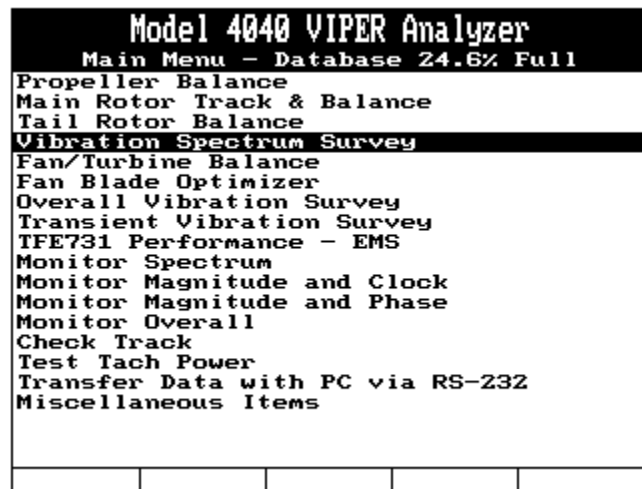

Chapter 9

Vibration Spectrum Survey

(Revision 3, Aug 2007)

“Vibration Spectrum Survey” is an analyzer function that is accessed from the analyzer’s Main Menu banner screen as shown in the illustration below. Selecting this function from the main menu brings up the “Vibration Spectrum Survey Jobs” banner screen menu (also shown below). Each of the listings on this banner screen menu is an option within the “Vibration Spectrum Survey” function. Descriptions of each of these options follow, along with the information required to complete the menu screens within the options, and the steps necessary to perform the vibration spectrum surveys function.



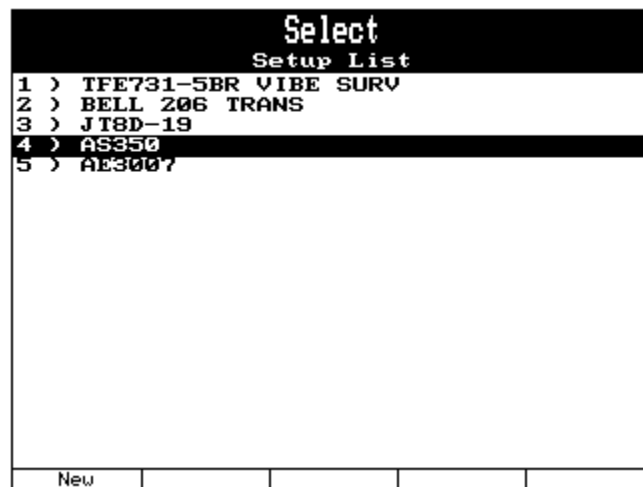
The Vibration Spectrum Survey option allows the user to rapidly complete and store vibration surveys using the “Spectra Setup” feature (described in section 9.1.1 below). With the setup feature you may complete surveys on several different components without manually entering the setup data between surveys. Each job is unique and very quick.

9.1. - Start Job

Selecting “Start Job” from the “Vibration Spectrum Survey Jobs” banner screen allows you to begin a vibration spectrum survey. When you select this option, one of two screens will appear next depending on whether you are starting a job from scratch or an incomplete job still exists in the analyzer’s memory.



If you have previously saved setups in the analyzer’s memory, a screen with the list of setups, as shown below, will be displayed. If no setups are stored, or if you choose “New” by pressing the [F1] key from the Setup List screen, the analyzer will display the “Spectra Setup” banner screen. If you select a setup from the list, the analyzer will proceed to the “Job Identification” banner screen described in section 9.1.2. Instructions for completing the “Spectra Setup” banner screen appear in the following Section, 9.1.1.



Model 4040 VIPER Analyzer				
Spectra Setup				
Name :	<input type="text"/>			
(RPM) :	<input type="text" value="0.00"/>	to	<input type="text" value="10000.00"/>	
Resolution :	<input type="text" value="400"/>	lines		
Average Type :	<input type="text" value="Expon."/>	Blocks :	<input type="text" value="4"/>	
Channel	Units	Mod	MaxValue	
A :	<input type="text" value="None"/>			
B :	<input type="text" value="None"/>			
C :	<input type="text" value="None"/>			
D :	<input type="text" value="None"/>			
Channel	Sensor		Desc	
A :				
B :				
C :				
D :				
Edit Conds	Speeds	Limits		

If another job was in progress but was not completed, the “Incomplete Job” banner screen will be displayed to inform you of this. This screen will also display a message prompting you to verify that you want to complete the in-progress job or that you want to ignore it and begin a completely new job. This verification prevents you from accidentally erasing data from an in-progress job. The screen will display the message “The last job performed is incomplete. Do you want to RESUME work on it?”

Model 4040 VIPER Analyzer				
Incomplete Job				
<p>The last job performed is incomplete.</p> <p>Do you want to RESUME work on it?</p>				
Yes				No

You must then choose a “Yes” or “No” answer by pressing the corresponding [F1] key, for “Yes,” or the [F5] key, for “No.” The “Yes” answer will return you to the point where the in-progress job was stopped and allow you to complete it. If you choose the “No” answer, the screen will then display the “Spectra Setup” banner screen so you can program a new setup or if you have previously-saved setups stored in the analyzer’s memory, a screen displaying the list of setups will be displayed. You can then select a setup from this list. If you select from the list, you proceed to the “Job Identification” banner screen described in section 9.1.2. Instructions for completing the “Spectra Setup” banner screen appear in the following Section, 9.1.1.

NOTE

The analyzer will store Setups as long as available memory remains. If you are attempting to store a survey that will exceed the analyzer's memory capacity, the analyzer will display a message saying "You must delete an item before adding a new one." Press the [BACKUP] key and select "Manage Setups" to delete the Setup of your choosing.

