



Application Note

Pratt and Whitney Canada PT6 Series

Transient Vibration Survey

Part Number: 11-200-0242

AppNote Number: E-PWC-PT6-4120-TVS (Rev. 1.03, May 2010)

This Application Note is provided for information only and does not supersede the requirements or guidelines set forth in the applicable engine or airframe maintenance manual. Technology for Energy Corporation assumes no obligation or liability, either expressed or implied, to the Purchaser arising out of the use of this procedure.

Copyright © 2009, 2010 TEC Aviation Division. All rights reserved. This document is to be printed and reproduced for personal use only.



Application Note

Application Note Number	E-PWC-PT6-4120-TVS
Revision	1.03
Function	1ENG, 1/3ENG, 1ENG Transient Vibration Survey
Airframe	Test Cell
Engine	PT6A (All Models)
E-Setup Number	e-pwc-pt6-4120-tvs
ACES Systems Analyzer	VIPER Model 4120
Firmware Version	2.07 or Higher
Procedure	N/A

Introduction

This Application Note covers the required equipment, equipment installation, analyzer setup, and data acquisition process for performing a tracked transient vibration survey on a PT6 engine using the Viper 4120 analyzer. General instructions for the use of the Model 4120 can be found in the Model 4120 User Manual #4120-OM-01 (P/N 75-900-4120). All procedures for Transient Vibration Survey and all adjustments should be made in accordance with the Engine Maintenance Manual.

A. Required Equipment

The following ACES Systems equipment is required*:

Item	Quantity	Description	Part Number
1.	1	ANALYZER, VIPER 4120, RACK MOUNTED	10-100-4120
2.	1	MOUNT, SENSOR, PT6 DYNO (PWC51495-1)	22-430-0126
3.	1	MOUNT, SENSOR, KISTLER 8044 (RGB) (From PWC)	PWC80522
4.	1	SENSOR, VIBE, ACCEL, B&K 4505A	69-100-0032
5.	1	SENSOR, VIBE, ACCEL, KISTLER 8044 (RGB)	69-100-8044
6.	2	CABLE, SENSOR, MICRODOT-TO-BNC, 3 FT	75-200-0031
7.	2	CABLE, SENSOR, 991V-1725/2020/4040 50 FT	10-320-0159
8.	2	GENERATOR, TACHOMETER, PWC N2	75-900-0001
9.	2	CABLE, INTERFACE, MS TACH GEN TO 4040	10-320-0485



10.	1	OPTION 4040 TRANSIENT VIBRATION SURVEY	11-900-0008
11.	4	INPUT MODULE, 4120 VOLTAGE , 0-3 VAC	10-110-4121-3
12.	1	CONVERTER, CHARGE, 510-2	10-100-1502
13.	1	CONVERTER, CHARGE, 510-3	10-100-1503
14.	1	CABLE, COMM, USB-to-4120 10 Feet	75-800-4005

*This listing shows the latest design parts. It is acceptable to perform this task using previous designs with the appropriate accessories. Required cable lengths may vary by user. For compatibility issues or custom length cables, contact ACES Systems.

Optional Equipment

Item	Quantity	Description	Part Number
15.	1	CABLE, LAPLINK, COMM/PRINTER, 17XX	75-800-0020
16.	1	MOUNT, SENSOR, PT6 PROP (PWC50578-1)	22-430-0127
17.	1	CONVERTER, RMS-to-DC, MODEL 505	10-100-0505
18.	1	CABLE, COMM, USB-to-4120 6 Inch	75-800-4004
19.	1	CABLE, COMM, USB-to-4120 20 Inch	75-800-4003

Miscellaneous Equipment

Engine Manufacturer's Maintenance Manual

Wire ties to secure cables

B. Equipment Installation

NOTE

For warnings, cautions, and notes regarding engine operations and tasks, see the Engine Manufacturer's Maintenance Manual.

Prior to using the Viper 4120, the technician conducting this Transient Vibration Survey should be familiar with the Viper 4120 functions and key pad. For further instruction see the Viper 4120 Users Manual (Item 1), Chapter 3.

1. If necessary, install the vibration sensor mounts (Item 2 and Item 3) per the LMM.
2. Install the 4505A Vibe Sensor (Item 4) into the Vibe Sensor Mount for the AGB. (See Figure 1) Install the Kistler 8044 sensor (Item 5) onto the RGB sensor mount (See Figure 2).

