Quick Start Guide
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AMS 2140 Machinery Health™ Analyzer

Quick Start Guide

EMERSON

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Patents

The product(s) described in this manual are covered under existing and pending patents.

Introduction to the analyzer

Front view

Figure 1: AMS 2140 front panel

A. *Home key—Return to the Home screen from any program.*
B. *Reset key—Return to the main menu in a program.*
C. *Function keys—Display menu options.*
D. *Enter key—Select a menu or option.*
E. *Keypad backlight key—Turn on the backlight under the keys.* (1)
F. *LCD backlight key—Set the backlight for the LCD touchscreen.*
G. *Help key—Display Help text for a key.*
H. *Power key—Turn the analyzer on or off, or put the analyzer in standby.*
I. *Battery LED—Green light if the battery pack is charged; amber when charging.*

(1) *To comply with relevant safety certifications, the AMS 2140 labeled "ATEX/IECEx Zone 2" does not have a keypad backlight.*

J. *Status LED—Blue light flashes each time you press a key or option, blinks in power save mode, and remains solid in standby mode.*
K. *Arrow keys—Move through menus.*
L. *ALT key—Display an alternate screen, if available.*
M. *Back key—Back up to the main menu in a program.*

Top view

Figure 2: Connectors

A. *Power supply connector.*
B. *Ethernet port.*
C. *Micro USB port.*
D. *Wireless LED.*
E. *Bluetooth® LED (not present on newer versions).*

⚠ CAUTION!

To prevent damage to the analyzer:

- Do not connect a signal outside the range of 0 to 24 volts into the Accel input of the AMS 2140.
- Do not connect a signal outside the range of +/- 24 volts into the Volts / Tach input of the AMS 2140.

Turn on the analyzer for the first time

Activate the battery pack before turning on the analyzer for the first time. The battery pack is shipped in storage mode to protect the battery charge. Connect the provided power supply cord into an outlet and to the analyzer to activate the battery pack.

Procedure

1. Connect the provided power supply cord into an outlet and to the analyzer.

   Note
   Refer to precautions for the battery pack and power adapter.

   The Battery LED is amber to indicate the battery pack is charging. The analyzer is activated.

2. Press and hold the power key to turn the analyzer on.

   The Home screen appears when you turn on the analyzer. The time and date are set to a default value.

3. To set the time and date, press Home > ALT > F3 Set Time.

Battery pack

A rechargeable Lithium-Ion battery pack powers the analyzer. A typical charge should last for more than 8 hours of continuous use. The analyzer displays a low-battery warning when the remaining charge reaches a set level; the default is 15 percent. If the battery pack fully discharges, you do not lose any data or settings.

The battery pack is shipped in storage mode to protect the battery charge. Refer to *Turn on the analyzer for the first time* to activate the battery pack.

You do not need to discharge or calibrate the battery pack. The hardware optimizes battery pack performance. Contact technical support if you experience any problems or for instructions on how to store or replace the battery pack.

⚠ WARNING!

Use only Emerson battery packs with the AMS 2140. The analyzer will not function if a non-Emerson battery pack is used. Lithium-Ion batteries have very specific charging requirements. Emerson power supplies and chargers are designed to work with the Emerson Lithium-Ion battery pack. Using battery packs other than approved Emerson battery packs could not only void the warranty, but could also be hazardous.

Charge the battery pack

The analyzer is fully operational during charging. As a best practice, charge the battery pack frequently. Emerson recommends you charge the battery pack the night before you intend to use it.

⚠ WARNING!

- Use only Emerson-supplied power supplies and chargers approved for use with the AMS 2140 and Emerson battery packs. Using any power supplies and chargers other than approved Emerson power supplies and battery packs could not only void the warranty, but will also most likely damage the analyzer or the battery pack.
- When charging the AMS 2140 with the battery pack or the battery pack by itself, ensure the ambient temperature where charging is occurring is 50° F to 95° F (10° C to 35° C).
- Charge the battery pack only in a non-hazardous area.

Procedure

1. Remove the rubber plug on the top of the analyzer.
2. Insert the power supply connector into the analyzer. The analyzer can be powered on or off.
3. Plug the AC connector on the power supply into a standard AC outlet, ranging from 100 VAC to 250 VAC, 50–60 Hz. A full recharge may take four hours.