9.1.1. - Spectra Setup

The "Spectra Setup" banner screen allows you to define and store a vibration spectrum survey job. As shown in the figure below, some fields in this screen have default values that appear automatically. You can use this information if appropriate or input your specific setup information using the keypad. (Refer to Chapter 3, "Using the Viper 4040 Analyzer" if you are unfamiliar with using the keypad.) The analyzer will display the "Spectra Setup" banner with default values as those shown in the figure below.

Model 4040 VIPER Analyzer				
Spectra Setup				
Name :	[]			
RPM :	0.00	to	10000.00	
Resolution :	400	lines		
Average Type :	Expon.	Blocks :	4	
Channel	Units	Mod	MaxValue	
A :	None			
B :	None			
C :	None			
D :	None			
Channel	Sensor	Desc		
A :				
B :				
C :				
D :				
Edit	Conds	Speeds	Limits	

9.1.1.1. Spectra Setup

- 9.1.1.1.1. In the **Name:** field, use the keypad to enter a name for the vibration spectra survey job. (Refer to Chapter 3, "Using the Viper 4040 Analyzer" if you are unfamiliar with using the keypad.) The "Name" should be one of your choosing which you will easily recognize and associate with this job. The airframe or engine name such as "AS350" or "TFE731-2" is best to use when naming a Setup.
- 9.1.1.1.2. Use the [↓] key to move to the frequency units (RPM or Hz) field. Determine if the required frequency units are revolutions per minute (RPM) or cycles per second (Hz), then use the [⇒] key to "toggle" between the two selections in this field.
- 9.1.1.1.3. Use the [↓] key to move to the Minimum Frequency and Maximum Frequency fields. These fields are unnamed, are located immediately to the right of the

frequency units filed, and are separated by the word “to”. Using the keypad, enter the minimum frequency value, then press [=>] key and enter the and maximum frequency value according to the requirements for the job. For instance, if the frequency of interest is 300 Hz, choose a minimum and maximum frequency that will place the 300 Hz in the center of the range. The minimum could be 250 Hz and the maximum 350 Hz for example. Be sure to set the min and max frequencies wide enough to encompass all turning speeds you wish to capture. The maximum frequency may be set as high as 30000 Hz (1,800,000 RPM). You should also consider other factors such as Harmonics. If you want multiples of the fundamental frequency included in the frequency range, determine to what extent that need is (1X, 2X, 3X, and so on) then extend the frequency range to include it. For example, 300Hz is the frequency of interest, the fundamental frequency. If you want 3X harmonics included in the frequency range you must multiply the fundamental frequency (300 Hz) X the harmonic range (3X) and arrive at an upper range of 900 Hz.

- 9.1.1.1.4. Move to the “Resolution” field using the [↓] key. Complete the field by setting the resolution as required at 100, 200, 400, 800, 1600, 3200, or 6400 lines by pressing the [=>] key until the desired resolution is displayed. Unless you are attempting to separate two frequencies that are within close proximity to one another, the default 400 lines should more than suffice for general analysis. Higher resolutions will provide a much sharper image of the specified frequency band, but also require more time and more memory for acquisition.
- 9.1.1.1.5. Move to the “Average Type” field using the [↓] key. Select the “Average Type” by scrolling between the available choices using the [=>] key. The three available options are “Normal, Expon.” and “Peak”. Normal averaging displays a running average of the last specified number of blocks of data. All blocks are weighed equally in normal averaging. Peak averaging plots the highest or worst case amplitude for all frequencies and holds that value on the display until a higher value is acquired. The displayed amplitude will not decrease thus the term “peak hold.” A peak hold survey will continue to collect data until you stop acquisition by pressing the [ENTER] key. Expon. will show the changes in amplitude as they occur allowing you to view the data in real time. The analyzer collects data until you stop the data collection by pressing the [ENTER] key. Consult your aircraft’s equipment maintenance manual for specific requirements of a vibration survey or for analysis guidelines.
- 9.1.1.1.6. Use the [↓] key to move to the “**Blocks**” field. Using the keypad, enter the number of data blocks you wish to be used in the calculations. The default is 4. The valid range is 0 to 999. Remember that a higher numbers of blocks, while providing more reliable data, also require more time to acquire and memory to store. The default of 4 is sufficient for most applications. This means that four blocks of data will be acquired before the averaging process is executed. The analyzer then acquires four more blocks and the process repeats until data acquisition is terminated.
- 9.1.1.1.7. Use the [↓] key to move to the “**Units**” field in the Channel A: row (or rows corresponding to the input channel you will use.). The “Units” field determines the engineering units in which the amplitude or “Y” axis (amplitude) of the

spectra will be displayed. Consult your equipment maintenance manual for specific requirements of a vibration survey or for analysis guidelines. Use the [⇒] key to select IPS (Inches Per Second), mm/sec (millimeters per second), cm/sec (centimeters per second), Mils (1/1000th of an inch), Microns (1/1000000th of a meter), g's (equivalent gravities of acceleration), mbars (microbars), Pascals, Volts, cm/s/s (centimeters per second per second) or db.

9.1.1.1.8. Move to the “**Mod**” (Modifier) field using the [↓] key. “Modifier” means unit Modifiers relevant to the (Vibration) engineering units you selected in step 9.1.1.1.7 above. Use the [⇒] key to select either Peak, Pk - Pk (Peak to Peak, also called Double Amplitude), Avg. (Average) or RMS (Root Mean Square). Consult the appropriate equipment maintenance manual for specific requirements of a vibration survey or for analysis guidelines.

