

CSI 2125-IS Machinery Health™ Analyzer

User Guide



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1 Introduction

Topics covered in this chapter:

- *User Guide conventions*
- *Technical support*
- *Certification and operation*
- *Precautions*

1.1 User Guide conventions

The following conventions are used throughout this User Guide.

Note

A note paragraph contains special comments or instructions.

⚠ CAUTION!

A caution paragraph alerts you to actions that may have a major impact on the equipment or stored data.

⚠ WARNING!

A warning paragraph alerts you to actions that may have extremely serious consequences for equipment and/or personnel.

1.2 Technical support

Hardware Technical Help

Please have the number of the current version of your firmware ready when you call. For the CSI 2125-IS, select About from the Main Menu to see details such as Unit ID and Firmware Version.

If you have a problem, explain the exact nature of your problem. For example, what are the error messages? When do they occur? Know what you were doing when the problem occurred. For example, what mode were you in? What steps did you go through? Try to determine before you call whether the problem is repeatable.

Software Technical Help

Please provide the software version numbers of your Windows® operating system and AMS Suite: Machinery Health Manager. In AMS Machinery Manager, select Help > About.

If you have a problem, explain the exact nature of your problem. For example, what are the error messages? (If possible, take a screen capture of the error message.) When do they occur? Know what you were doing when the problem occurred. For example, what mode were you in? What steps did you go through? Try to determine before you call whether the problem is repeatable.

Please be at your computer when you call. We can serve you better when we can work through the problem together.

Software Technical Support

Emerson Process Management provides technical support through the following for those with an active support agreement:

- Telephone assistance and communication via the Internet.
- Mass updates that are released during that time.
- Interim updates upon request. Please contact Emerson Process Management Technical Support for more information.

Contact information

For Emerson Technical Support and Customer Service Toll Free numbers, email addresses, and hours of operation, please visit

<http://www2.emersonprocess.com/en-US/brands/sureservice/Pages/TechnicalSupport.aspx>

1.3 Certification and operation

Refer to the document titled "Instructions" included with the analyzer for certification details and important safety instructions. Please read and adhere to the important safety instructions at all times.

The following instructions describe requirements for operation in hazardous areas. The CSI 2125-IS has been certified for use ONLY with the supplied power adapter when in a *Non Hazardous Area*. Any attempt to charge or power the analyzer from any other source will render the analyzer's certification permanently invalid.

The SIGNAL socket of the CSI 2125-IS can only be connected to the following transducers by the CA-40 cable:

Type	Brand and Model
Accelerometer	Monitran MTN/1100I Wilcoxon 793-35 Wilcoxon 797-35

The TRIGGER socket of the CSI 2125-IS can only be connected to the following tachometer by the CA-61 cable:

Type	Brand and Model
Hand Tachometer	Compact Instruments Ltd model A2109. When used with the model A2109, this equipment is only suitable for use as Category 2G due to the A2109 having Category 2G/zone1 assessment only.

Third party accessories such as a tachometer, accelerometer, and cables cannot be used with the CSI 2125-IS in a Hazardous Area. If you are unsure of which accessories can be used in hazardous areas please contact Emerson Process Management Technical Support.

⚠ WARNING!

Connect the analyzer to the power adapter only in a *Non Hazardous Area*.

⚠ WARNING!

Open the battery access door only in a *Non Hazardous Area*.

⚠ WARNING!

Charge the battery only in a *Non Hazardous Area*.

⚠ WARNING!

Connect the analyzer to a computer only in a *Non Hazardous Area*.

⚠ WARNING!

Only update the firmware in a *Non Hazardous Area*.

1.4 Precautions

Cleaning

The analyzer is dust resistant. Use a damp, clean cloth for cleaning. Do not use cleaning fluids, abrasives, or aerosols. They could enter the analyzer, causing damage, fire or electrical shock. These substances may also mar the finish of the analyzer.

Avoid water

The analyzer is splash resistant. However, avoid direct contact with water, wet surfaces, or condensing humidity. Keep away from wet locations such as sinks, laundry, wet basements, swimming pools, and so on. If the analyzer is subjected to these conditions, adverse operation may result. If the surface of the analyzer becomes wet, allow it to dry

thoroughly before operation. This analyzer is not certified for use with a Compact Flash card. However, if the analyzer has a card door, do not open the card door in locations where water or other contaminants could enter the analyzer.

Avoid damage or injury

Follow these guidelines to avoid costly damage or injury:

- Place the analyzer on a solid, stable surface when not in use and do not place any heavy objects on it.
- Use only accessories recommended by Emerson Process Management.
- Keep liquids and foreign objects away from your analyzer.
- Never operate your analyzer if any liquid or foreign object has entered it.
- This analyzer is not certified for use with a Compact Flash card. If the analyzer has a card door, do not enter any other object other than recommended PCMCIA type cards into the PCMCIA opening. Electrical shock could result, causing fire or shock hazards as well as damage to your analyzer.

2 Introduction to the analyzer

Topics covered in this chapter:

- *CSI 2125-IS Machinery Health Analyzer*
- *Analyzer buttons and LED lights*
- *Connectors*
- *Battery access door and reset switch*

2.1 CSI 2125-IS Machinery Health Analyzer

The CSI 2125-IS Machinery Health Analyzer is an intrinsically safe vibration analyzer that allows you to perform route-based and off-route data collection on equipment in a *Hazardous Area*. The CSI 2125-IS Machinery Health Analyzer has an internal (Nickel Metal Hydride) battery for use in a *Hazardous Area*. With AMS Suite: Machinery Health Manager, you can use the Data Transfer program to load routes on the analyzer and upload the collected data to perform analysis and reporting.

Due to the restrictions imposed on the hardware design by Intrinsic Safety design rules, the CSI 2125-IS responds more slowly to button presses than other CSI-branded analyzers. Give the analyzer a moment to respond to button presses.

2.2 Analyzer buttons and LED lights

Figure 2-1: Analyzer buttons and LED lights



- A. Numeric keys
- B. Arrow keys
- C. Enter
- D. Red LED
- E. Amber LED
- F. Green LED
- G. Software function keys
- H. Power
- I. Rubber protective boot

2.3 Connectors

Figure 2-2: Connectors



- A. *Trigger - Tachometer input*
- B. *Charger - Power adapter connection*
- C. *RS232 - Computer connection*
- D. *Signal - Vibration sensor input*

2.4 Battery access door and reset switch

Figure 2-3: Battery access door and reset switch location



- A. *Reset switch location (visible when battery access door is open)*
- B. *quarter-turn fasteners*
- C. *Battery access door*

3 Operate the analyzer

Topics covered in this chapter:

- *Turn the analyzer on and off*
- *Using the touchscreen interface*
- *Calibrate the touchscreen interface*
- *Assemble the strap*
- *Display hardware and firmware details*
- *Charge the battery*
- *Display the battery status*
- *Remove and refit the battery pack*
- *Reboot the analyzer*
- *Perform a hardware reset*
- *Update the CSI 2125-IS firmware*
- *Adjust the display contrast*
- *Open context sensitive help*

3.1 Turn the analyzer on and off

- Press the Power button to turn on the analyzer.
The startup screen appears. Or, if resuming operation after a timeout, the last screen appears.
- Press and hold the Power button for one second to turn off the analyzer.
If the power-saving timeout feature is enabled, the analyzer turns off automatically after several minutes.

3.2 Using the touchscreen interface

The CSI 2125-IS has a touchscreen interface. You can use your finger or the included stylus to make selections on the screen. Most operations can be completed with the touchscreen interface. However you must use arrow keys for some actions, such as navigating through a route. If the screen becomes unresponsive, wait a moment to allow the system to respond.

3.3 Calibrate the touchscreen interface

Calibrate the touchscreen interface when the screen no longer responds as expected.

Procedure

1. Go to Instrument Setup > Touchscreen and select Calibrate.
The calibration screen displays a series of crosses on the screen.
2. Tap the center of the crosses with your finger or stylus.
The touchscreen is calibrated.

3.4 Assemble the strap

Feed the ends of the strap through the top and bottom pillars on the left or right side of the analyzer, as shown in [Figure 3-1](#).

Figure 3-1: Assemble the strap



3.5 Display hardware and firmware details

Record your device information if you need to contact Technical Support.

Procedure

1. From the Main Menu, press About.
2. Record the Unit ID, Firmware Version, and disk space information to provide to Technical Support.