   The back of the analyzer may feel warm during charging. The power supply can remain connected to the analyzer after charging completes. You cannot overcharge the battery pack.

Attach the shoulder strap

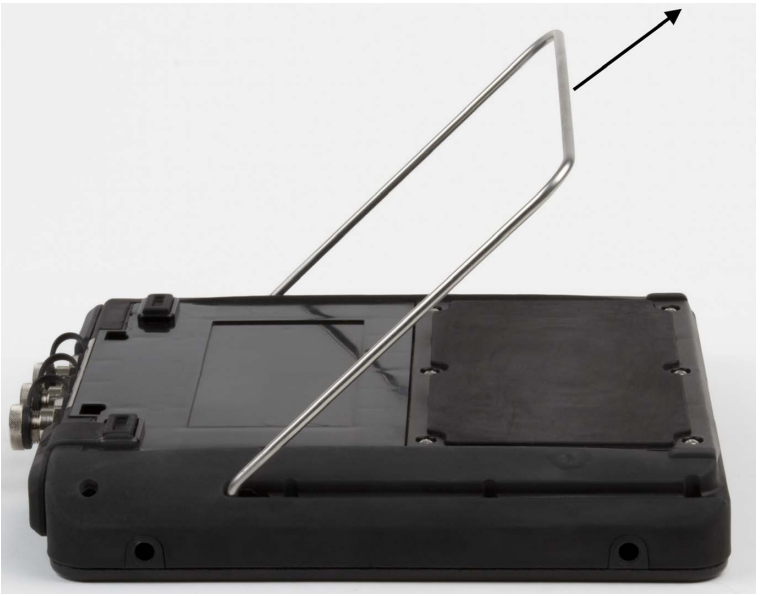
1. Press and hold the button on the strap connector, and insert it into the connectors on the sides of the analyzer or the AMS 2140 Four-Channel Input Adapter, if attached.
2. To release the strap, press and hold the button on the connector and then pull.

Use the stand

1. To put the stand in the upright position, grab the stand and pull up until the stand locks.
2. To release the stand, place the analyzer face down, grab the base of the stand, and gently pull.

The lock releases, and you can push the stand toward the analyzer.

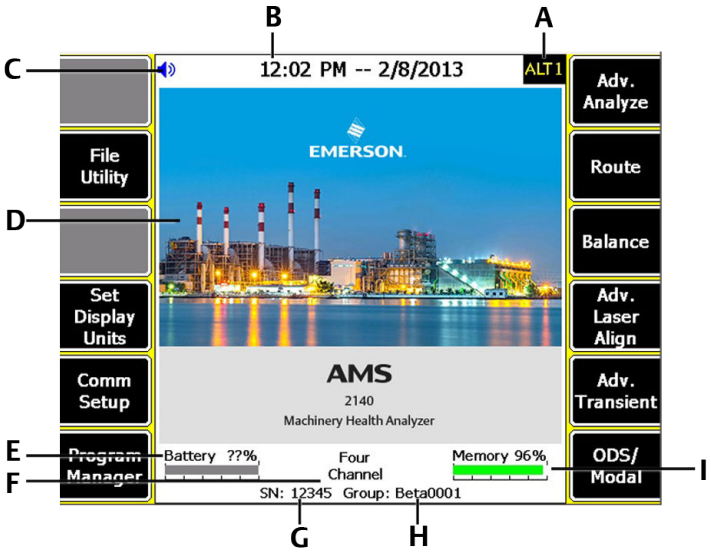
Figure 3: Release the stand



Home screen

The Home screen appears when you turn on the analyzer by pressing the power key.

Figure 4: Home screen



A. An alternate screen (ALT) includes additional options.
B. Current time and date.
C. Bluetooth device connection status (headphones connection icon shown).
D. Default splash screen.
E. Remaining battery pack charge.
F. Number of supported channels for the analyzer.
G. Serial number.
H. Group number for updating multiple analyzers at one site.
I. Available internal memory.

Home screen programs and settings

The Home screen has two alternate screens that display programs and settings. ALT1 or ALT2 appears at the top of the screen and the function keys are outlined in yellow. To switch ALT screens, press the ALT key or the ALT text on the touchscreen.

ALT1 keys

Option	Description
F1	Intentionally blank.
F2 File Utility	Copy, delete, or move routes or jobs saved in the analyzer internal memory or a memory card.