9.1.1.1.9. Use the [↓] key to move to the “**MaxValue**” field. Toggle between the selections by using [⇒] key. The full scale indicates the maximum amplitude you reasonably expect to acquire or the maximum amplitude of interest. You should choose an amplitude value that will adequately display the full amplitude of any specified limit. If you do not expect amplitudes in excess of what would normally be experienced for the equipment application, set this field as low as possible while still allowing sufficient space to display the maximum limitations as stated above.

NOTE

Encountered amplitudes above this setting may cause the analyzer to overload. It is best to set the “Full Scale Vibration” higher than needed as opposed to lower than needed for this reason. The overload does not cause a fatal error. You can recover from the overload by pressing the [MAIN MENU] key and starting the process again from the beginning. However, avoiding an overload will save you time in the process.

The available selections are: 0.01, 0.02, 0.05, .10, .20, .50, 1.00, 2.00, 5.00, 10.00, 20.00, 50, and 100. This scale refers to the number of engineering units of vibration amplitude specified in step 9.1.1.1.7 above. Repeat steps 9.1.1.1.7 thru 9.1.1.1.9 for each channel being used to acquire vibration data for this survey.

NOTE

See the Chapter 19, Equipment and Accessory Setup and Troubleshooting, for additional information on installing accessory equipment such as vibration sensors and tachometers.

9.1.1.1.10. Use the [↓] key to move to the “**Sensor**” field for the Channel A: row. Select a sensor from the available sensor list by using [⇒] key. A “None” selection indicates that you do not intend to use the channel. You **MUST** select at least one sensor for any channel. You may use different sensor types for each individual channel. The analyzer will process the incoming signal and display the vibration in the units and modifiers specified in 9.1.1.1.7 and 9.1.1.1.9 above. If you are using an accelerometer for the sensor and have the Units set to mils (displacement), you will require an external integrator for signal processing. Call ACES Systems for more information.

- 9.1.1.1.11. Use the [↓] key to move to the “**Desc**” (description) field. If the Sensor field contains a sensor selection, use the keypad to enter a description for the sensor such as FRONT, REAR, or a clock position (12:00 for instance). The Desc fields are optional. The available field length is 7 characters. Use the keypad to make an entry in these fields. Repeat steps 9.1.1.1.10 and 9.1.1.1.11 for each channel being used for this survey. Press the [↓] key repeatedly to skip over the unused Sensor and Desc fields.

9.1.1.2. – Edit Conditions

The “Edit Conds” or Edit Conditions, (which corresponds to the [F1] key) selection appears at the bottom left of the “Spectra Setup” banner screen. Press the [F1] key if you wish to define conditions for the survey. Defining conditions for the survey allows you to acquire data in each job for the same optional conditions. If you choose this option, the following “Spectra Conditions” banner screen is displayed.

Model 4040 VIPER Analyzer	
Spectra Conditions	
Condition	
1)	
2)	
3)	
4)	
5)	
6)	
7)	
8)	
9)	
10)	
11)	
12)	
13)	
14)	
15)	

To input conditions, do the following:

- 9.1.1.2.1. Use the [↑], [↓], [⇒], and [⇐] keys to navigate the screen and input conditions’ using the keypad.
- 9.1.1.2.2. In the “Condition” column, use the analyzer keypad to enter a descriptive name for up to fifteen conditions. You may define up to fifteen individual conditions for which you optionally collect and store data. When defined, these conditions are stored with the setup and are accessed when the setup is selected from the START JOB function
- 9.1.1.2.3. When the conditions are completed per your requirements, press [ENTER] to accept and return to the “Spectra Setup” screen.

9.1.1.3. – Speeds

Press the [F2] “Speeds” key from the Spectra Setup screen shown above in paragraph 9.1.1. The Speeds option allows you to measure several types of speed inputs for synchronizing

with the vibration input or to provide an entry field for reference where no actual speed input is available. This allows you to view amplitude, in the selected engineering units, relative to the speed of the machine or component being monitored. To complete the Speed option, do the following:

- 9.1.1.3.1. Use the [↑] and [↓] to move from field to field on this screen and the [⇒] and [⇐] keys to navigate within the field. Make field entries in the fields using the keypad.
- 9.1.1.3.2. The column of numbers to the left side of the fields represents the four speed input channels, TACH 1, 2, 3, and 4. In the “Measure” field, use the [⇒], and [⇐] keys to select the type of input. The available selections are: NONE (where no speed input or reference is used), PULSE S-H (Pulse, Single ended – High), Volts S (volts – single ended), PULSE D – H (Pulse Differential – High), Volts D (Volts Differential), PULSE S – L (Pulse, Single ended – Low), PULSE D – L (Pulse Differential – Low), and ENTRY (A user entered speed reference).

	Measure	DESC	OFF/100%	Factor
1)	None		0.00000	0.00000
2)	None		0.00000	0.00000
3)	None		0.00000	0.00000
4)	None		0.00000	0.00000

- 9.1.1.3.3. The “DESC” column is the descriptive name for the tachometer input such as N1, N2, Fan, or HPT. Enter up to five alphanumeric characters in this field. The description should be one that all users of this setup are familiar with and easily understand.
- 9.1.1.3.4. The “OFF/100%” column is used when the VOLTS selection is made in the “Measure” column described above. This field is used to enter the offset if measuring a DC voltage or the frequency at 100% of component speed if measuring frequency in Hertz (Hz). Use the keypad to enter the value in the OFF/100% field.
- 9.1.1.3.5. In the “FACTOR” column, enter the multiplier for the DC voltage or Hertz to attain the actual component speed. If measuring a voltage, the speed in RPM is equal to OFF + voltage x Factor. If using a Pulse (RPM) input, the RPM is equal to Hertz x Factor. The analyzer assumes the input to be relative to Hz (cycles per second) so that an input of one pulse per revolution (one-per-rev) would

require a FACTOR of 60 (1 (pulse per-rev) X 60 Hz) to equal Revolutions per minute (RPM). Enter the factor using the keypad.