3. Press Info to obtain details about the firmware build.
4. Record this information for reference.

Unit ID	
Firmware Version	
Internal Disk % Free	
Firmware Build Information	
Notes	

3.6 Charge the battery

Charge the battery using the provided power adapter with the analyzer. If the battery discharges completely, the analyzer's hardware resets and the current date, time, and status information, such as the last route opened resets.

Important

Only use the power adapter provided. Using any other power adapter will render the certification permanently invalid and may cause permanent damage to the analyzer.

WARNING!

Charge the battery only in a *Non Hazardous Area*.

Note

The battery will stop charging if the ambient temperature is too high (>40°C). Always charge the battery in a well-ventilated area, and allow longer for the battery to charge if the ambient temperature is high. If you intend to use the CSI 2125-IS in a high ambient temperature, take the instrument off charge at least 2 hours before use.

Tip

If the battery has not been used for some time you may have to cycle it (fully charge and then discharge it) once or twice to renew the full capacity of the battery.

Procedure

1. Connect the provided power adapter to an electrical outlet.
2. Align the red dots on the connector to the CHARGER socket on the analyzer and press the connector into the socket.

When the power adapter is connected, the red LED indicates the battery charging status.

Red LED State	Description
Flashing	Power adapter detected
Flashing continuously	If the red LED continues to flash and does not change to solid after 30 seconds, this indicates a fault in the main battery and the battery will not charge. For example, the cell temperature is too high.
On	Charging
Off	Fully charged

The red LED flashes and turns solid. If the analyzer is turned on, the battery status displays the  icon.

- (Optional) Turn off the analyzer for fastest charging.

When the battery is fully charged, the red LED turns off. The battery does not lose charge while the power adapter is attached.

3.7 Display the battery status

Press the dot (.) button to display detailed battery status information when the analyzer is turned on. [Table 3-1](#) describes the battery status displayed on the top right of all screens.

Table 3-1: Battery status icon

Icon	Status	Battery Life
	Good	70-100%
	Medium	35-70%
	Low	15-35%
	Very Low	<15%
	Charging	

3.8 Remove and refit the battery pack

WARNING!

Open the battery access door only in a *Non Hazardous Area*.

Procedure

- Turn off the analyzer.

2. Loosen the quarter-turn fasteners on the back of the analyzer.
3. Open the battery access door.
4. Release the locking tab to the right of the battery.
5. Lift the battery out of the analyzer.
6. Reinsert the battery. Press it until the locking tab latches and the battery does not move.
7. Replace the battery access door and tighten the quarter-turn fasteners.

3.9 Reboot the analyzer

You can reboot the analyzer's operating system to reset the analyzer and retain the factory default settings, including the current date, time, contrast setting, and some status information.

You can reboot instead of performing a hardware reset if the analyzer becomes unresponsive. For example, if you disconnect the analyzer's cable from the computer while a route is loading, you may need to reboot the analyzer or perform a hardware reset. Refer to for instructions.

Procedure

Press and hold keys 7, 8, 9, and 2.

Allow at least 30 seconds for the analyzer to reboot and activate the display.

3.10 Perform a hardware reset

⚠ WARNING!

Open the battery access door only in a *Non Hazardous Area*.

Perform a hardware reset to return the analyzer to the factory default settings, including the current date, time, contrast setting, and some status information. Refer to [Section 3.9](#) to reboot the analyzer and retain settings.

Procedure

1. Turn off the analyzer.
2. Loosen the quarter-turn fasteners on the back of the analyzer.
3. Open the battery access door and locate the reset switch.
4. Insert a pin (1/16th inch in diameter) or straightened paper clip into the reset switch and press the reset button.
5. Replace the battery access door and tighten the quarter-turn fasteners.

Postrequisites

Turn on the analyzer. Allow at least 30 seconds for the analyzer to reconfigure and activate the display.

3.11 Update the CSI 2125-IS firmware

⚠ WARNING!

Only update the firmware in a *Non Hazardous Area*.

When directed by customer support, you can load a new operating system (OS) image on a CSI 2125-IS analyzer to perform field-installable updates.

Procedure

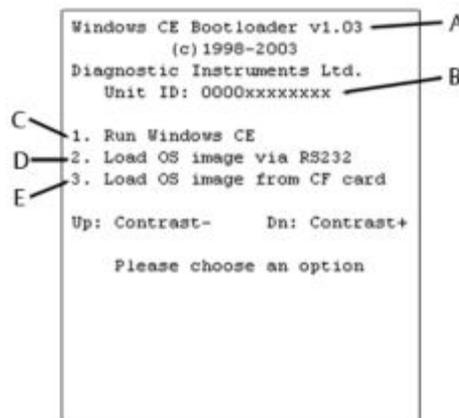
1. Turn off the analyzer.
2. Loosen the quarter-turn fasteners on the back of the analyzer.
3. Open the battery access door and locate the reset switch.
4. Insert a pin (1/16th inch in diameter) or straightened paper clip into the reset switch and press the reset button.
5. Replace the battery access door and tighten the quarter-turn fasteners.
6. Connect the power adapter to the analyzer and an electrical outlet.

Important

Do not perform firmware updates while operating on battery power.

7. Press and hold the left and right arrow keys simultaneously and press the Power button.

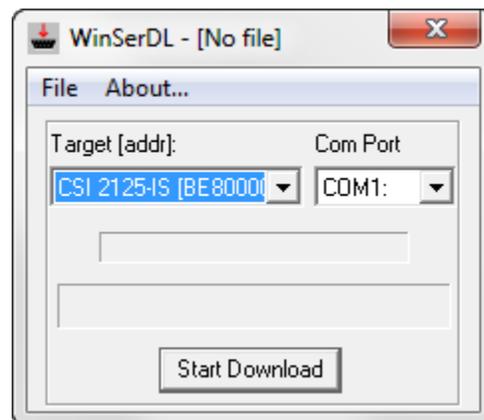
The analyzer boots and displays the Engineer Mode menu.

Figure 3-2: Engineer Mode menu

- A. Bootloader version
- B. Unit ID number
- C. Run Windows CE: run the current firmware loaded in the CSI 2125-IS analyzer. Some settings that are stored in the registry, such as date and time will need to be reset after performing this action.
- D. Load OS image via RS232: load a new firmware to the CSI 2125-IS analyzer
- E. Load OS Image from CF Card: unsupported option by the CSI 2125-IS analyzer.

8. On the analyzer, Press 2 to select Load OS image via RS232.
9. Connect the analyzer to the computer using the serial cable.
10. Run WinSerDL.exe on the computer.

A dialog titled WinSerDL opens.

Figure 3-3: WinSerDL dialog

11. In WinSerDL, select File > Open and browse to the location of your firmware update.

Note

A firmware update file has an .out extension (for example v100.out for version 1.00). You may need to change the Files of type selection to All files (*.*) to see the update file.

A status message says "Ready to start download."

12. Select the CSI 2125-IS option from the Target (addr) menu.

13. Select a port for Com Port, if different from COM1 (default).
14. Click Start Download to begin the firmware update.

The update takes several minutes. A message will display when the update is complete.

15. When the update is complete, on the analyzer, press 1 to select Run Windows CE and launch the updated operating system.

3.12 Adjust the display contrast

You can adjust the display contrast from any screen.

Note

When the ambient temperature increases the screen may darken. This is normal behavior.

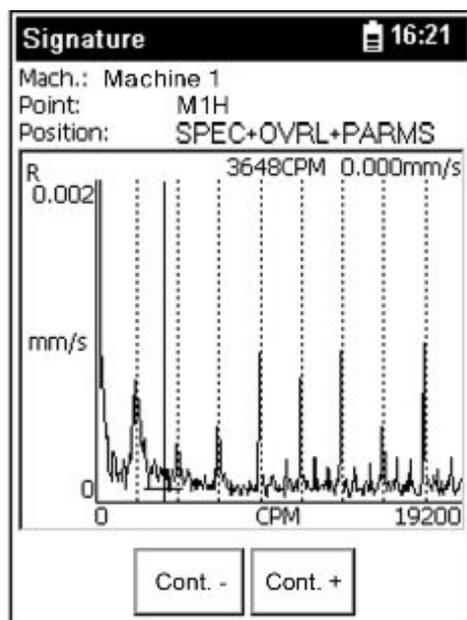
Tip

If you practice adjusting the contrast with this procedure when the screen is viewable in normal temperatures, you will be able to adjust the contrast if the screen has gone completely black in a very hot environment. Adjusting the contrast brings the screen back to a visible state within its allowable temperature range.