Option	Description
F3	Intentionally blank.
F4 Set Display Units	Set the default display units for the measurement values and plots.
F5 Comm Setup	Set the communication options to connect the analyzer to AMS Machinery Manager. You can also set up the Bluetooth functionality.
F6 Program Manager	Update the programs, add new programs, delete unused programs, or change the splash screen. A password is required to delete programs.
F7 Analyze or Adv. Analyze	Collect data using predefined measurements called Analysis Experts, or create your own measurements in Manual Analyze.
F8 Route	Collect data using a route created in AMS Machinery Manager. You cannot create or modify routes on the analyzer.
F9 Balance	Balance a machine. Balance is an optional program that you load onto the analyzer.
F10 Basic Laser Align or Adv. Laser Align	Align machines. The Basic Laser Alignment Application comes with analyzers that have the wireless option. The Advanced Laser Alignment Application is an optional program that you can load onto the analyzer and has more functions than the Basic application.
F11 Adv. Transient	Collect large, unbroken time waveforms similar to a digital recorder. Advanced Transient is an optional program that you load onto the analyzer.
F12 ODS/Modal	Collect cross channel data for animated analysis of a machine. ODS/Modal is an optional program that you load onto the analyzer.

ALT2 keys

Option	Description
F1 Version	View the versions of the firmware and programs installed on your analyzer.
F2 General Setup	Modify settings for the analyzer screen, keys, and print functionality.
F3 Set Time	Set the time and date in the analyzer.
F4 Memory Utility	View information about the internal memory.
F5 Battery Utility	View information about the battery pack.
F6 View Error Log	View information about any errors the firmware generated.
F7 Connect For Printing	Connect to AMS Machinery Manager to print files or screen captures.
F8	Intentionally blank.
F9	Intentionally blank.
F10	Intentionally blank.
F11	Intentionally blank.
F12	Intentionally blank.

Touchscreen

The touchscreen and function keys let you access the menu options and enter text. If the touchscreen does not respond accurately, calibrate the touchscreen.

⚠ WARNING!

Clean the touchscreen only in a non-hazardous area. An electrostatic discharge is possible when you clean the equipment exterior. Do not use any abrasive or corrosive chemicals or materials. Do not use petroleum distillates and ketone solvents, for example, acetone, gasoline and kerosene. Use a dry, lint-free towel or cloth dampened with a mild soap and water solution.

Note

To prevent permanent damage to the touchscreen, never use sharp objects or excessive pressure with your fingers or stylus. Lightly tap the screen.

Common analyzer settings

Task	Key sequence
Enable or disable the beeper for key presses	Home > ALT > F2 General Setup > F2 Set Keypad Beeper
Set a timer to enter standby when inactive	Home > ALT > F2 General Setup > F4 Set Standby Time
Set a timer to turn off the backlight when inactive	Home > ALT > F2 General Setup > F5 Set Backlight Time
Set the low-battery warning level	Home > ALT > F2 General Setup > ALT > F3 Set Warning Level
Set the number of seconds to hold the power key before the analyzer shuts down	Home > ALT > F2 General Setup > ALT > F4 Set Hold Time
Set the connection type to use with AMS Machinery Manager	Home > F5 Comm Setup > F1 Set Connect Port
Set the default display units for all programs	Home > F4 Set Display Units
Set the date and time	Home > ALT > F3 Set Time
View the analyzer firmware version	Home > ALT > F1 Version

AMS 2140 Four-Channel Input Adapter

The AMS 2140 Four-Channel Input Adapter expands the capabilities of your AMS 2140 by enabling four inputs.

⚠ WARNING!

Use the AMS 2140 Four-Channel Input Adapter in non-hazardous areas only.

The AMS 2140 Four-Channel Input Adapter has two sides that display connectors for Volts and Accel. Each side has a connector labeled To AMS 2140. Use the appropriate Interface cable to connect the AMS 2140 Four-Channel Input Adapter to the AMS 2140. The Accel side has a 5-pin connector. The Volts side has an 8-pin connector.

Connect to the AMS 2140

Attach the AMS 2140 Four-Channel Input Adapter to the shoulder strap connectors on each side of the analyzer, and press the tabs until they click into place. To release the adapter, press the tabs on each side of the AMS 2140 Four-Channel Input Adapter. To attach the shoulder strap, use the connectors on the sides of the AMS 2140 Four-Channel Input Adapter.