- 9.1.1.3.6. Repeat steps 9.1.1.3.2 through 9.1.1.3.5 for each of the channels required. When all fields are completed per your requirements, press the [ENTER] key to return to the Spectra Setup screen.

9.1.1.4. – Limits

Press the [F3] “Limits” key from the Spectra Setup screen shown above in paragraph 9.1.1. The Limits option allows you to enter the limits relative to the speed, or frequency (X coordinate of the spectra) which will place a limit line directly on the spectral plot for quick reference of compliance with operating limits of the machine or component being monitored. To complete the Limits option, do the following:

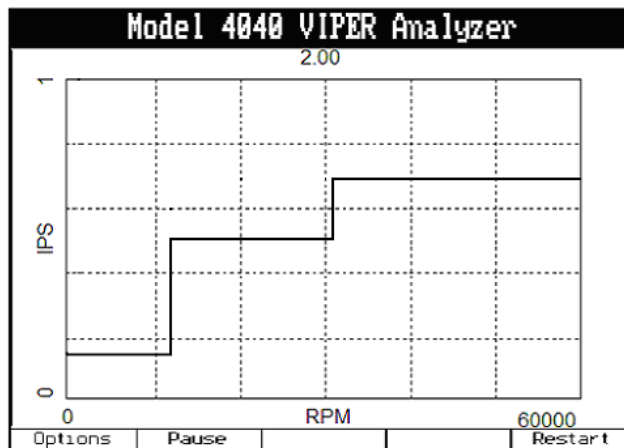
Model 4040 VIPER Analyzer		
Spectra Setup		
Name:	[]	
Minimum Frequency:	0.00	
Maximum Frequency:	10000.00	(RPM)
Resolution:	400	lines
Average Type:	(Expon.)	
Blocks in Average:	4	
Channel	Sensor	Desc
A:	None	
B:	None	
C:	None	
D:	None	
Vibration:	(g's)	
Modifier:	(Peak)	
Full Scale Vibration:	(1.00)	
A-Limits	B-Limits	C-Limits
D-Limits	Back	

- 9.1.1.4.1. After pressing the [F3] “Limits” key from the Spectra Setup screen, the five function key values will change to those shown in the example screen above. Press the key corresponding to the channel for which you wish to enter limits, [F1] for Channel A, [F2] for Channel B, [F3] for Channel C, [F4] for Channel D, or you may exit back to the Spectra Setup by pressing the [F5] “Back” key. When you select a Channel the Edit Limits for Channel X screen, shown below will be displayed.
- 9.1.1.4.2. In the “Edit Limits for Channel X:” screen, use the [↑] and [↓] keys to move from field to field and the [⇒] and [⇐] keys to select options or move the cursor within each field. Use the keypad to enter a beginning limit frequency in the “F-low” field. Use the keypad to enter an ending limit frequency in the “F-high” field. Select the unit multiplier for the reference frequency in the “Unit” field and finally enter the actual limit, in numbers of engineering units of amplitude, in the “Limit” field. You may then copy the specified limits to all other input channels by pressing the [F1] “CopyToAll” key or to any other individual channel by pressing the corresponding “F” key for “CopyToX”. When all limits are set, press [ENTER] to accept and continue. The second

screen below illustrates an example of how the limit line is actually depicted on the analyzer screen.

Press [ENTER] from the Spectra Setup screen to finish and save the setup.

Model 4040 VIPER Analyzer				
Edit Limits for Channel A:				
	F-low	F-high	Unit	Limit
1)	0.00	0.00	{xCS1}	0.00
2)	0.00	0.00	{xCS1}	0.00
3)	0.00	0.00	{xCS1}	0.00
4)	0.00	0.00	{xCS1}	0.00
5)	0.00	0.00	{xCS1}	0.00
6)	0.00	0.00	{xCS1}	0.00
7)	0.00	0.00	{xCS1}	0.00
8)	0.00	0.00	{xCS1}	0.00
9)	0.00	0.00	{xCS1}	0.00
10)	0.00	0.00	{xCS1}	0.00
11)	0.00	0.00	{xCS1}	0.00
12)	0.00	0.00	{xCS1}	0.00
13)	0.00	0.00	{xCS1}	0.00
14)	0.00	0.00	{xCS1}	0.00
CopyToAll		CopyToB	CopyToC	CopyToD



9.1.2. - Job Identification

The next screen displayed is the “Job Identification” banner screen shown in the following illustration. At this point you may turn the analyzer off or continue with the job. All information on this screen is optional; however we highly recommend you fill in as much information as possible to ease the task of storage and retrieval of surveys from AvTrend and the analyzer’s memory. If you have other names stored, you may press the [F1] key to select from a list of stored names, which will then be entered into the “Name” field. Enter information as desired in each of the fields using the analyzer keypad. When all fields are completed as desired, press [ENTER] to continue.

Model 4040 VIPER Analyzer				
Customer Information				
Enter the following optional Customer information.				
Name:	Sky King			
A/C Registration:	N123SK			
A/C Total Time:	3457			
Press ENTER to continue.				
Names				

9.1.3. – Engine Information

The “Engine Information” banner screen, shown below, will be displayed. Use the [⇒] key to select a position number for the engine being surveyed. A serial number (“S/N”), “Type” “TSO” (time since new), and “TSN” (time since new) field is available for both an engine and a propeller so that stored surveys can be traced by either component of the powertrain system, where applicable. All fields are optional but we highly recommend you fill in as much information as possible for ease of use in trending, recall, and storage.