Procedure

1. From any screen, press the 0 key to expose alternate software function keys.

The Cont.- and Cont.+ keys appear in the same positions (software function key 2 and software function key 3) in the alternate software function key menu. [Figure 3-4](#) shows the positions of the contrast controls.

Figure 3-4: Contrast controls on alternate software function keys menu

2. Press Cont.- (software function key 2) to lighten the display.
3. Press Cont.+ (software function key 3) to darken the display.
4. Press 0 to revert to the normal function keys.

The Cont.- and Cont.+ keys remain visible for approximately 3 seconds. Repeat this procedure until the screen is at the desired contrast level.

3.13 Open context sensitive help

Press Help from any screen to read help messages for that screen.

4 Configure the analyzer

Topics covered in this chapter:

- [Instrument Setup screen](#)
- [Change instrument setup](#)
- [Instrument Configuration screen](#)
- [Change global settings for data collection](#)
- [Instrument configuration and route measurement limitations](#)

4.1 Instrument Setup screen

The Instrument Setup screen allows you to change settings for power, communication, and date and time.

Option	Values	Description
Timeout	5 min 10 min 15 min 20 min Off	Period of inactivity before the analyzer turns off automatically; no data is lost. Press the Power key to resume operation after a timeout. Choose Off to disable this power-saving feature.
Baud Rate	1200 – 115200	Data transmission rate (bits/second). Default is 115200.
Dflt Units	English Metric	Default units of measure: English (for example, in/s) or Metric (for example, mm/s)
Date Format	DD/MM/YYYY MM/DD/YYYY YYYY/MM/DD	Date format displayed on the analyzer.
Date/Time	24hr units	Date and time displayed on the screen and recorded during data collection.
Touchscreen	Calibrate	Run the touchscreen calibration program.
Memory	Delete all routes Initialise	Delete all routes: remove all routes from memory. Initialise: remove all files from memory, including any routes and directories.
Purge Cache	On Off	On: create a cached empty database file for faster purging point data of large databases. Off: maximize storage space; no empty database file is created.

4.2 Change instrument setup

The Instrument Setup screen appears when you turn on the analyzer for the first time or after you perform a hardware reset. You can change these settings at any time.

Procedure

1. From the Main Menu, select Instrument Setup and press Enter.
The Instrument Setup screen displays.
2. From the Instrument Setup screen, press the up or down arrow keys select a setting.
The selected setting is highlighted.
3. Press the right arrow key to edit the setting.
The selected value is highlighted.
4. Use the numeric keypad to enter a value, or press the up and down arrow keys to cycle through options.
5. Press Enter to accept the value.
6. Press Apply to save changes and return to the Main Menu.

4.3 Instrument Configuration screen

The Instrument Configuration screen allows you to change global settings for data collection.

Setting	Values	Description
Freq. Units	Hz CPM Orders	Display of x-axis data for spectrum/FFT data. For example, fundamental frequency = 50Hz, 3000 CPM or x1 order. Orders data is only provided when order normalized or phase data is collected using a tachometer or strobe to trigger data collection, otherwise data is provided in terms of CPM.
Auto Store	On Off	On: automatically accept the overall measurement when the measurement is within a certain percent fluctuation for a period of time. When Auto Store is On, you can change the Auto store time (seconds) and Auto store percentage (percent) to change how the overall is accepted. Off: allows you to determine if the reading appears to be stable as possible and then accept (save) the overall measurement by pressing Enter.

Setting	Values	Description
Auto Advance	On Off	On: automatically advance through all collections at this part of the point. Off: you must accept each data collection for each point setup for each point in the route. Press Enter to accept.
Acquisition	Single avg. Continuous	Only applies for spectrum signature collection with 1 average. Single avg. (single average): collection stops after a spectrum is collected and displayed. Continuous (continuous spectrum): continuously collect and display successive single average spectra until you press Enter to stop collection. (Press Enter again to store the data.)
Autoranging	Aggressive Conservative	Aggressive: limits the auto-ranging to 20mV level and sets the range limits to between 1% and 70% of range. Conservative: Allows autoranging to go the lowest range of 2mV level and sets the range limits to between 10% and 70% of range.
Mach. Speed	Normal Slow	Normal: sets the autoranging algorithm to only track signals above 120CPM. Slow: sets the autoranging algorithm down to the Low Pass Filter setting. If none, it shall track down to approximately 20CPM (0.33Hz).
Settling Delay	0.00–60.00s	Specifies a time to delay data acquisition after applying power to an ICP [®] accelerometer to allow the sensor to settle. After placing a sensor at a location on a machine, it is a good practice to allow at least 3-5 seconds for the sensor to settle. If you collect data before the sensor has settled, you could get ski-slope on your data.
Memory	Purge Delete Route Delete All Routes Initialise	Purge: Delete all data from routes, but keep the routes. Delete Route: Select a route to remove. Delete All Routes: Delete all routes and associated data. Initialise: Delete all routes and data (and all other files) from memory.
Fill Signature	On Off	On: fill the space between the signature line and the X-axis. This viewing preference could make the spectrum easier to see and give it more contrast. Off: do not fill the space.

Setting	Values	Description
Trig Level	Fixed Automatic	Fixed: always use the point setup information from either the route or off-route, depending on where the measurement is taken. When you select Fixed, you must also set Trig Hyst (Hysteresis) and whether or not to use the pull up (Trig Pull Up). Automatic: sample the trigger signal prior to beginning data acquisition and select the most appropriate settings.
Trig Hyst	0.25V 0.5V 1.25V 2.5V	Hysteresis. Manually compensate for noise on a trigger signal. The signal level must be at least twice the value of the hysteresis value applied for successful triggering. This setting applies if Trig Level is set to Fixed.
Trig Pull Up	Off On	Off: (Default) Recommended. On: Not recommended. Use for triggering from a tachometer or other source with an open collector output.

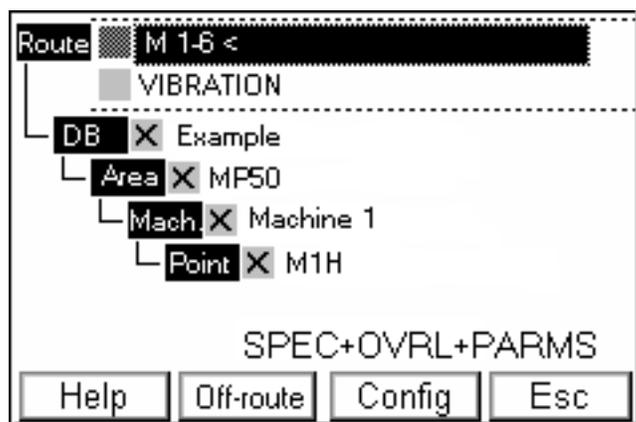
4.4 Change global settings for data collection

You can change global settings that control how data is collected and stored from the Instrument Configuration screen. These settings are stored in flash memory. You can reset these values to the system defaults by performing a hardware reset.

Procedure

1. From the Main Menu, select Data Collection and press Enter.

Figure 4-1: Data Collection screen with route selected



The Data Collection screen displays routes loaded on the analyzer.

2. From the Data Collection screen, select the Config software function key.
The Instrument Configuration screen displays.
3. From the Instrument Configuration screen, press the up or down arrow keys to select a setting.
The selected setting is highlighted.
4. Press the right arrow key to edit the setting.
The selected value is highlighted.
5. Use the numeric keypad to enter a value or press the up and down arrow keys to cycle through options.
6. Press Enter to accept the selected value.
7. Set other settings, as desired.
8. Press Apply to save changes and return to the Main Menu.

4.5 Instrument configuration and route measurement limitations

This section describes limitations of the CSI 2125-IS analyzer. Contact customer support for more information about software and firmware updates that address these issues.

Data collection

The CSI 2125-IS is designed to acquire one data type (and one data unit) per measurement point. Whereas, other CSI-branded analyzers acquire multiple data types and data units simultaneously. Turn on Auto Advance (in the Instrument Configuration screen) so the CSI 2125-IS can acquire all the data types and data units on a single point when you press Enter during data collection. If you do not use Auto Advance, you must press Enter to collect each type of data at each measurement point.

Transferring off-route data from the analyzer

The CSI 2125-IS analyzer is capable of collecting data that is not supported in an AMS Machinery Manager database. Be aware of the following limitations as you collect off-route measurements.