Use the appropriate Interface cable to connect the AMS 2140 Four-Channel Input Adapter to the AMS 2140.

Side	Required interface cable
Accel	A40ADAPTR Accel Interface Cable
Volts	A40ADAPTR Tach/Volts Interface Cable

Figure 5: AMS 2140 Four-Channel Input Adapter attached to the AMS 2140 without the interface cable

Use with the AMS 2140

The AMS 2140 Four-Channel Input Adapter requires no additional setup, except in the Balance program. For the Balance program, you must enable the mux option to use the AMS 2140 Four-Channel Input Adapter.

To access the other connectors, turn the adapter over and connect to the AMS 2140 using the appropriate Interface cable.

Multiple inputs

Your analyzer may support up to four channels in each program to simultaneously collect data. To use the multi-channel functionality, set the number of inputs in the Input Setup menu in each program, set up a sensor for each input, and use a connection listed below. For routes, you need to set up the inputs and sensors in AMS Machinery Manager.

Number of inputs	Connection options
1	Use a single cable.
2	• Use two single cables on two separate inputs (acceleration only). • Use a splitter cable on one input. • Use the AMS 2140 Four-Channel Input Adapter.
3	• Use a splitter and one single cable on two separate inputs. • Use the AMS 2140 Four-Channel Input Adapter. • Use the triaxial accelerometer with a single cable.
4	• Use two splitters on two separate inputs. • Use the AMS 2140 Four-Channel Input Adapter. • Use the triaxial accelerometer with a single cable on one accelerometer input and another cable on the other accelerometer input.

AMS 2140 for use in hazardous locations

Be aware of the appropriate approvals before operating the AMS 2140 in hazardous locations.

Each AMS 2140 has a label attached to the back of the unit that designates with approval markings the approved locations for use:

Label	Approved locations
CSA General Safety	Non-rated. Do not use in a hazardous location.
Class I Division 2	Approved for use in a Class I Division 2 hazardous location.
ATEX/IECEx Zone 2	Approved for use in an ATEX/IECEx Zone 2 and Class I Division 2 hazardous location.

Be aware of the following when using the AMS 2140 in a hazardous location:

⚠ WARNING!

- The USB port must only be used in a non-hazardous location.
- The Ethernet port must only be used in a non-hazardous location.
- Do not use the Emerson 430 SpeedVue Sensor in a hazardous location.
- The battery must only be charged and/or replaced in a non-hazardous location.
- If a unit shows any sign of damage, please return for repair.
- If leaving the device unattended outdoors, it is recommended to store the unit in a shaded area or with the LCD facing down.
- The front touch screen must be protected from impact.
- Outputs are intrinsically safe when implemented per drawing D25671 for use in an ATEX/IECEx Zone 2 hazardous environments.
- Outputs are intrinsically safe when implemented per drawing D25639 for use in a Class I Division 2 hazardous environment.

Refer to Emerson Safety Addendum D25670 for complete information on certifications and conditions of safe use in ATEX/IECEx Zone 2 locations. Only ATEX/IECEx Zone 2 units will include this safety addendum in the package.

Notes

- To comply with relevant safety certifications, the AMS 2140 labeled “ATEX/IECEx Zone 2” does not have a keypad backlight.
- Emerson 430 SpeedVue Sensor may not be compatible with the AMS 2140 labeled “ATEX/IECEx Zone 2.” The Emerson 430 is not permitted in hazardous areas; and it may not function with the ATEX-certified AMS 2140 even in a safe area.

Collect route data

The following section describes how to collect route data. By default, the AMS 2140 and AMS Machinery Manager Data Transfer use USB communication to transfer routes. Ensure your AMS Machinery Manager database has a route before you proceed. See the AMS Machinery Manager documentation for information about creating routes.

Note

You must use AMS Machinery Manager version 5.6 or newer to connect to the AMS 2140.