Navigate (move) between the fields using the [↓] and [↑] keys. When all fields are filled as required, press [ENTER] to continue.

Model 4040 VIPER Analyzer				
Engine Information				
Position:	1			
Propeller:				
S/N	MC8799			
Type	BLK MAX			
TSO	700			
TSN	1478			
Engine:				
S/N	34889			
Type	I0540			
TSO	0			
TSN	1478			
Serial Nos				

9.1.4. – Select Aircraft Condition

The “Select Aircraft Condition” banner screen is displayed. The conditions are those defined in the “Edit Conditions” screen (see section 9.1.1.2 above).

Use the [↑] or [↓] keys to select the condition you wish to collect. When your choice is highlighted, press [ENTER] to begin collecting data.

9.1.5. – Start Component

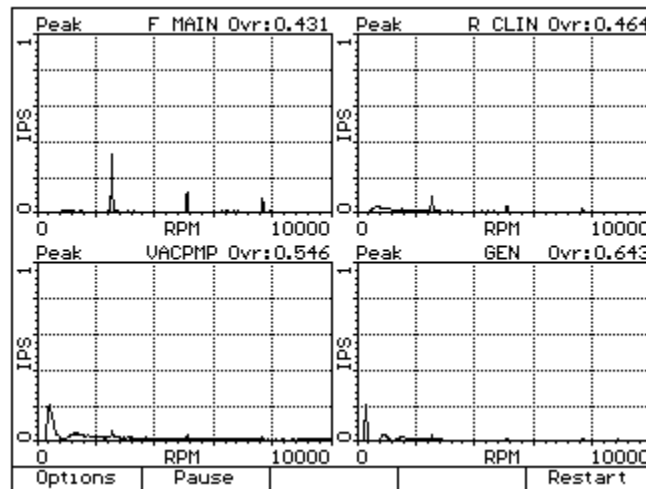
Start the component you are checking (engine, generator, gearbox, etc.). When the component reaches the desired or normal operating conditions (speed, temp, pressures, etc.), press the [ENTER] key to begin acquiring data.

NOTE

When the spectra is displayed on screen, you may press the [⇒] key to produce a **NORMAL CURSOR** immediately at the highest displayed amplitude frequency. The [↑] or [↓] keys may also be used immediately to **EXPAND** or **SHRINK** the Y scale.

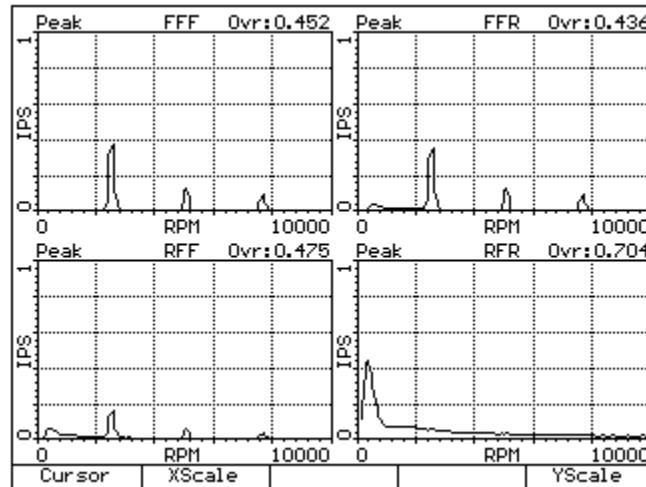
9.1.6. - Collecting Data

When the spectra is displayed, you will also see three function boxes at the bottom of the screen (see following figure) corresponding to the position of the [F1], [F2], and [F5] keys directly below them. The boxes read “Options,” “Pause,” and “Restart.”

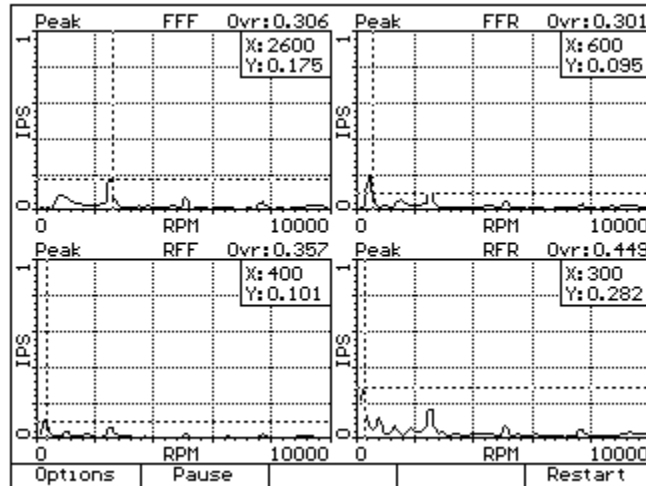


Once any of these “F” key options are selected, both the screen and the corresponding “F” key functions change. With each selection, the “F” keys offer different options (e.g., Expand, Shrink, X scale) for viewing the spectra. The “F” key functions for viewing spectra are described in the following steps.