- | | |
|--------------------------------|--|
| Averaging | The CSI 2125-IS does not support time synchronous averaging (TSA) or order track averaging. If a route contains these measurements, they will not be transferred to the CSI 2125-IS. Data Transfer displays a notification. |
| Fmax values above 40KHz | If a route has parameters with Fmax set above 40KHz, Data Transfer scales the Fmax back to 40KHz when the route is loaded in the CSI 2125-IS. This is the same behavior for the CSI 2120. Any parameters above 40KHz are not calculated. |

Manually enter measurements	You can type in a temperature measurement but it will not be saved in the AMS Machinery Manager database.
Non-vibration data	Data Transfer does not load non-vibration points to the CSI 2125-IS. Non-vibration data such as current, voltage, temperature, can be collected with the analyzer but Data Transfer ignores such non-vibration data when transferring data to the database.
Off-route data	Off-route measurements are associated with a route point. Off-route measurements other than spectra and waveform will not be stored in AMS Machinery Manager.

Transferring routes to the analyzer

AMS Machinery Manager routes may contain measurement points that are not supported in the CSI 2125-IS analyzer. Be aware of the following limitations as you create routes and transfer routes to the CSI 2125-IS analyzer.

Maximum routes limit	The CSI 2125-IS analyzer can hold up to 31 routes internally, provided there is enough available memory.
Maximum route point limit	The CSI 2125-IS analyzer can hold up to 1500 points in any single route.
Fault frequency	Fault frequencies are not supported.
Force into database	With the CSI 2125-IS, the "Force into Database" function can only work if the target database has the same route.
Integration mode	The CSI 2125-IS supports analog. Digital is not supported.
Unsupported collection types	The CSI 2125-IS does not support points set up to collect non-vibration dynamic signals, such as general dynamic, pressure, current, flux, or shaft probe data. In addition, it does not support spectral weighting of A-Weighting, 1/3 octave analysis, SST, or demodulation.
Override analog overall	If you have a route set up for analog overall, Data Transfer converts the route to digital overall when downloading to the analyzer.
PeakVue	PeakVue points will only be transferred to the CSI 2125-IS if the firmware version of the CSI 2125-IS supports PeakVue.
Special Time Waveform	The CSI 2125-IS does not support triggered waveforms.
Trends	Trend data is supported as long as it is a parameter that is either the energy within a band or the peak value within a band. Also, the upper end of the band must be less than or equal to 40KHz. Waveform parameters are supported.
Variable Speed Machines	For variable speed machines, orders, spectrum, and waveform will be collected based on reference speed. If the speed of the machine is not running at the reference speed, parameters based on orders will not be calculated correctly.
Vibration	The CSI 2125-IS supports vibration data points set up to collect data using conventional vibration sensors. Note that only a limited number of sensors are certified for use with this meter in a hazardous environment.

Waveform size The CSI 2125-IS supports maximum waveform block sizes up to 16384 points.

Other route management notes

Loading routes with more than 500 points can be noticeably slower than loading smaller routes. Consider dividing your large route into smaller routes.

Routes with more than 50 machines, or machines that contain more than 50 points can be very slow to update in the analyzer's Route Navigation screen.

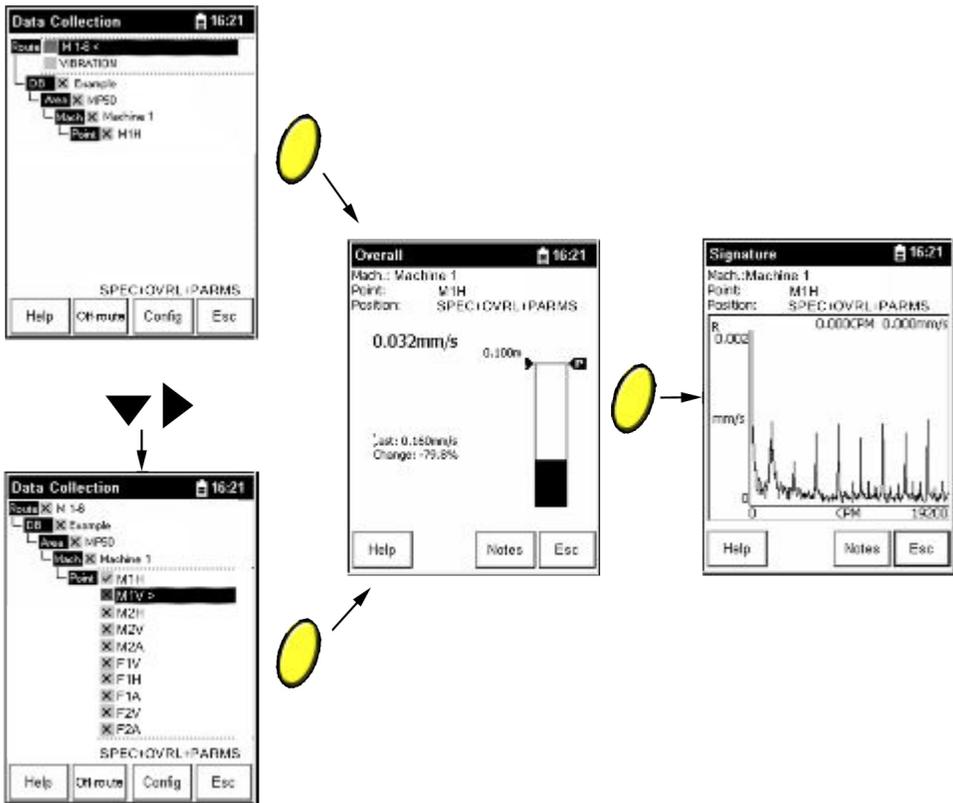
Points with a high number of lines require more memory, so consider using lower resolutions (e.g. 800 or 1600 lines rather than 3200 or 6400 lines). To conserve memory, only load the routes you require for the day's work and delete unused routes from the analyzer.

5 Collect data

Topics covered in this chapter:

- *Data Collection screens*
- *Overall screen*
- *Signature screen*
- *Analysis functions in Data Collection mode*
- *Collect data from equipment on a route*
- *View current point information*
- *Add a note to a measurement point*
- *Collect an off-route measurement*

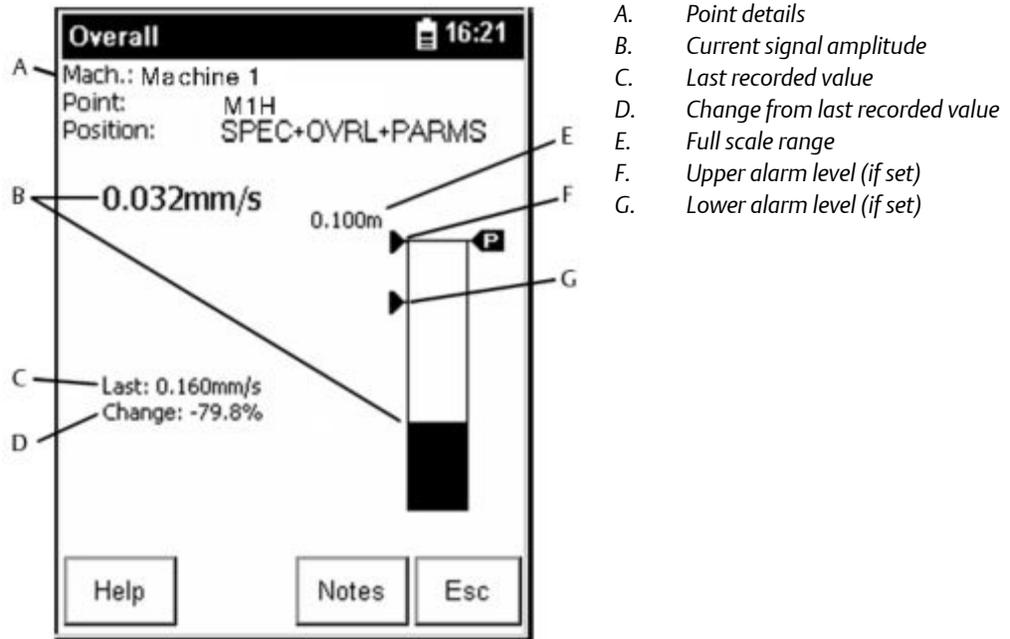
5.1 Data Collection screens



5.2 Overall screen

The Overall screen appears during data collection⁽¹⁾.