3. Connect one Microdot-to-BNC Cable (Item 6) to each of the two Vibe Sensors, then to the BNC connector of the appropriate charge converter, (Model 510-2, Item 12, for the AGB and Model 510-3, Item 13, for the RGB). (See Figure 2 and Figure 3)
4. Connect the four pin end of the 50 ft 991V to 4040 cables (Item 7) to the four pin output side of the 510-2 and 510-3 charge converters. Connect the 6 Pin end of the Cables (Item 7) to the Viper 4120 analyzer (Item 1). (See Figure 3) Connect the AGB input to CHAN A and the RBG input to CHAN B.
5. Install the RGB and AGB Tachometers (Item 8) per the LMM.
6. Connect the Tachometer Generator Cable (Item 9) between the Tachometer Unit (Item 8) and the TACH 1 input of the analyzer for the AGB and TACH2 input of the analyzer for the RGB. (See Figure 3)
7. Optionally, you may connect Model 505 RMS-to-DC converter as shown in Figure 4 below in place of the standard configuration shown in Figure 3. The RMS-to-DC converter is used to route a DC value relative to the overall amplitude through the 4120 Tach circuit or your test cell system for display. This enables measurement of broad band vibration amplitudes in the range of 0 to 200 gs while simultaneously having a narrower spectral band width specified in the transient setup itself. This provides all required measurements in a single run, saving time and fuel, rather than multiple runs because of the differences in the measurement requirements. This module was designed to meet the requirements of the Acceptance Limits as stated in the PT6 vibration checks independent of the transient setup configuration of the 4120 analyzer. The DC signal from the 505 RMS-to-DC converter may be routed through either the 4120 or the test cell system for display.

