

**Open Item(s)** – Reports on all POINTs branching from all open hierarchy items (ROUTES, SETs, and machines). Enables you to report only POINTs in specified (open) hierarchy items.

**Selected Item** – Includes all POINTs branching from the selected hierarchy item (regardless of whether items branching from the selected item are open or closed). For example, if a ROUTE is selected (highlighted) and three SETs branch from the ROUTE, with each SET containing any number of POINTs, then all POINTs in all three SETs are included in the report, regardless of whether their parent SET is open or closed.

## Report Type

Select the type of report using the option buttons. Select one choice only.

Options are:

**Exception** – Produces a report of measurements in violation of their alarm settings, including Statistical Process Control (SPC) alarms. In the report, the type of alarm is represented by the following alarm conditions:

### Alarm Conditions

Danger High  
Danger Low  
Alert High  
Alert Low  
SPC  
Inspection Alert  
Inspection Danger

**Last Measurement** – Reports the last measurement values for POINTs included in the report scope.

**Overdue** – Produces a report of all POINTs that are overdue for measurement (POINTs whose most recent measurement timestamp plus the POINT's **Schedule** setting is older than the current system time).

**End of Shift** – For the specified Report Scope, produces a report of all POINTs with new data (data collected since the last upload).

**History** – For the specified Report Scope, produces a report of all POINTs that have “coded” or “user” notes attached.

**Statistics** – Produces a report of statistics for all SETs specified in the Report Scope. Statistics include the total number of POINTs in each specified SET, the number of POINTs in alarm for each specified SET, and the overdue POINTs in each specified SET.

- After specifying the report's scope, title, and report type, press the **View** button located at the bottom of the display to launch the HTML report on the MARLIN.
  - Machine Inspector software provides a variety of report formats for data uploaded from the MARLIN.

SKF 12/5/01		New Report	
Overdue			
ID	Description	Days	Overdue
*R* MARLIN Demo Plant			
*S* MARLIN Demo Set			
*M* MARLIN Demo Machine			
123ABC I Pressure	Take Suction Pressure	40.38	
123ABC D Pressure	Take Discharge Pressure	1118.63	
123ABC Oil Clarity	Oil Sample from Spigot	40.38	

Figure 2. An Example Report View.



# Appendix A

## Statistical Process Control

### Overview

---

When the MARLIN's **SPC** feature is enabled in the **Operator Preferences** setup area, 18 **Statistical Process Control** rules apply to process trends.

- The operator must have stored at least 30 data records for the MARLIN to enable the SPC feature.

During data collection, when you press the **OK** button to record the current value, the value is automatically compared to the 18 SPC rules. If any rules are violated, an appropriate message is displayed in the lower area of the measurement's **Feedback** display's **SPC Result** field. An **SPC** button is available in the upper area of the **Feedback** display.

- Press the **SPC** button to display the SPC results and violated rules in detail.

The 18 rules and their corresponding messages are listed below:

1. Rule - A record is above the upper control limit.  
Message - Upper control limit exceeded.
  - A *record* is a stored measurement value.
2. Rule - Of three consecutive records, two are more than two standard deviations above the centerline.  
Message - Process out of control (Rule 2).
  - *Standard deviation* - The positive square root of the expected value of the square of the difference between a random variable and its mean.
3. Rule - Two consecutive records are more than two standard deviations above the centerline.  
Message - Process out of control (Rule 3).
4. Rule - Of five consecutive records, four are more than one standard deviation above the centerline.  
Message - Process out of control (Rule 4).
5. Rule - The last four consecutive records are more than one standard deviation above the centerline.  
Message - Process out of control (Rule 5).
6. Rule - Seven consecutive records are above the centerline.  
Message - Process out of control (Rule 6).
7. Rule - The last six records are monotonically increasing.  
Message - Process out of control (Rule 7).
  - *Monotone increasing function* - A function which never decreases, that is, if  $x \leq y$  then  $f(x) \leq f(y)$