Figure 5-1: Overall screen

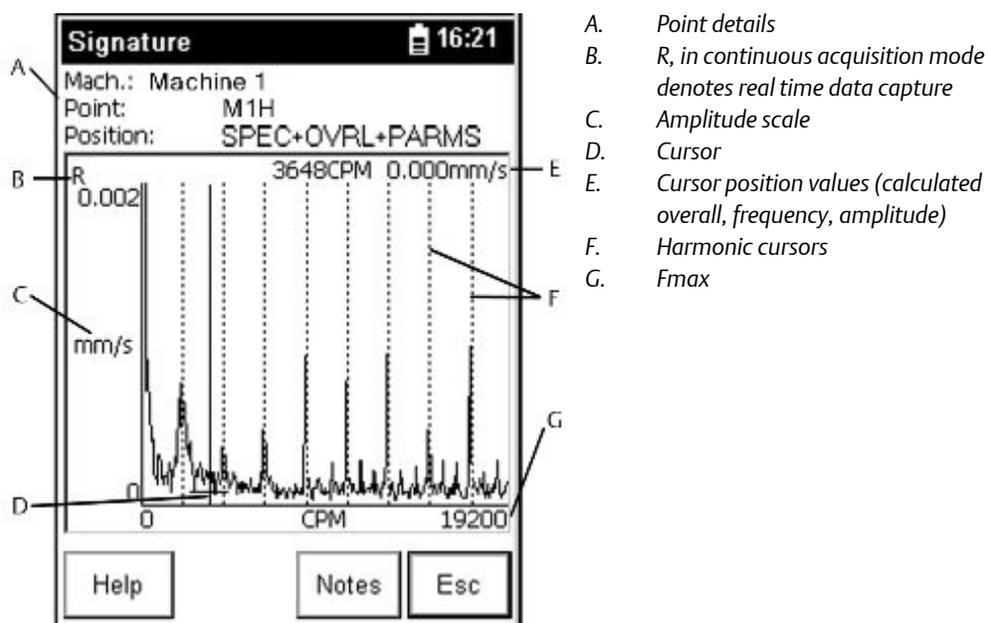


(1) The Notes software function key is present in data collection mode only.

5.3 Signature screen

The Signature screen appears during data collection.

Figure 5-2: Signature screen



5.4 Analysis functions in Data Collection mode

Table 5-1 describes the analysis functions available from the Overall and Signature screens.

Table 5-1: Analysis functions during data collection

Key	Function
Enter	Store data.
Help	Read help about the current screen.
Esc	Escape to the route.
Notes	From the Data Collection screen, press Notes to add an observation.
Up Arrow	Decrease amplitude scale (y-axis).
Down Arrow	Increase amplitude scale (y-axis).
Left Arrow	Move cursor left.
Right arrow	Move cursor right.
4(H)	Display 32 harmonic cursors. Press again to alternate between harmonic and fixed cursors.

Table 5-1: Analysis functions during data collection (continued)

Key	Function
7(P)	Locate next peak value.
.	Press to alternate the +- key between expand and compress.
0	Shift. Alternates software function keys to show other software function keys, for example: Off-route, Cont-, and Cont.+ keys to adjust contrast).
+-	Expand/Compress signature. Press to expand or compress the Frequency/CPM/Orders axis (trace) three levels. Press . then +- to switch to compress the trace three levels.

5.5 Collect data from equipment on a route

⚠ WARNING!

Use only the certified transducers listed in [Section 1.3](#) in *Hazardous Areas*.

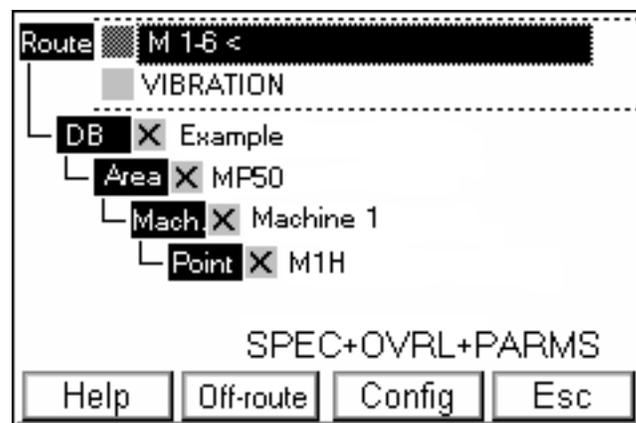
Prerequisites

Load a route using AMS Machinery Manager Data Transfer.

Procedure

1. From the Main Menu, select Data Collection and press Enter.

Figure 5-3: Data Collection screen with route selected



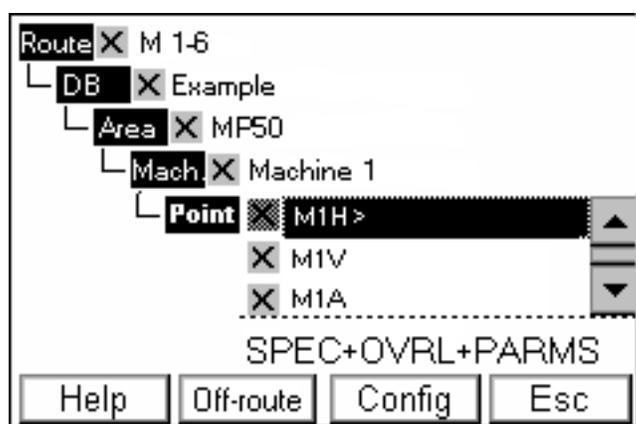
The Data Collection screen displays routes loaded on the analyzer.

2. Select a route using the up and down arrow keys.
3. Press the right arrow key to expand the route.

An active route is marked with a < symbol and the route contents displays. An x indicates no data has been collected at a point, or the area has measurement points that have not been collected. When data has been collected, the x is replaced by a check.

4. Navigate to the first measurement point and press Enter.
 - a. Press the right and left arrow keys to navigate through the database (DB.), area (Area), machine (Mach), and point (Point).
 - b. Press the up and down arrow keys to make a selection within a level if multiple options are available.

Figure 5-4: Data Collection screen with a point selected



The route is registered (if necessary) and data collection begins automatically on the first point accessible from the place in the route structure where you pushed Enter.

Note

You can push Enter before or after the route is registered.

5. Connect the transducer from the analyzer's SIGNAL socket to the measurement location on the equipment corresponding to the selected route measurement point.
6. Press Enter to start data collection.

The LEDs will indicate the system status:

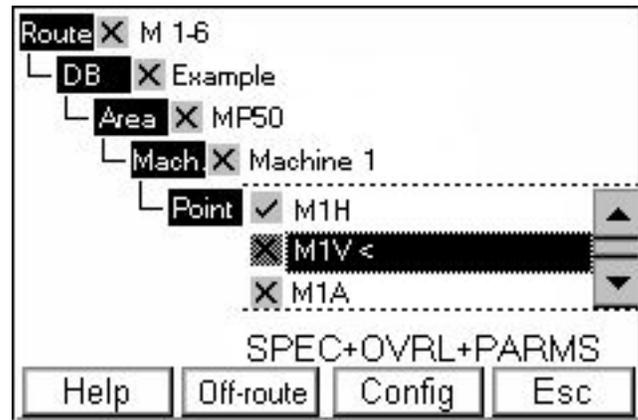
- Red indicates the transducer is not attached (prior to data collection).
- Amber indicates the system is settling.
- Green indicates the system is taking data and preparing to store data.

The "Collecting Data..." message displays, followed by a screen showing the data collected.

7. Press Enter to store the data and collect the next measurement at this point or to move to the next measurement point.

When all the measurements are collected for this point, the Data Collection screen automatically selects the next point in the route.

Figure 5-5: Data Collection screen with next point selected



8. Repeat [Step 5](#) – [Step 7](#) until all the measurements are collected.

When the route is complete, the route contains a check.

5.6 View current point information

You can view a list of details for a point.

Procedure

1. Navigate to a point in a route and select Help.
The Help screen appears.
2. Press Pt. Info.
A list of point details appears.
3. Press ESC to go back to the route.

5.7 Add a note to a measurement point

Your observations of the equipment are a very important part of data collection. You can add and remove notes during data collection or while reviewing data. You can add up to 6 predefined note codes per measurement point. Note codes are defined in the AMS Machinery Manager database and are associated with the route. You can add notes during data collection or later.