Equipment Installation Diagram

Figure 1

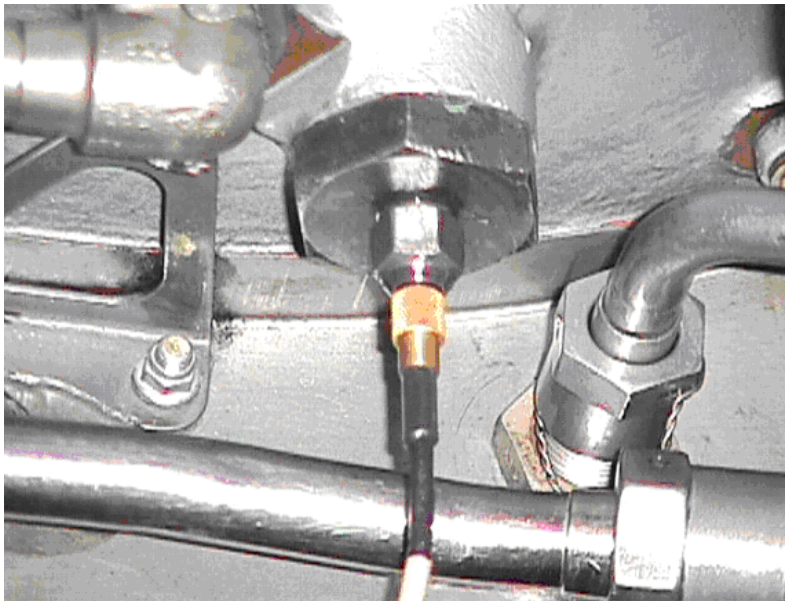


Figure 2