8. Rule - Of the last ten consecutive values, eight are in a monotonically increasing pattern.  
Message - Process out of control (Rule 8).
9. Rule - Given two consecutive records, the second is at least four standard deviations above the first.  
Message - Process out of control (Rule 9).
10. Rule - A record is below the lower control limit.  
Message - Lower control limit exceeded.
11. Rule - Of three consecutive records, two are more than two standard deviations below the centerline.  
Message - Process out of control (Rule 11).
12. Rule - Two consecutive records are more than two standard deviations below the centerline. Message - Process out of control (Rule 12).
13. Rule - Of five consecutive records, four are more than one standard deviation below the centerline.  
Message - Process out of control (Rule 13).
14. Rule - The last four consecutive records are more than one standard deviation below the centerline.  
Message - Process out of control (Rule 14).
15. Rule - Seven consecutive records are below the centerline.  
Message - Process out of control (Rule 15).
16. Rule - The last six records are monotonically decreasing.  
Message - Process out of control (Rule 16).
17. Rule - Of the last ten consecutive values, eight are in a monotonically decreasing pattern.  
Message - Process out of control (Rule 17).
18. Rule - Given two consecutive records, the second is at least four standard deviations below the first.  
Message - Process out of control (Rule 18).

# Appendix B

## Emmissivity

### Setting Emmissivity

---

The amount of infrared energy radiated by an object depends on its emmissivity and its temperature. The emmissivity depends on the type of material being monitored and its surface characteristics. For more accurate non-contact temperature readings, adjust the POINT's emmissivity value for the type of material being measured. A table of materials and their emmissivity ratings is found in Appendix E of your SKF CMAC4200-SL Infrared Thermometer User Manual.

On the MARLIN (or in Machine Analyst), use the temperature POINT's **Description** field to specify the emmissivity rating for the type of surface being measured by the POINT. For example, a painted surface has an emmissivity rating of 0.93, a steel surface 0.80, etc. When the temperature reading is collected with SKF's CMAC4631 Infrared Thermometer, the device is automatically calibrated by the specified emmissivity value and produces a more accurate temperature reading.

#### To specify a POINT's emmissivity rating on the MARLIN or in Machine Analyst:

- In the POINT's **Description** field, enter “..E0.##” or “..e0.##”. Where ## represents the numerical emmissivity rating between .10 and .99. There can be no spaces between the first “.” and the last number specified.

Some examples of emmissivity ratings as specified in the POINT **Description** field are:

For a painted surface - ..E0.93

For a plastic surface - ..e0.95

For a steel surface - ..E0.80





# Appendix C

## Firmware Security

### Using the Version 4.2 Key Code

---

MARLIN firmware version 4.2 implements firmware security to safeguard against illegal firmware distribution.

To upgrade to version 4.2, the customer must obtain and input a “key code” the first time the MARLIN is run with 4.2 firmware. Without the key code, the MARLIN version 4.2 cannot upload collected data to the host PC.

#### To upgrade to version 4.2 firmware:

- First, obtain your MARLIN's **Unit ID** number, which will be needed to obtain the necessary key code.

*On the MARLIN Pro*, press the **Start** button and select **Programs**. From the programs list, select the **About the CMDM-5000** option. The **About** dialog displays the **Unit ID** number. Write this number down for easy access when speaking with SKF Technical Support.

*On the MARLIN Pocket Pro*, press the **Start** button on the upper left hand corner. And select **Settings**. Select the **System** tab. Tap the **Symbol Settings** icon. Select the **System** tab. The **UUID Part 2:** field contains the Unit ID, *not the UUID Part 1: field*. The last 12 digits of the alphanumeric code in the **UUID Part 2:** is the Unit ID. Write down the Unit ID for easy access when speaking with SKF Technical Support.

Example: A1CA**1E987F080079** – bold is the Unit ID.

- Another way of getting the **Unit ID** is to run the Marlin application version 3.2 after installing the 4.0 firmware. An “Enter Key Code” dialog displays showing the **Unit ID** just above the on-screen keyboard. Note, this requires that you run the firmware upgrade first (installing the firmware upgrade is described in the following steps).
- Next, call SKF Technical Support at (800) 523-7514. Provide the SKF service representative with your unit's 12-digit **Unit ID** number. The SKF service representative will then provide the necessary 12-digit key code. Write the key code down for easy reference when upgrading to version 4.2.

*On the MARLIN Pro*, Next, upgrade the Pro's operating system to Win CE version 3.0. MARLIN version 4.2 and later firmware requires Win CE 3.0. The Win CE 3.0 upgrade and installation instructions are located on the Firmware Upgrade CD. Reference file 31906400.pdf for Win CE 3.0 operating system upgrade installation procedures.
- Next, install the 4.2 firmware upgrade. Reference the 31906400.pdf file document located on the Firmware Upgrade CD for firmware upgrade installation procedures specific to your MARLIN unit.