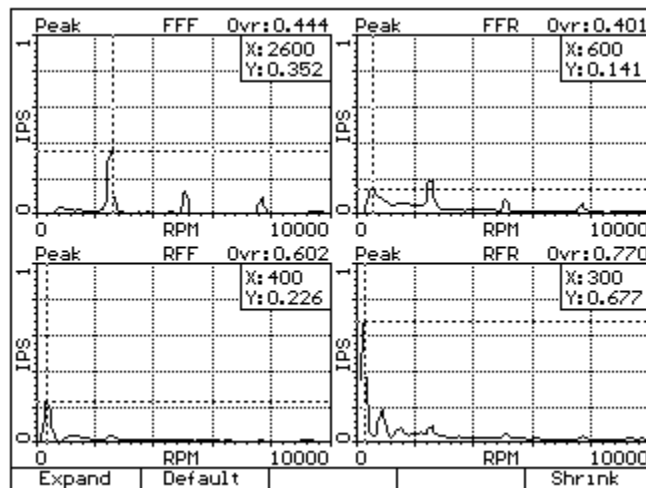
- 9.1.6.1. Pressing the [F1] “Options” key will change the [F1], [F2], and [F5] boxes to read “Cursor,” “X scale,” and “Y scale” respectively as shown in the figure below.
- 9.1.6.2. Pressing the [F1] “Cursor” key will change the [F1], [F2], and [F5] boxes to read “Normal,” “Harmonic,” and “None” respectively. The functions of the “F” keys will continue to change as the screens change.



- 9.1.6.3. Pressing the [F1] “Normal” key will produce a normal cursor on the screen accompanied by an X and Y scale value readout box in the upper right corner of each displayed spectra (see the following figure). These X and Y values are relative to the current position of the cursor only. The cursor can be moved along the X (horizontal) axis of the spectra by pressing the [\leftarrow] or [\rightarrow] keys. Hold down the key for large and rapid incremental changes. The value of the X-axis (frequency) and Y-axis (amplitude) will be displayed for the current position of the cursor. Incremental values are determined by the number of lines of resolution specified in the setup screen.
- 9.1.6.4. Pressing the [F2] “Harmonic” key will produce multiple harmonic cursors according to the specified frequency range. When this key is pressed, cursors will appear to the right of the fundamental frequency identified by the leftmost cursor. For example, if the fundamental frequency is 300 Hz cursors will be placed at 2X (600 Hz) 3X (900 Hz) 4x (1200 Hz) and so on until the upper frequency limit of the screen is met. When the primary cursor (for the fundamental frequency) is moved, the multiple harmonic cursors will automatically follow the movement and position themselves at the new multiple of the fundamental frequency. To remove the harmonic cursors, repeat steps 9.1.6.1 to 9.1.6.2 above. At step 9.1.6.3, press either the [F1] “Normal” or [F5] “None” key and the multiple cursor will be replaced by your selection.
- 9.1.6.5. Pressing the [F5] “None” key will remove either a normal or harmonic cursor if currently displayed on screen. The three boxes above the [F1], [F2] and [F5] keys will return to “Options,” “Pause,” and “Restart” respectively. If no cursor is displayed when pressing this key, only the box nomenclature will change.



9.1.6.6. Pressing the [F2] “X scale” key will change the [F1], [F2], and [F5] boxes to read “Expand,” “Default,” and “Shrink” respectively as shown in the following figure.



9.1.6.7. Pressing the [F1] “Expand” key will expand the X scale of the spectra, in effect enlarging the viewing area. You might think of this function as a “Zoom Out” feature. The center of the Expanded view will be the position of the cursor prior to pressing the [F1] key. If the view is already at the maximum range of the specified X scale range, no scaling change will occur. However, the cursor will be displayed and the X, Y, and “Ovr” (Overall) values will be shown in the upper right corner of the screen. The [F1], [F2], and [F5] boxes will return to the format described in step 9.1.6.5 above. If you wish to Expand the X scale even further, retrace the steps from that point as described in the text.

9.1.6.8. Pressing the [F2] “Default” key will return the X scale and Y scale to the values specified in the setup. This is a quick and easy way to return all expanded and shrunken scales to that default value without the necessity of numerous keystrokes.

If the X and Y scales are already at the setup values when the [F2] Default key is pressed, the three function boxes will return to “Options,” “Pause,” and “Restart”. No other changes will occur.

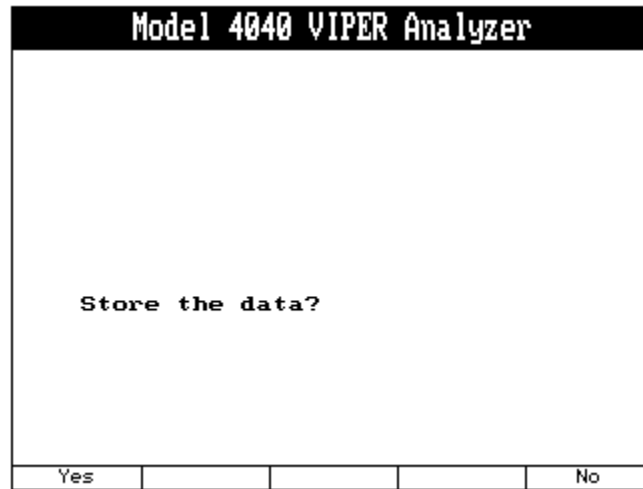
- 9.1.6.9. Pressing the [F5] “Shrink” key will lower the X scale of the spectra, in effect shrinking the viewing area. You might think of this function as a “Zoom In” feature. If the view is already at the minimum of the specified X scale range, no scaling change will occur. However, the cursor will be displayed and the X, Y, and “Ovr” (Overall) values will be shown in the upper right corner of the screen. The [F1], [F2], and [F5] boxes will return to the format described in step 9.1.6.5 above. If you wish to Shrink the X scale even further, retrace the steps from that point as described in the text.
- 9.1.6.10. Pressing the [F5] “Y scale” key changes the [F1], [F2], and [F5] boxes to read “Expand,” “Default,” and “Shrink” respectively (see above).
- 9.1.6.11. Pressing the [F1] “Expand” key will expand the Y scale of the spectra, in effect enlarging the viewing area. You might think of this function as a “Zoom Out” feature. If the view is already at the maximum range of the specified Y scale range, no scaling change will occur. However, the cursor will be displayed and the X, Y, and Ovr: (Overall) values will be shown in the upper right corner of the screen. The [F1], [F2], and [F5] boxes will return to the format described in step 9.1.6.5 above. If you wish to Expand the Y scale even further, retrace the steps from that point as described in the text.
- 9.1.6.12. Pressing the [F2] “Default” key will return the X scale and Y scale to the values specified in the setup. This is a quick and easy way to return all expanded and shrunken scales to that default value without the necessity of numerous keystrokes. If the X and Y scales are already at the setup values when the [F2] Default key is pressed, the three function boxes will return to “Options,” “Pause,” and “Restart.” No other changes will occur.
- 9.1.6.13. Pressing the [F5] “Shrink” key will lower the Y scale of the spectra, in effect shrinking the viewing area. You might think of this function as a “Zoom In” feature. If the view is already at the minimum of the specified Y scale range, no scaling change will occur. However, the cursor will be displayed and the X, Y, and “Ovr” (Overall) values will be shown in the upper right corner of the screen. The [F1], [F2] and [F3] boxes will return to the format described in step 9.1.6.5 above. If you wish to shrink the Y scale even further, retrace the steps from that point as described in the text.