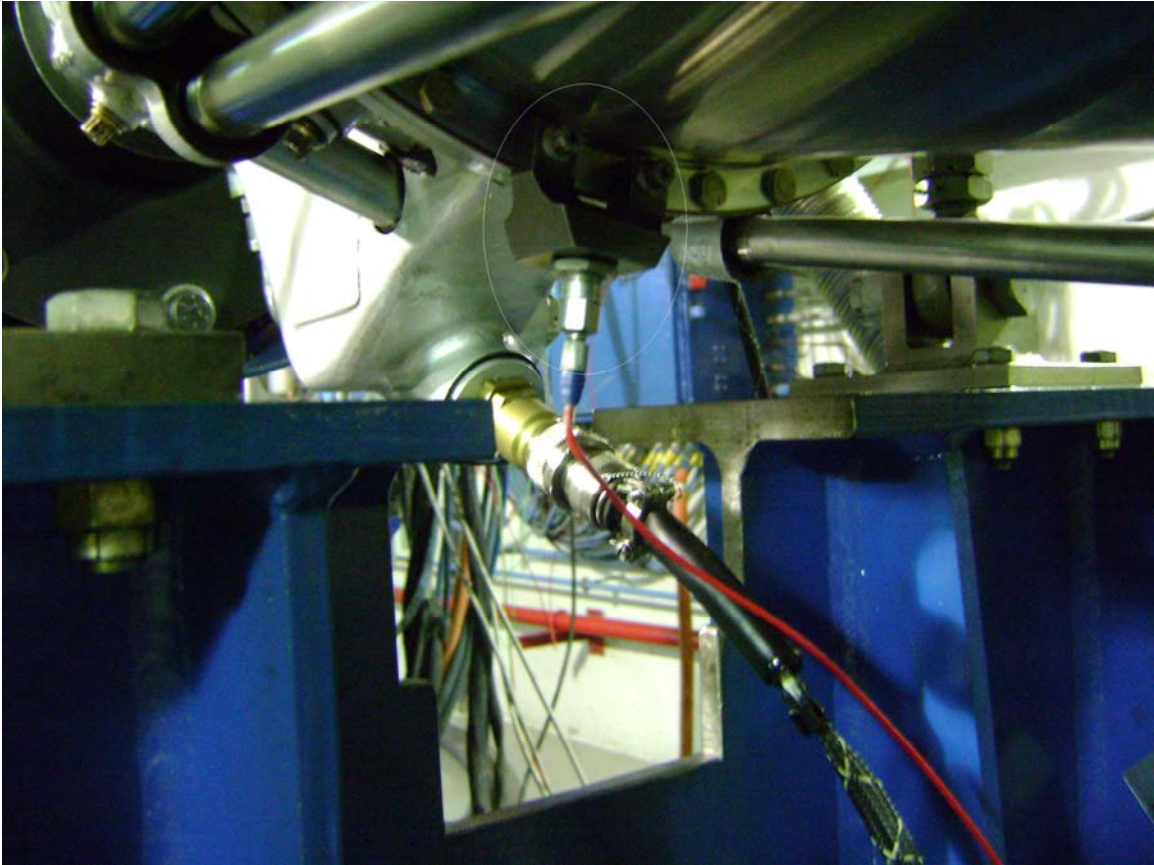
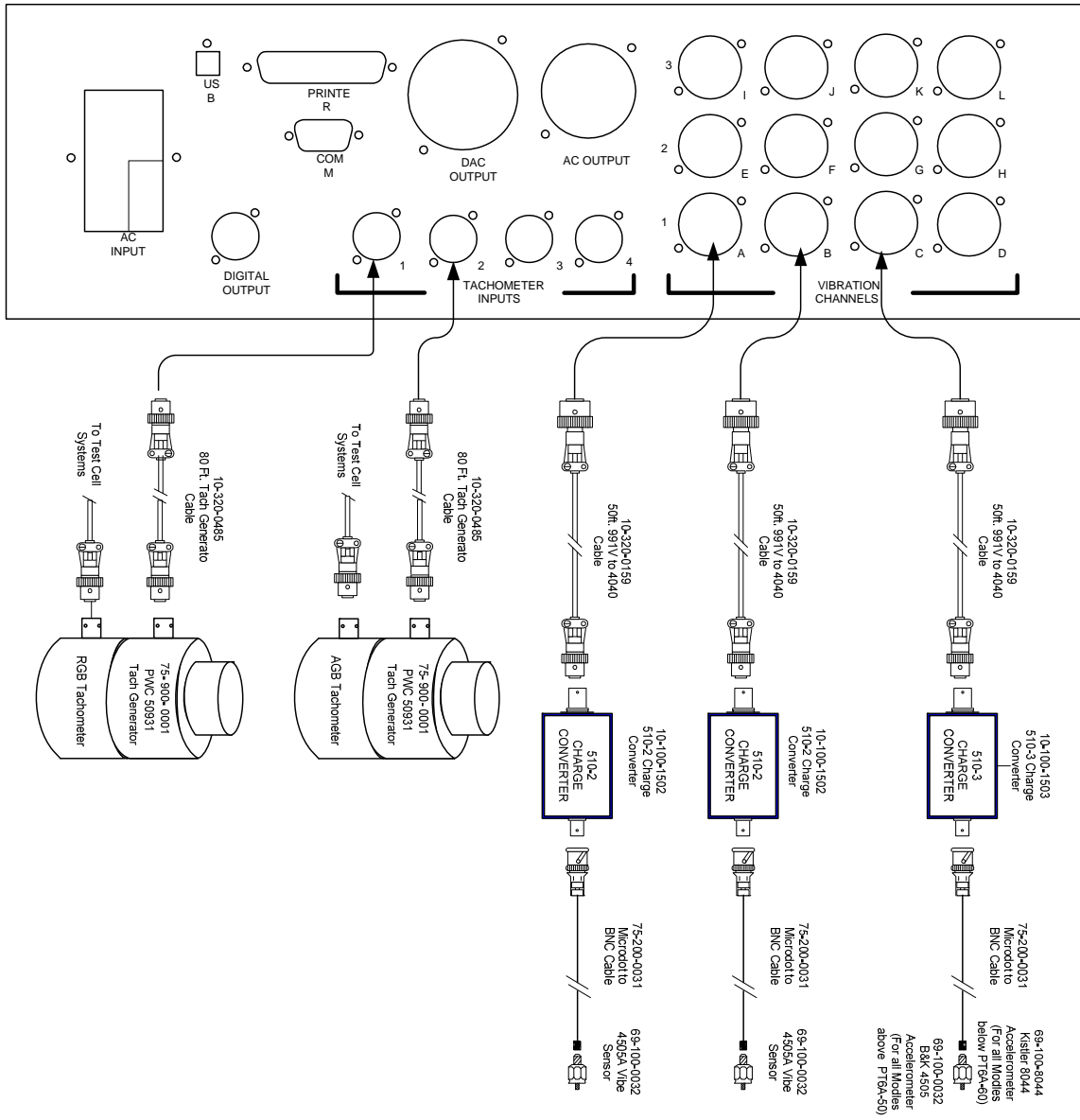
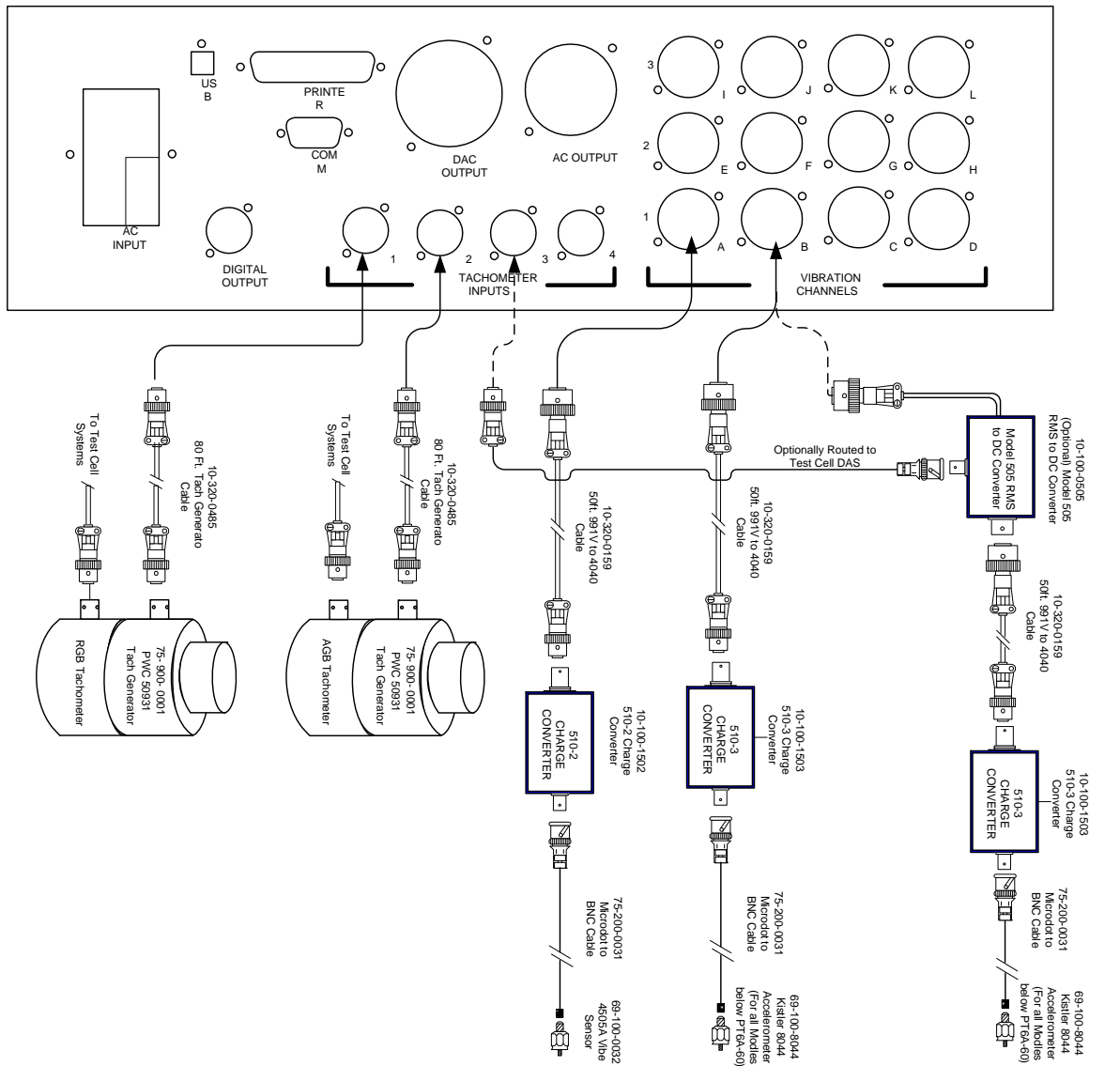