- Next, on the MARLIN Pro, run the MARLIN application. A dialog prompts you to enter the 12-digit key code. Enter the key code and press **OK**. The MARLIN program's title screen displays, indicating the upgrade was successful.
  - If you do not enter the key code, you must enter at least one number to bypass the "Enter the Key Code" display. You then have the option to try again, or cancel the key code effort (if cancelled, the MARLIN will not have data upload capability, and you are re-prompted to enter the key code each time you start the MARLIN application).

# Appendix D

## Work Notification

### The MARLIN Work Notification Feature

---

The MARLIN and SKF Machine Work Notification software work together to allow you to generate work notifications to effectively manage plant maintenance. Work notifications may be generated from the MARLIN device, allowing machinery maintenance personnel to walk a ROUTE, and create work notification(s) immediately as problems are detected or observed. Work notifications can then be uploaded to SKF Machine Analyst for MARLIN or SKF Machine Inspector software, where further management tools, including editing, reports, approval, etc. are available.

- The MARLIN work notification features are only operable if the host computer is running Machine Analyst software version 3.1 or higher, with the work notification plug-in installed.

The available SAP interface plug-in allows you to automatically submit work notifications to the SAP CMMS system.

- The SAP interface plug-in is an optional component purchased separately.

### SKF Machine Work Notification Software Overview

---

SKF Machine Work Notification software is the term used to describe Machine Analyst with the work notification plug-in.

SKF Machine Work Notification software and MARLIN devices are used to generate work notifications for machinery problems. In SKF Machine Work Notification software, the work notifications are managed, reviewed, submitted, and archived. Machine Monitor processes submitted work notifications, and connects to the compatible CMMS (Computerized Maintenance Management Software) system, such as SAP, if available.

- Refer to your Machine Analyst and SKF Machine Work Notification User Manuals for more information on software operations.

### Administrative Setup

---

The administrator manages work notification access among operators. On the MARLIN's **Administrator** form, select to enable or disable each operator's access to the following work notification procedures:

**View H-WN** – Enable to allow the current operator to view previously created (historical) work notifications. This feature is useful if you want to allow the operator to find out whether a machine problem has already been reported. For example, if the operator notices a machine leaking oil while walking their ROUTE, they can view the previously created work notification list to see if the problem has already been

documented in a work notification entry. If it has not, the operator can notify the supervisor (or applicable personnel) to document the issue.

**Create** – Enable to allow the current operator to create a work notification. This feature is useful if you want to allow the operator to create work notifications while walking their ROUTE. For example, if the operator notices excessive machine noise, they can create a work notification immediately and upload it along with their other collected data, streamlining the process and enabling quicker corrective action.

## Creating Work Notifications

Before creating new work notifications, you must first specify work notification settings in the SKF Machine Work Notification software. These settings, including **Priorities, Problem Descriptions, Corrective Actions,** and **Work Types,** are used to add important details when generating work notifications.

Once created, perform a **Download** in Machine Analyst to transfer these settings to the MARLIN, or use **MARLIN Transfer / Status** tab's **Config** button to transfer the work notification settings to the MARLIN device.

## Work Notifications – Machines Previously Downloaded to the MARLIN

To create a new work notification on a machine that has been downloaded from Machine Analyst:

- From either the **Machine** or **POINT** display, click the **Work Notification** icon to display the **Work Notification** Entry form.

The screenshot shows the 'Work Notification Entry Form' on a handheld device. At the top, the status bar shows 'Administrator', a signal strength icon, a battery icon, and the time '10:11'. The form fields are as follows:

- WN Entry: 11/16/04 10:09:54
- Operator: Administrator (with a 'Has existing WNs' annotation pointing to the field)
- Location: Functional Loca (dropdown)
- Function Location: No Functional Location>
- Work Type(s): BC (with a 'Work Types button' annotation pointing to the field)
- Priority Text: (1)High (dropdown)
- Problem Description: Leaky Seal (with a 'Details buttons' annotation pointing to the field)
- Corrective Action: Repair Seal (with a 'Details buttons' annotation pointing to the field)
- Fix by Date: 11/16/04 (dropdown)

At the bottom of the form are 'Save' and 'Cancel' buttons. A keyboard icon is visible at the very bottom of the screen.