9.1.7. - Storing Data

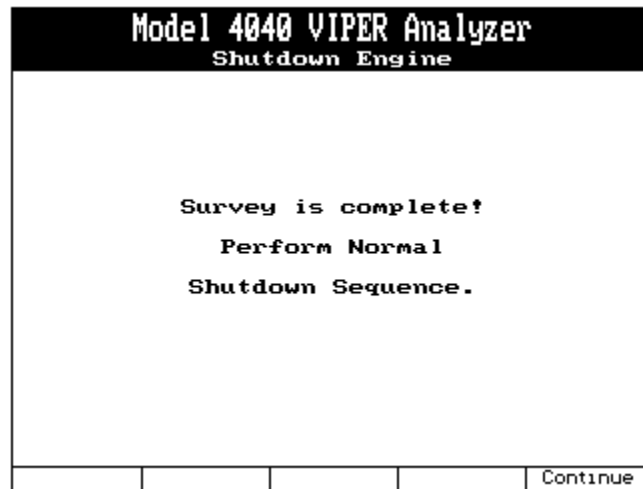
Pressing the [F2] “PAUSE” key will stop data acquisition and freeze the screen with the latest displayed data. The [F1], [F2], and [F5] boxes will change to read [F1] “Blank”, [F2] “Blank”, and [F3] “Resume”.

Pressing the [F5] “Resume” key will restart the data acquisition and continue the data collection process with the latest data. Anytime the spectrum is displayed on screen you may

press [ENTER] to terminate data acquisition. The analyzer will then display the screen shown below.

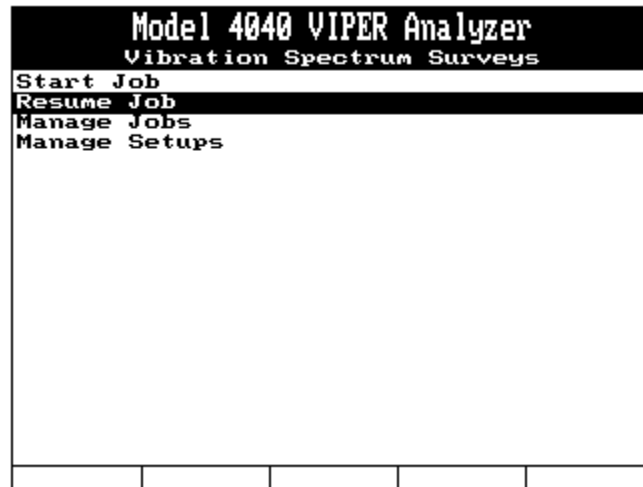


To save the collected data, press the [F1] "Yes" key. If you elect to save the data by pressing the [F1] key, the following screen will be displayed. This is an information only screen. Press the [F5] "Continue" key to acknowledge and exit.



The "Select Aircraft Condition" banner screen is again displayed as shown in the following figure. Notice that the condition for which you just collected and stored data now has an "X" immediately to the left of the defined condition. This alerts the user that data has been collected and stored for this condition. This does not preclude you from selecting and acquiring new data for this condition. However, if you choose to store the data, the previously stored data will be written over and may not be recovered.

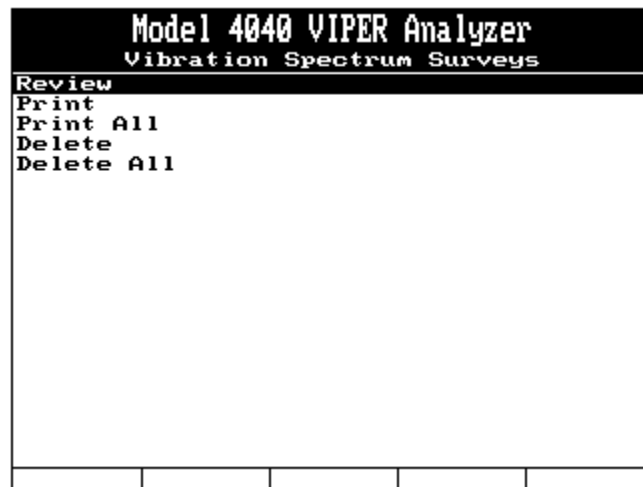
9.2. - Resume Job



When you select “Resume Job” from the “Vibration Spectrum Surveys” banner screen menu, the “Incomplete Jobs” banner screen will be displayed. Incomplete jobs are listed by name, preceded by an asterisk. Select the job you wish to complete and the analyzer will return you to the point where the in-progress job was stopped, allowing you to complete it.