Figure 3



Standard Configuration

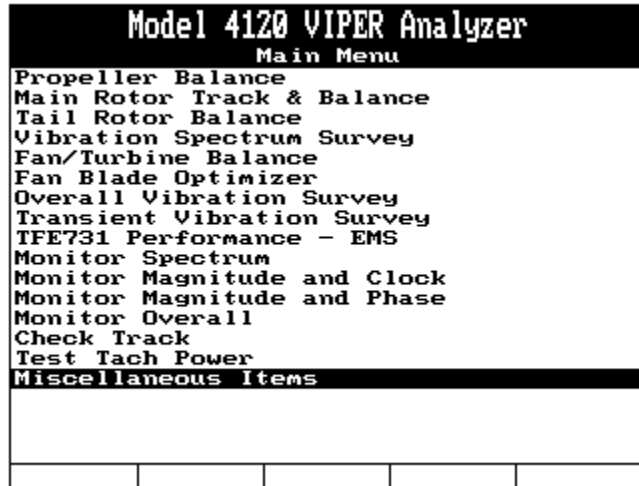
Figure 4



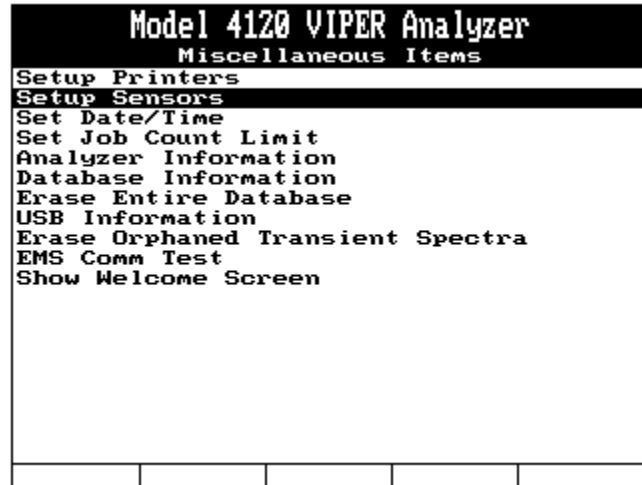
Optional Configuration for Wide Band (0 - 25 KHz) Overall Survey

C. Analyzer Set Up

1. Turn the analyzer ON by pressing the [ON/OFF] key.
2. At the main menu use the [↓] key to select “Miscellaneous Items”. Press [ENTER] to move to the next screen.