Figure 1. The Work Notification Entry Form.

Use the **Work Notification Entry** form to create a new work notification for the current machine.

**WN Entry** – Displays the date and time the work notification was generated.

**Operator** – Displays the current operator name.

**Location** – Displays the selected source for identifying Machine location, either **Functional Location**, or **Barcode**. The **Functional Location** is either the machine name or asset name, as determined by the Machine Analyst or Machine Inspector system administrator. The **Functional Location** is the only **Location** option available for Machines and POINTs that have been downloaded to the MARLIN from Machine Analyst or Machine Inspector software (Machines and POINTs that are part of a downloaded ROUTE). For Machines and POINTs that have *not* been downloaded (not part of a ROUTE), both the **Functional Location** and **Barcode** options are available. To identify these machines, you can either select **Functional Location** and manually enter the appropriate text, or select **Barcode** and perform a scan.

- On the MARLIN I-Pro, the **Location** options include **Barcode / RFID**. The SKF I-Pro RF Interrogator (Model Number CMRF 6100) is an available I-Pro optional accessory that allows the MARLIN I-Pro to use either barcode or RFID labels.

**Functional Location / Barcode** – Displays the machine’s scanned barcode or functional location entry, as applicable.

**Work Types** – Displays the assigned work types. Click the **Work Type** button to display the **Work types** form, allowing you to select multiple pre-configured work type descriptions.

**Priority Text** – Select a priority setting from the drop down list.

**Problem Description** – Select a problem description from the drop down list. Click the details button to enter additional information (up to 200 characters) to further explain the problem.

**Corrective Action** - Select a corrective action from the drop down list. Click the details button to enter additional information (up to 200 characters) to further explain the corrective action.

**Fix By Date** – Select the appropriate date by which the problem must be resolved. You may edit the mm/dd/yy field manually, or click the field’s arrow to display a pop-up calendar to assist in date selection.

- Click **Save** to save the new work notification.
  - You can assign multiple work notifications to each machine, as necessary.

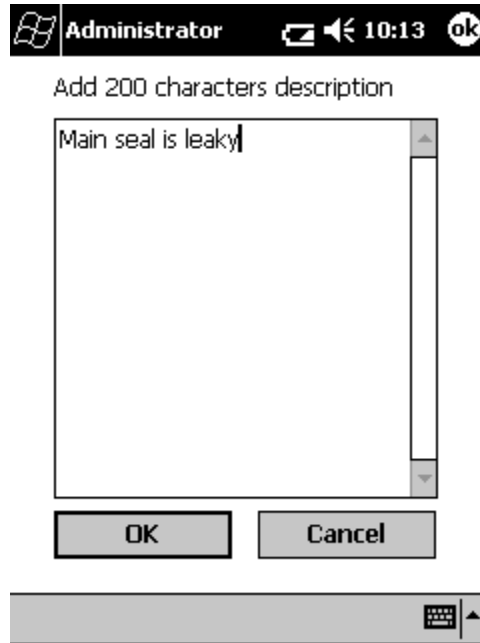
### Work Types Form

The screenshot shows a Windows-style dialog box titled "Work Types Form". The title bar includes the text "Administrator" and the time "10:12". The main content area is a list box containing four items: "BC" (with a checked checkbox), "PMR" (with an unchecked checkbox), "PDM" (with an unchecked checkbox), and "SFTY" (with an unchecked checkbox). Below the list box are four buttons: "Select All", "Clear All", "OK", and "Cancel". At the bottom right of the dialog, there is a small icon representing a keyboard and mouse.

**Figure 2.** The **Work Notification Work Types** Form.

The **Work Types** form allows you to select one or more work type to assign to the current work notification. All previously defined (In SKF Machine Work Notification software) work types display in the form's main window. Click an item's checkbox to select it. Click the **Select All** button to select all available work types. Click the **Clear All** button to clear all selections. Click the **OK** button to return to the **Work Notification Entry** form and apply your work type selections.

### Details Form



The screenshot shows a Windows-style dialog box titled 'Administrator'. The system tray in the top right corner displays the time '10:13' and an 'ok' button. The main content of the dialog is a text area with the text 'Main seal is leaky' and a character count 'Add 200 characters description'. Below the text area are two buttons: 'OK' and 'Cancel'. At the bottom of the dialog is a taskbar with a keyboard icon.