Procedure

1. From the Data Collection screen, navigate to a measurement point and press Enter.
The Overall screen opens.
2. Press Notes from the Overall screen or Signature screen.
The notes dialog opens displaying a list of note codes.
3. Choose a note code using the up and down arrow keys and press Select to select the highlighted note.
A check appears to the right of a selected note.
4. Select up to 6 note codes and press Save.
Or, press Cancel to discard selected notes and return to the route.

5.8 Collect an off-route measurement

When you are collecting data on a route, you may collect an off-route measurement associated with a point in a route. You can select a point by navigating to a point in the route. However, if you do not select a point, the analyzer selects the last point measured (during data collection) or the first available point (if no data has been collected for the route).

Note

You may configure points and collect data with all the options on this analyzer. However, only supported measurements will be transferred to AMS Machinery Manager. Refer to [Section 4.5](#) for more information.

WARNING!

Use only the certified transducers listed in [Section 1.3](#) in *Hazardous Areas*.

Prerequisites

Load a route using AMS Machinery Manager Data Transfer.

Procedure

1. Connect the transducer to the analyzer.
If no transducer is attached during data collection, an error dialog box appears on the screen. No measurements can be taken without a transducer.
2. Go to the Data Collection screen.
The Data Collection screen displays routes loaded on the analyzer.
3. Press Off-route.

The Off-route screen appears.

4. Choose a measurement configuration from the Off-route menu:

Point	Description
Same	Same as the current point (last point measured in the route).
Opposite	Opposite from the current point (last point measured in the route) where Spectrum becomes Time or Time becomes Spectrum.
ACCEL	Acceleration Spectrum measurement. 10kHz, 800 lines, 4 averages.
Velocity	Accel → Velocity Spectrum measurement. 2kHz, 400 lines, 4 averages.
ACCEL TIME	Time measurement. 10kHz, 2048 points.
High Res	High-Resolution measurement set up the same as the current point (last point measured in the route). Increased number of lines by a factor of 2. For example, a measurement having 400 lines becomes 800 lines.
User	User defined measurement. Configure a measurement from a menu of all measurement settings. Changes you select in the User menu apply to the current measurement only. The menu resets when you exit the User menu.

The <RouteName> (Off-route) screen appears.

Note

<RouteName> represents the last selected route.

5. Connect the transducer from the analyzer's SIGNAL socket to the measurement location on the equipment corresponding to the selected route measurement point.
6. Press Enter to start data collection.

The LEDs will indicate the system status:

- Red indicates the transducer is not attached (prior to data collection).
- Amber indicates the system is settling.
- Green indicates the system is taking data and preparing to store data.

The "Collecting Data..." message displays, followed by a screen showing the data collected.

7. Enter a note for this point, if desired.
8. Press Enter store the data to return to the Off-route screen.

The <RouteName> (Off-route) screen displays the new point information.

5.8.1 Set up a user-defined measurement

1. From the Off-route screen, select User.
2. Update the settings that apply to the measurement you want to collect.

- a. Highlight a setting using the up and down arrow keys.
 - b. Press the right arrow key to edit the option.
 - c. Change the option with the up or down arrow keys or by typing in a value.
 - d. Press the left arrow key to accept the option and return to the settings.
3. Press Enter to collect and store data.

The User screen appears.

6 Review data

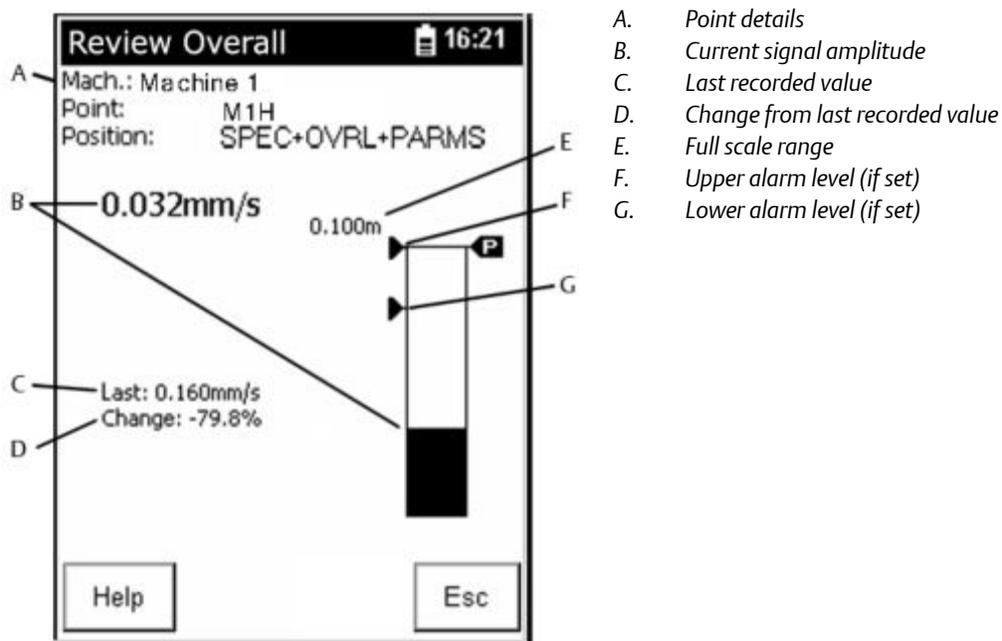
Topics covered in this chapter:

- *Review Overall screen*
- *Review Signature screen*
- *Analysis functions in Review Data mode*
- *Review collected route data*
- *Review collected off-route data*

6.1 Review Overall screen

The Review Overall screen appears during data review⁽¹⁾.

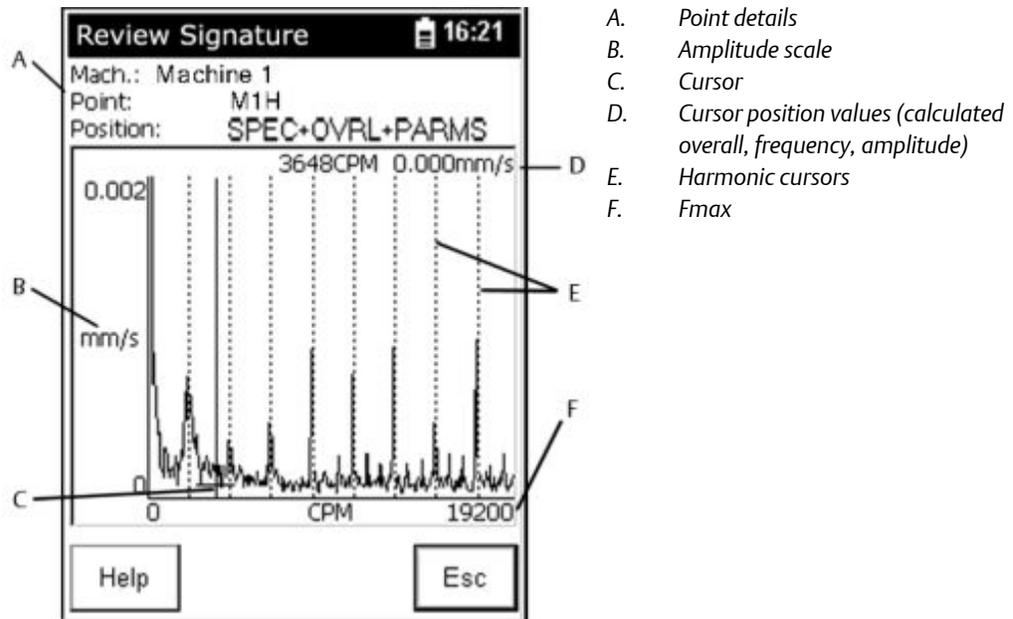
Figure 6-1: Review Overall screen



6.2 Review Signature screen

The Review Signature screen appears during data review.

(1) The Notes software function key is not present during data review; it is present in data collection.

Figure 6-2: Review Signature screen

6.3 Analysis functions in Review Data mode

Table 6-1 describes the analysis functions available from the Review Overall and Review Signature screens.

Table 6-1: Analysis functions in Review Data mode

Key	Function
Enter	View the next stored data.
Help	Read help about the current screen.
Esc	Escape to the route.
Up Arrow	Decrease amplitude scale (y-axis).
Down Arrow	Increase amplitude scale (y-axis).
Left Arrow	Move cursor left.
Right arrow	Move cursor right.
4(H)	Display 32 harmonic cursors. Press again to alternate between harmonic and fixed cursors.
7(P)	Locate next peak value.
.	Press to alternate the +- key between expand and compress.
0	Shift. Alternates software function keys to show other software function keys, for example: Off-route, Cont.-, and Cont.+ keys to adjust contrast).