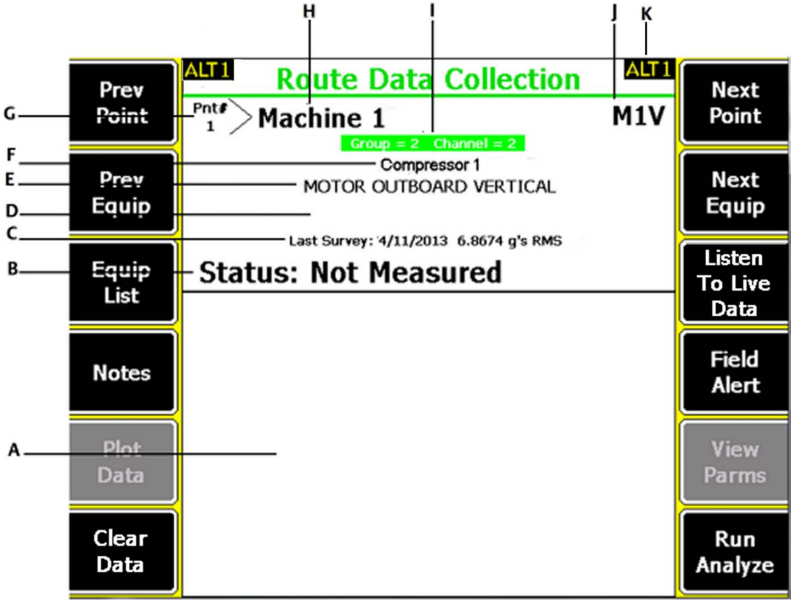
Step 1: Load a route into the analyzer

Task	Steps
Connect to AMS Machinery Manager	1. Remove the rubber plug on the top of the analyzer. 2. Connect the USB cable to the AMS 2140 and the computer where AMS Machinery Manager is installed. 3. Open and log in to AMS Machinery Manager. 4. Click the Data Transfer tab. 5. On the analyzer, press Home > F8 Route > F7 Connect for Transfer.
Load a route from AMS Machinery Manager	1. In Data Transfer, select the database in the Navigator. 2. Drag and drop the route from the database to the connected analyzer in Data Transfer. 3. Click Disconnect in AMS Machinery Manager.
Activate a route	On the analyzer, select a route and press F3 Activate Route on the Route Management screen.

Route Data Collection screen and options

Route Data Collection is the main menu for Route. After you activate a route, the analyzer displays the Route Data Collection screen.

Figure 6: Route Data Collection screen



A. Displays the live and collected data.
B. Status field for measurements, notes, and field alerts.
C. Date and overall value of the last data collected on this point.
D. Measurement reading (overall vibration level).
E. Measurement point description.
F. Equipment description.
G. Measurement point number.
H. Equipment ID.
I. Group and channel number of the measurement point.
J. Three-character measurement point ID.
K. An alternate (ALT) screen includes additional options.

Table 1: Route Data Collection options: ALT1 keys

Option	Description
F1 Prev Point	Move to the previous measurement point on the equipment. If the first point on the equipment displays and you press F1 Prev Point, the analyzer displays the last point on the previous equipment.
F2 Prev Equip	Move to the previous equipment in the route. If the first equipment displays and you press F2 Prev Equip, the analyzer displays the last equipment.
F3 Equip List	View all equipment and measurement points in a route.
F4 Notes	Create, add, or delete notes.

Table 1: Route Data Collection options: ALT1 keys *(continued)*

Option	Description
F5 Plot Data	View the collected data on one or more plots.
F6 Clear Data	Delete data from the current measurement point.
F7 Next Point	Move to the next measurement point on the equipment. If the last point on the equipment displays and you press F7 Next Point, the analyzer displays the first point on the next equipment.
F8 Next Equip	Move to the next equipment in the route. If the last equipment displays and you press F8 Next Equip, the analyzer displays the first equipment.
F9 Listen To Live Data	Listen to vibration using headphones.
F10 Field Alert	Add or remove a field alert from a measurement point. Use field alerts to identify a point for further investigation.
F11 View Parms	View the Analysis Parameter Set with measured values, percent of fault, and any parameters that may be in alert.
F12 Run Analyze	Open the Analyze program to collect additional data on the current measurement point.