Figure 3. The Work Notification Details Form.

The **Details** form allows you to add additional information to your work notification's problem description or corrective action text. From the **Work Notification** Entry form, click the **Problem Description** or **Corrective Action** fields' **Details** button to display the **Details** form. Enter additional text (up to 200 characters) as needed. Click **OK** when finished to return to the **Work Notification Entry** form.

### Work Notifications – Machines Not Downloaded to the MARLIN (Off-ROUTE)

You can also use the work notification feature to create work notifications for machines that have not been downloaded to the MARLIN. This option enables operators to create work notifications, as needed, by scanning the problem machine's barcode, or by manually entering its functional location.

**To create a work notification for a machine that has not been downloaded to the MARLIN unit:**

- From the **Tools** menu, select the **Work Notification** option. The **Work Notification Entry** form displays.

The screenshot shows a 'Work Notification Entry' form on a device screen. The top status bar displays 'Administrator' and '10:11'. The form fields are as follows:

- WN Entry: 11/16/04 10:09:54
- Operator: Administrator
- Location: Functional Loca
- Function Location: No Functional Location>
- Work Type(s): BC
- Priority: (1)High
- Text: Leaky Seal
- Problem Description: Leaky Seal
- Corrective Action: Repair Seal
- Fix by Date: 11/16/04

At the bottom of the form are 'Save' and 'Cancel' buttons. A keyboard icon is visible at the bottom right of the screen.

Figure 4. The Work Notification Entry Form.

- Select the appropriate location type from the **Location** drop down list. Options include:
  - Barcode** – Select this option to use the MARLIN's barcode scanner to scan and identify the machine.
    - On the MARLIN I-Pro, the **Location** options include **Barcode / RFID**. The SKF I-Pro RF Interrogator (Model Number CMRF 6100) is an available I-Pro optional accessory that allows the MARLIN I-Pro to use either barcode or RFID labels.
  - Functional Location** – Select this option to manually enter the machine's functional location to identify the machine.
- Enter work notification information in the appropriate fields, as described previously.

## Reviewing Existing Work Notifications


---

On the Work Notification Entry form, the clock icon in the display's top right corner indicates work notifications exist for the current machine.



Administrator 10:11 ok

WN Entry: 11/16/04 10:09:54

Operator: Administrator  Indicates previous work notifications exist for the current machine

Location: Functional Loca

Function Location: No Functional Location>

Work Type(s): BC

Priority: (1)High

Text:

Problem Description: Leaky Seal

Corrective Action: Repair Seal

Fix by Date: 11/16/04

Save Cancel

- Click the clock icon to review the previously created work notification(s). The last ten work notifications for the current machine display, along with each work notification’s status, creation date, and fix by date.

Administrator 10:16 ok

Please choose

Status	Creatio...	Fix By ...
New	11/16/...	11/16/...

Display Cancel

Figure 5. The Review Work Notifications Form.

- Select a work notification from the list, and click the **Display** button to display the work notification’s entry form, to review additional work notification details.



# Index

## A

- access level 3-2, 7-2
- activesync
  - disabling 4-2
  - synchronization 4-6
- add point 7-1
- adding operators 3-2
- administration options 3-1
- alarm 7-4, 7-9
  - inspection 7-7
  - messages 5-16, 5-20, 5-22, 5-23, 7-7
  - setpoints 7-5
  - type 7-4
- alarms
  - in window 7-5
  - level 7-5
  - out of window 7-5
- alert message 7-7
- 2-1

## B

- backup 2-3
- bar display 5-13
- barcode scanner 7-3
- brute force 4-6

## C

- check boxes 2-3
- clear tag 7-4
- coded note 5-11, 5-12
- collecting data 5-1
- command buttons 2-3
  - cancel 2-3
  - OK 2-3
- communications
  - parameters 4-2, 4-8

## D

- danger message 7-8
- data
  - input 2-2, 5-11, 7-6
  - reviewing 6-1
  - transfer 4-2
- data collection 5-1, 5-4

- MCD probe 5-23
  - temperature 5-23
  - vibration 5-23
- data collection limit 3-5
- data input displays 5-9
  - multi-select inspection points 5-21
  - process point 5-9
  - single-select inspection points 5-19
- delete database button 2-7
- deleting non-route points 7-11
- deleting operators 3-6
- deleting points 7-11
- derived POINT 5-15
  - calculate 5-15
- derived POINT data input display 5-15
- description 7-2
- verification mode 3-3
- document link
  - measurement instructions 5-10
- downloading 4-2