Table 6-1: Analysis functions in Review Data mode (continued)

Key	Function
+-	Expand/Compress signature. Press to expand or compress the Frequency/CPM/Orders axis (trace) three levels. Press . then +- to switch to compress the trace three levels.

6.4 Review collected route data

1. From the Main Menu, select Review Data.
2. Navigate to a measurement point and press Enter.
The Overall screen opens.
3. From the Overall screen, press Enter to go to the next screen.
4. Press Enter to open the Signature screen.

Note

You can push Enter before or after the route is registered.

6.5 Review collected off-route data

1. From the Main Menu, select Review Data.
2. Press 0 to display alternate software function keys.
The Off-route software function key displays.
3. Press Off-route to view off-route data.

7 Transfer data

Topics covered in this chapter:

- *Transfer files with CSI 2125-IS analyzers*
- *Connect the CSI 2125-IS*
- *Load a route from AMS Machinery Manager to the analyzer*
- *Dump a route from the analyzer to AMS Machinery Manager*
- *Working with routes as files*
- *Delete a route from the analyzer*
- *Disconnect the analyzer from AMS Machinery Manager*

7.1 Transfer files with CSI 2125-IS analyzers

AMS Machinery Manager Data Transfer

AMS Machinery Manager Data Transfer lets you manage the route files in your analyzer. You need Data Transfer so you can transfer routes between the AMS Machinery Manager database and your analyzer.

You can do the following:

- Transfer routes from AMS Machinery Manager to the analyzer for data collection.
- Transfer routes from the analyzer to the AMS Machinery Manager database for storage and analysis.
- Transfer and store routes between the analyzer and a folder on your computer.
- Create route definition files and route data files that you can email to others.

AMS Machinery Manager Standalone Data Transfer

If your computer does not have AMS Machinery Manager installed, use the AMS Machinery Manager Standalone Data Transfer application to transfer route files between an analyzer and a local folder on the computer. The Standalone Data Transfer does not have a database, so all files are transferred to a computer folder.

The AMS Standalone Data Transfer software is available on the AMS Machinery Manager installation media.

Limitations:

- You cannot install Standalone Data Transfer on the same computer as AMS Machinery Manager.
- You cannot create routes. You can only transfer files.
- You cannot save files directly to the AMS Machinery Manager database.

7.2 Connect the CSI 2125-IS

⚠ WARNING!

Connect the analyzer to a computer only in a *Non Hazardous Area*.

Procedure

1. Connect the supplied serial cable to the computer and the RS232 socket on the analyzer.

Note

If your computer does not have a serial port, use the supplied serial-to-USB cable. Install the serial-to-USB driver (from the CD-ROM included with your analyzer) before using the cable for the first time.

2. Turn on the analyzer.
3. On the computer, open Data Transfer.
4. Click the Enable Device menu and select your analyzer.

A device status box with an icon, name, and status appears in the workspace.
5. If more than one analyzer is enabled, click a device status box to select an analyzer.

The selected analyzer's options appear in the Options pane.
6. Click the Options icon to expand the Options pane.
7. Set the connection type in Data Transfer to match the analyzer's communication setup options and click Apply.
8. Click Connect.

The device status updates in the Devices waiting for connection pane and a tab displays any route names and status.

Important

Do NOT press buttons on the CSI 2125-IS or unplug the serial cable while the analyzer is connected in Data Transfer. The analyzer will no longer be physically connected, but the software will appear to be connected. The connection status updates automatically after a timeout period. Refer to [Section 7.7](#) for instructions to safely disconnect the analyzer.

7.3 Load a route from AMS Machinery Manager to the analyzer

Procedure

1. Connect to the analyzer.

2. In Data Transfer, select the appropriate database from the Navigation - Data Transfer pane.
3. Drag and drop or copy and paste the route to the connected analyzer in the workspace.

The Data Transfer Notification pane displays the progress of the transfer.

The list of files in the analyzer's tab contains the new route. The Notifications Pane lists the analyzer's available remaining memory.

7.4 Dump a route from the analyzer to AMS Machinery Manager

Once you have collected data on the analyzer, dump the route to AMS Machinery Manager for storage and analysis.

Procedure

1. Connect to the analyzer.
2. In Data Transfer, locate the route you want to import from the analyzer's tab.
3. Locate the appropriate database in the Navigation - Data Transfer pane.
4. Drag and drop or copy and paste the desired route from the analyzer's tab to the database in the Navigation - Data Transfer pane.

The Data Transfer Notification pane displays the progress of the transfer.

Postrequisites

In AMS Machinery Manager, go to the Vibration Analysis tab to analyze your data.

7.5 Working with routes as files

7.5.1 Create a route file to send to another user

You can create intermediate route definition file to send to another user. The remote user can transfer the route definition file to a connected analyzer with the AMS Standalone Data Transfer application or with an AMS Machinery Manager Client. For example, you may email this file to a remote user who needs to collect data with an analyzer, but does not have an AMS Machinery Manager Client or a database.

Procedure

1. In Navigator, locate the route you want to transfer to the other user.
2. Drag-and-drop the route to the File Transfer pane.

The route name appears in the File Transfer pane. The route definition file is saved to the Working Directory folder.

3. Click Explore to open the folder in Windows Explorer.

Windows Explorer opens and displays a route definition file named in the following format <route name>_<identification string>.RDF. RDF stands for Route Definition File.

Postrequisites

Send the route definition file to the user by email or using a File Transfer Program, for example.

7.5.2 Load a route from a file to the analyzer

1. Connect to the analyzer.
2. In Data Transfer, open the File Transfer pane.
3. In the File Transfer, click Working Directory and select a folder on the computer to store the file.
4. Copy the route definition file (file with an .RDF extension) emailed to you to this folder in Windows Explorer.

The File Transfer pane displays the name of the route under the Vibration Route Definition heading.

5. Drag and drop or copy and paste the route to the connected analyzer in the workspace.

The Data Transfer Notification pane displays the progress of the transfer.

The list of files in the analyzer's tab contains the new route.

7.5.3 Dump a route from the analyzer to a folder on a computer

You can transfer a route from a connected analyzer to a file to send to an AMS Machinery Manager user (by email, for example).

Procedure

1. On the computer, open Data Transfer.
2. Connect to the analyzer.
3. Click View > File Transfer.

The File Transfer pane appears at the bottom of the screen.

4. Click the Working Directory link in the File Transfer pane, and select a folder on the computer to store the file.
5. Click OK.
6. On the computer, drag and drop or copy and paste one or more files from the top pane displaying the analyzer files to the File Transfer pane at the bottom of the screen.

The transferred files appear in the File Transfer pane. The route data file is saved to the Working Directory folder.

7. Click Explore to open the folder in Windows Explorer

Windows Explorer opens and displays a route data file named in the following format <route name>_<identification string>. RDT.

Postrequisites

Transmit the route data file to the user by email or using a File Transfer Program, for example.

7.5.4 Dump a route from a file to AMS Machinery Manager

Dump data from a route data file on a computer to the AMS Machinery Manager database.

Procedure

1. On the computer, open Data Transfer.
2. Open the File Transfer pane.
3. Click the Working Directory link in the File Transfer pane, and select a folder on the computer to store the file.
4. Click OK.
5. Click Explore in the File Transfer pane to open Windows Explorer to the Working Directory location.
6. Copy the route data file (file with an .RDA or .RDT extension) to this folder and close Windows Explorer.

The name of the route displays in the File Transfer pane. (Press F5 to refresh the screen.)

7. Drag and drop or copy and paste the route from the File Transfer pane to the Navigator pane.

7.6 Delete a route from the analyzer

The CSI 2125-IS can hold up to 31 routes, provided there is enough free space. When you transfer a route to the analyzer, the Data Notifications pane displays a message with the available remaining memory. If you run out of space, you can delete routes from the analyzer.

Dumping a route transfers the contents of a route to the AMS Machinery Manager database. The route and its data remains in the analyzer until they are deleted. You can remove a route from the analyzer in Data Transfer when an analyzer is connected.

Tip

Before deleting a route from the analyzer, dump the route to the database or dump the route to a file on the computer.

Procedure

1. Connect to the analyzer.
2. In the analyzer's tab, right-click the route you want to delete and select **Delete**.

The route is removed from the analyzer.