Table 2: Route Data Collection options: ALT2 keys

Option	Description
F1 User Setup	Set options for your route. You can set the plots to display live and collected data, parameters to collect route data, and the amount of route data to store.
F2 Override Control	Set up a different sensor than what is specified for the route.
F3 Out Of Service	Label equipment as out of service and skip the measurement.
F4	Intentionally blank.
F5 Tach Setup	Set up and save a tachometer configuration. You can also open, edit, delete, or rename a configuration.
F6 New RPM	Enter a new RPM or load for equipment using a different value than defined in the route.
F7 Exit Route	Close Route and return to the Home screen.
F8	Intentionally blank.
F9 Route Mgnt	Load, delete, or activate routes. You can also connect to AMS Machinery Manager Data Transfer.
F10 View Trend History	Display trend data for the current point in a graphical format. The data includes both historical data downloaded from the database and new data collected with the analyzer.
F11 Print Route Report	Send a route report to the memory card or to AMS Machinery Manager, depending on the default print mode for the analyzer.
F12 More Point Info	View information about the route and the current measurement point.

Step 2: Review data collection and display parameters

The default parameters should be appropriate for most routes. Press Enter or the Back key when you are finished.

Task	Steps
Set the plot type for collected data	From the Route Data Collection screen, press ALT > F1 User Setup > F2 Select Data Display.
Automatically go to the next measurement point	From the Route Data Collection screen, press ALT > F1 User Setup > F3 Point Advance Mode.
Set the route storage mode	From the Route Data Collection screen, press ALT > F1 User Setup > F5 Data Storage Mode.
Set the overlap	From the Route Data Collection screen, press ALT > F1 User Setup > F6 Percent Overlap.
Set the plot type for live data	From the Route Data Collection screen, press ALT > F1 User Setup > F8 Select Live Display.
Set the overall mode	From the Route Data Collection screen, press ALT > F1 User Setup > F9 Set Overall Mode.
Set the integrate mode	From the Route Data Collection screen, press ALT > F1 User Setup > F10 Set Integrate Mode.
View the Analysis Parameters	From the Route Data Collection screen, press F11 View Parms.

Step 3: Collect route data

Task	Steps
Collect route data	1. Attach the sensor to the equipment and the analyzer. 2. From the Route Data Collection screen, press Enter.
Move to the next measurement point	Press F7 Next Point.
Move to the next equipment	Press F8 Next Equip.
Plot route data	Press F5 Plot Data. Press Enter to close the plot view.
Optional: Mark a frequency on a plot with a cursor	Press F10 Cursor Mark or touch the plot. Use the arrow keys to move the cursor. The cursor value displays at the bottom of the screen.
Optional: Run the Analyze program for a route measurement point	1. From the Route Data Collection screen, press F12 Run Analyze. 2. Select an Analysis Expert or a measurement in Manual Analyze. 3. Follow the prompts and press Enter to collect data. 4. Press F9 Store Data to save the data.

Run Analyze to collect data for a route measurement point

If you see unusual data for a measurement point, you can open the Analyze program to collect additional data to troubleshoot the problem. Press the F12 Run Analyze key on the Route Data Collection screen to open Analyze.

The Analyze main menu shows the route name, equipment name, area, and the measurement point. Collect data using predefined measurements called Analysis Experts or set up measurements in Manual Analyze. If you open Analyze from Route, the analyzer may prompt you to use your route parameters.

Note

Emerson recommends collecting route data and marking a frequency on a plot with a cursor before you select an Analysis Expert or measurement in Analyze.

When you open Analyze from Route, there are several limitations:

- Alarms or parameter sets for the route are not applied to the data you collect in Analyze.
- Job data is not trended.
- Two and four channel measurements are unavailable, unless your measurement points are set for these measurements.

Note

After you collect the data, store it. The analyzer does not automatically save the collected data from Analysis Experts to a route or job. You can temporarily view data from the Review Data option in Analyze.

Step 4: Transfer the route

Task	Steps
Optional: Print a route report to AMS Machinery Manager	1. Connect the USB cable to the AMS 2140 and the computer where AMS Machinery Manager is installed. 2. Open and log in to AMS Machinery Manager. 3. Click the Data Transfer tab. 4. From the Route Data Collection screen, press ALT > F11 Print Route Report. 5. Select the starting point, ending point, data to include, and the bar graph options. 6. Press F7 Print.
Transfer a route to AMS Machinery Manager	1. Connect the USB cable to the AMS 2140 and the computer where AMS Machinery Manager is installed. 2. Open and log in to AMS Machinery Manager. 3. Click the Data Transfer tab. 4. From the Route Data Collection screen, press ALT > F9 Route Mgnt > F7 Connect For Transfer. 5. Drag and drop the route from the analyzer on the Data Transfer tab to the database in the Navigator.

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