## E

- editing input 2-2
- emmissivity B-1
  - setting B-1
- emmissivity rating 7-2
- enable machine ok 3-4
- erasing characters 2-2

## F

- feedback display 5-20
- feedback displays 6-1
- form type 7-6
- full scale 7-6

## G

- gauge display 5-14
- generating reports 8-1
- global preferences 3-8

## H

- hardware preferences 3-7
- hierarchy display 2-8

## I

- 2-1

ID 7-2  
in window 7-5

- erasing 2-2
  - 2-1

input display 7-4  
2-1

inspection

- data collection 5-16
- result 5-16, 5-19
- types 5-19

inspection point

- set range 7-6

inspection points 5-22

inspection prompt 7-7

inspection results 7-7

instructions, measurement 5-10

instructions, route 5-1

## K

2-1  
2-1  
2-1

keypad 5-15

keypad data entry display 5-15

## L

LAN location 4-6

limit

- data collection 3-5

list boxes 2-2

location method 7-3

location tag 7-3, 7-10

logging on 2-5

## M

machine

- modifying 7-12
- not operating 5-8

machine display 5-7

machine feedback display 5-9

Machine Inspector 8-2

machine OK 5-8

data input displays 5-9

hardware preferences 3-7

- 2-1

MCD

- accel. enveloping 7-8
- temperature 7-9
- velocity 7-9

data collection 5-23

- 2-1

measurement identification 5-4

measurement points 5-4

menu bar 2-3

menus 2-3

- options menu 2-3
- point menu 2-5
- tools menu 2-4
- tree menu 2-4, 5-2

messages 7-7

- alert 7-7
- danger 7-8

min. scale 7-6

modifying preferences 3-5

modifying sets 7-12

modifying setups 7-10

MQC stud 5-5, 7-3

- data collection 5-24

multi-select inspection 5-19, 5-21

## N

navigation display 2-8

non route 5-1, 7-1

note

- attaching 5-11
- coded 5-11, 5-12
- codes 5-11, 5-12
- text 5-11, 5-12

2-1

## O

open nodes 8-2

operator

- preferences 2-6

operator preferences 3-1

option buttons 2-2

out of window 7-5

## P

password

- changing 2-7

- initial 2-7
- reset 3-5
- 2-1
- point type 7-3
- preferences 2-6, 3-1
  - global 3-8
  - hardware 3-7
  - modifying 3-5
  - setting 3-6
- process measurements
  - using inspection input display 5-22

## R

- report
  - end of shift 8-2
  - exception 8-2
  - history 8-2
  - last measurement 8-2
  - overdue 8-2
  - statistics 8-2
  - title 8-1
- report generation 8-1
- report scope 8-1
- report type 8-2
- restore 2-3
- reviewing data 6-1
- route 4-1
  - instructions 5-1

## S

- scale 7-6
  - settings 7-6
- scan required 3-3
- scan tag 7-4
- schedule 7-3
- scrolling 2-2
- selected nodes 8-2
- serial number 3-7
- set
  - modifying 7-12
- SET display 5-5
- SET feedback display 5-6
- set limits
  - MCD 7-8
- set range 7-4, 7-6
  - inspection prompt 7-7
- sets 5-3
- severity level 5-11

- show previous data 3-4
- single select inspection 5-19
- single-select inspection 5-19
- skip POINT 5-10
- slider display 5-10
- SPC A-1
  - enabled 3-3
- SPC rules
  - button 3-3
- splash screen 2-6
- statistical process control 3-3, A-1
  - 2-1

## T

- temperature
  - data collection 5-23
  - units 3-8
- text boxes 2-2
- text note 5-11, 5-12
- title screen 2-6
- transfer 4-1
  - 4-8
  - status 4-2
- tree menu 5-2
- trend plot 5-23, 6-2

## U

- units 3-8, 7-6, 7-9
  - system 3-8
  - temperature 3-8
- uploading 4-2

## V

- version number 2-6
- vibration
  - data collection 5-23
- viewing reports 8-2

## W

- work notification
  - administrator settings 3-6

## Y

- yes/no checkbox 7-7

## Z

zoom in/out 6-3