7.7 Disconnect the analyzer from AMS Machinery Manager

When an analyzer is connected in AMS Machinery Manager or AMS Machinery Manager Standalone Data Transfer, there are several safe ways to disconnect the analyzer.

- In the Workspace, right-click the device icon and select **Disconnect Device**.
- In the Workspace, open the connected analyzer's tab and click the **Disconnect** icon.
- Shut down AMS Machinery Manager or AMS Machinery Manager Standalone Data Transfer.

The device icon's status message changes from "Connected" to "Ready to Connect". Your analyzer is still enabled.

Appendix A

Product specifications

Physical dimensions (with rubber protective boot)	
Height	207 mm (8.07 in)
Width	100mm (3.93 in) at narrowest point 134mm (5.90 in) at widest point
Depth	5.5 mm (2.17 in)
Weight	850g (1.6 lbs)
Display	1/4 VGA : 240 x 320 LCD, touchscreen, backlit 58mm x 77mm viewable

Connector panel	
PC Comms	RS232 - 9 way D Type (Plug) RS-232 serial port: up to 115k baud
I/O	2 pin: Power In/Battery Charge 4 pin: Signal 3 pin: Trigger

Connector positions				
Pin	TRIGGER (3-pin)	CHARGER (2-pin)	RS-232, 9 way (plug) D Type	SIGNAL (4-pin)
1	Trigger in	Ext-DC-IN		Signal In
2		Ground	TxD-OUT	ICP® In
3	Ground		RxD-IN	Ground
4			DTR OUT	Ground
5			Ground	
6			CTS-IN	
7			RTS-OUT	
8				
9				

Battery/power	
Battery type	Rechargeable Nickel Metal Hydride (NiMH) Pack.

Battery/power	
I/O	1800 mAhr
Battery life, ON	8 hours continuous use
Battery life, OFF	7 days
Charging method	In analyzer with power adapter
Charge time, 100% power	8 hours
Charge time, 50% power	3.5 hours

Performance	
Operating system	Windows CE V2.12
Processors	MIPS R4000, DSP Motorola 56307
OS storage (for WinCE and applications)	16 Mbytes FLASH
Internal flash disk (for data and applications)	8 Mbytes FLASH
Internal RAM	8 Mbytes SDRAM

Environmental	
Certification (IS)	<p>IECEX SIR 07.0032X, Sira 07ATEX2128X Ga Ex ia IIC T4 (Ta -20°C to +50°C) Ma Ex ia I (Ta 0°C to +50°C) SKF (U.K.) Limited EH54 7DP, UK Model DC-225-IS</p>  
Sealing	IP65
Drop test	1 meter (to Mil-Std 810)
Temperature range	Operating: -10 to +50 deg C Storage: -20 to +60 deg C
Humidity	Operating: 0 to 85% relative humidity

Glossary

alarm	An indication that the parameters of a machine have changed in a significant manner.
alarm limits	Amplitude levels that define an alarm condition on the equipment being monitored.
alert	An alarm limit calculated by the software which indicates that equipment is approaching failure. Designated as a "C" alarm in reports.
aliasing	An effect that results in erroneous frequency spectra when the frequency of the signal being sampled is more than 0.5 times the sampling rate. CSI analyzers include anti-aliasing filters that eliminate these errors.
amplitude	Indicates the strength (magnitude in RMS, peak, peak-to-peak, average, or D.C.) of a measured signal.
analysis parameter set	Includes individual analysis parameters, and also contains instructions that tell the machinery analyzer how to acquire data.
analysis parameters	Divides the frequency spectrum into bands that are individually measured and analyzed.
autorange	The process of automatically adjusting the input instrumentation amplifier of the analyzer to match the amplitude of the vibration signal. This process results in increased dynamic range.
baud rate	Unit of speed for data transmission over a serial communications link.
cursor	A manually controlled marker that can be moved across a spectrum or waveform plot display indicating time or frequency and amplitude at the cursor location.
cycles per minute, CPM	The unit of frequency in cycles per minute. Equal to Hz x 60.
Data Transfer	An application within AMS Suite: Machinery Health Manager that facilitates the transfer of data in the form of a route between the AMS Suite: Machinery Health Manager database and analyzers.
displacement	<p>Refers to the distance that an object moves, usually considered to be the overall range of movement; measured in mils or microns. Displacement is often measured from eddy current probes and represents the physical movement of a rotating shaft relative to its supporting bearing.</p> <p>Sometimes accelerometers or velocity probes are used, and the data is integrated into displacement. In this case, movement represents the displacement of the equipment casing where the probe is mounted.</p>
equipment	Machinery that includes one or more rotating, stationary, electrical, and structural components such as motors, gearboxes, fans, and pumps, for example. Each component has a set of measurement points.
fast fourier transform, FFT	An efficient computational process which allows the conversion of a signal's time waveform into a frequency spectrum.
filter	A device which removes certain frequencies from a signal while preserving the rest of the signal.

frequency	Number of times an event repeats in a unit of time; usually expressed in hertz (Hz) or cycles per minute (CPM).
fundamental frequency	The frequency of the peak from which related harmonics are referenced. 1xRPM is an example of a fundamental frequency.
hanning	Type of window applied to waveform data before frequency analysis; used to prevent peaks in a frequency spectrum from spreading out due to a phenomenon called leakage. The Hanning window is recommended for most frequency analysis measurements where the signal is steady-state.
harmonic	An integer multiple of a fundamental frequency f_0 (example $2f_0$, $3f_0$, $4f_0$, etc.).
harmonic marker	A box marker that appears on a spectrum display to indicate the harmonic peaks of a fundamental peak.
hertz, Hz	The unit of frequency in cycles per second.
high-frequency detection, HFD	The amplitude of vibration in g's over a broad frequency band from 5 kHz up to 20 kHz or greater.
lines	The number of lines of resolution used for the spectrum calculation. Resolution (in Hz) equals maximum frequency divided by the number of lines.
measurement point	Any location or point on a machine where measurements are made.
mil	A unit of measure for displacement (one thousandth of an inch).
notes	Specific observations that can be stored on the measurement point of a piece of equipment along with collected data. Notes can be predefined from the database or entered on an analyzer.
peak	The largest signal level seen in a waveform over a period of time. For sinusoidal signals, the peak signal level is always 1.414 times the RMS value of the signal level. For non-sinusoidal signals, the peak level is often larger than the result that this formula would produce.
peak-to-peak	The difference between the maximum and minimum signal levels over a period of time. For a pure sinusoidal signal, the peak-to-peak level is two times the peak signal level and 2.828 times the RMS value of the signal level. For non-sinusoidal signals, the peak-to-peak level is often larger than the result this formula would produce.
period	Time required to complete one cycle in a periodic signal.
phase	1xRPM phase represents the location of the shaft of a piece of equipment in degrees (0 - 360) with respect to the tachometer pulse where the largest vibration occurs.
real-time	Continuously updated data or plot, such as an FFT spectrum.
RMS	The magnitude of a signal calculated or measured by the root mean square method. Equal to 0.707 times the peak value for a pure sinusoidal signal.
route	One or more machines and their respective measurement points organized in an efficient sequence for data collection.
RS232	A serial, synchronous communication standard; a type designation for cables that are used to connect communications ports on host computer, analyzer, and telephone modems. Other types of connections are ethernet and USB.
subharmonics	Vibration frequencies which are integer fractions of the running speed (example $\frac{1}{2}$ RPM, $\frac{1}{3}$ RPM, etc.) or some other fundamental frequency.

tachometer	Pulse signal used to measure shaft turning speed. This may also be used to synchronize the acquisition of dynamic data.
transient	A non-steady-state signal of finite duration; often refers to a startup or coastdown of a piece of equipment.
trend	Plotting a number of measurements of a parameter over time.
trigger	Causes the analyzer to start collection of data upon the receipt of a specified dynamic signal from a sensor.
uniform window	Description of a uniformly weighted signal, where no special window shaping is applied before frequency analysis. Sometimes used for collection of non-steady-state data.
velocity	A measurement of the time rate of change in the displacement of an object. Vibration is often measured in velocity using a velocity sensor. Velocity can be measured also by integrating an accelerometer signal.
vibration parameters	Twelve frequency band-limited parameters which are measured from the vibration signal. These parameters are defined in the analysis parameter set and are loaded into the machinery analyzer for each point from the database. (Also called individual analysis parameters.)
waveform	Analog or digital representation of a signal or function displayed as amplitude vs. time.
window	See hanning window and uniform window.

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