9.3. - Manage Jobs

Selecting “Manage Jobs” from the “Vibration Spectrum Surveys” banner screen menu presents several sub-menu choices to choose from. These choices allow you to “manage” previously completed job data you have stored in the analyzer.



9.3.1. - Review

Selecting the “Review” option presents a list of stored jobs on the “Job List” banner screen. You can select one job for on-screen viewing. When viewing is complete, press the [BACKUP] or [ENTER] key to exit the screen.

9.3.2. - Print

The “Print” option presents a list of stored jobs on the “Job List” banner screen. From the list, you may select one job for printing. See Chapter 14, “Printing” for a detailed explanation of how to set up the analyzer to print.

9.3.3. - Print All

The “Print All” option sends all currently stored jobs to the printer. When you select “Print All,” a message will appear on the analyzer’s “Print All Jobs” banner screen asking you to verify that you want to print all jobs. Answer the prompt, “Are you sure?” by pressing the [F1] key for “Yes” or the [F5] key for “No.” If you choose the “Yes” answer, ensure your printer is prepared (paper, print cartridge, etc.) to complete the number of jobs stored. The “Yes” answer will send *all* currently stored jobs to the printer. The “No” answer will return you to the previous menu.

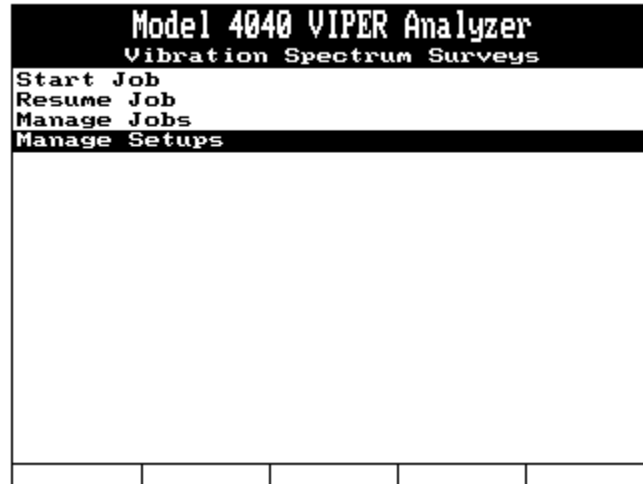
9.3.4. - Delete

The “Delete” option presents a list of stored jobs on the “Job List” banner screen. From the list, you may select one job for deletion. After making your selection, the “Delete Job” banner screen will appear, asking you to verify your intent to delete the selected job by pressing the [F1] key for “Yes” or the [F5] key for “No.” You may wish to transfer the data to AvTrend or print the job for reference or permanent record prior to deleting. Once deleted, the job cannot be retrieved from the analyzer.

9.3.5. - Delete All

The “Delete All” option will delete all currently stored jobs. After selecting this option, the “Delete All Job” banner screen will appear, asking you to verify your intent to delete all the jobs by pressing the [F1] key for “Yes” or the [F5] key for “No.” You may wish to transfer the data to AvTrend or print the jobs for reference or permanent record prior to deleting. Once deleted, the jobs cannot be retrieved from the analyzer.

9.4. - Manage Setups



Selecting “Manage Setups” from the “Vibration Spectrum Surveys” banner screen menu presents several sub-menu choices to choose from. These choices allow you to “manage” job setups you have stored previously in the analyzer.

9.4.1. - Edit

Selecting the “Edit” function displays the “Setup List” screen. Select the setup you wish to edit. The screen will display the “Spectra Setup” screen. Edit the setup as necessary and press [ENTER] to store and exit the edited setup screen. DO NOT use the BACKUP key to exit the screen following changes made in the setup with the Edit mode. You must use the [ENTER] key to progress to the end of the setup for the changes to be permanent.

9.4.2. – New

| If you select “New,” the “Spectra Setup” screen is displayed. See section 9.1.1 for instructions on how to proceed from this point.

9.4.3. - Print

Selecting the “Print” function displays the “Setup List” screen. Ensure your printer is turned on and connected to the analyzer with the COMM/Print cable supplied with your analyzer. Select the setup you wish to print. (See Chapter 14, “Printing” for a detailed explanation of how to set up the analyzer to print.)

9.4.4. - Print All

Selecting “Print All” sends all currently stored setups to the printer. When making this selection, you will be asked to verify “Are you sure?” by pressing the [F1] key for “Yes,” or the [F5] key for “No.” If choosing the “Yes” answer, ensure your printer is prepared (paper, print cartridge, etc.) to complete the number of jobs stored. The “Yes” answer will send *all* currently stored setups to the printer. The “No” answer will return you to the previous menu.

9.4.5. - Delete

The “Delete” option presents you with a list of stored setups. From the list, you may select one setup for deletion. If you wish to delete all stored setups, you must delete them individually. After making your selection, you will be asked to verify your intent to delete the selected job by pressing the [F1] key for “Yes,” or the [F5] key for “No.” We highly recommend you print the setup for reference or permanent record prior to deleting them.

Once deleted, the setups cannot be retrieved from the analyzer. If the setup is locked, indicated by a small padlock icon to the left of the setup name, the setup can still be deleted but not edited. Setups can only be locked as a function of AvTrend.