2.1. Use the [↓] key to select “Setup Sensors”. Press [ENTER] to move to the next screen.



2.2. Use the [↓] key to select “New”. Press [ENTER] to move to the next screen.

Model 4120 VIPER Analyzer				
Sensor Setup				
Name :	KISTLER 8044 / 510-3			
Amplitude Units :	g's			
Probe Sensitivity :	1.800			
Reverse Polarity :	No			
Input Type :	Single Ended			

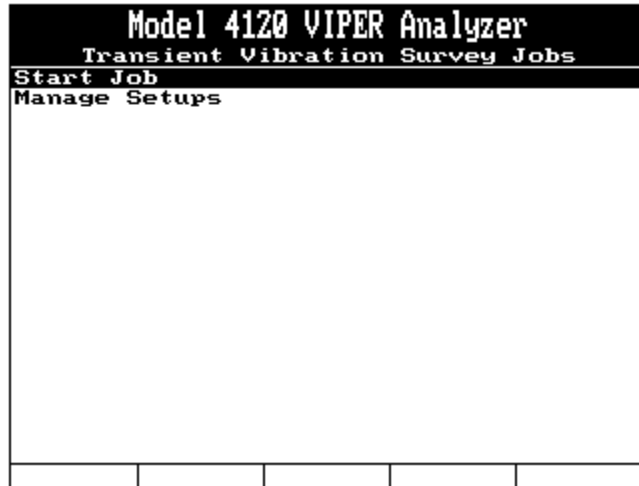
- 2.10. When all fields are complete, press ENTER to save the setup. The analyzer screen will return to the Manage Sensors screen. Press BACKUP key to return to the Main Menu page.

Transient Vibration Setup for 1ENG, 1ENF and 1/3 ENG. For Spectrum setup, go to item 7.

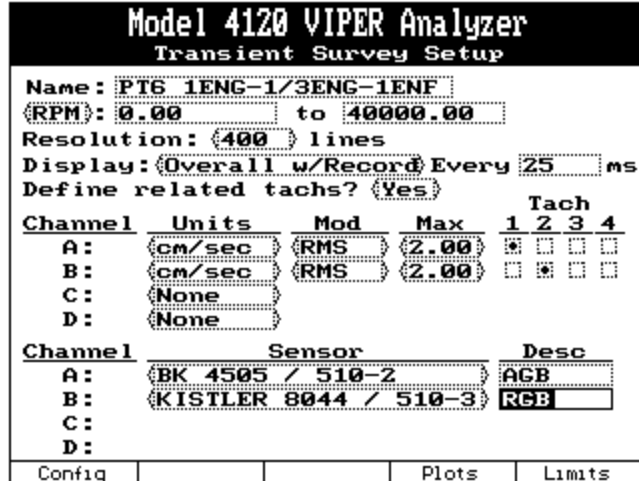
3. From the Main Menu, select “Transient Vibration Survey” and press the [ENTER] key.

Model 4120 VIPER Analyzer				
Main Menu				
Propeller Balance				
Main Rotor Track & Balance				
Tail Rotor Balance				
Vibration Spectrum Survey				
Fan/Turbine Balance				
Fan Blade Optimizer				
Overall Vibration Survey				
Transient Vibration Survey				
TFE731 Performance - EMS				
Monitor Spectrum				
Monitor Magnitude and Clock				
Monitor Magnitude and Phase				
Monitor Overall				
Check Track				
Test Tach Power				
Miscellaneous Items				

4. From the “Transient Vibration Survey Jobs” menu, select “Start Job” and press the [ENTER] key.



5. If PT6 1ENG-1/3ENG-1ENF is listed in the Setup List, select it using the [↓] key, press [ENTER] and go to Section D, Step 1 below. If PT6 1ENG-1/3ENG-1ENF is not in the Setup List, press the [F1], “New” key and go to Step 6 below.
6. Complete the Transient Vibration Survey Setup screen per the illustration screen below. (For detailed instructions regarding options in this screen [configurations, plots, limits, conditions, speeds, and parameters] see the Model 4120 User Manual #4120-OM-01 (P/N 75-900-4120), Chapter 6.)



- 6.1. In the “Name:” field, use the analyzer keypad to enter “PT6-1ENG-1/3ENG-1ENF”. Press the [↓] key to move to the next field.
- 6.2. In the “RPM:” field, press the [⇒] key to toggle to “RPM”. Press [↓] to move to the next field.
- 6.3. In the unmarked fields adjacent to “RPM” enter the Minimum Frequency “0”. Use the [⇒] key to toggle to Maximum Frequency “40000”. Press the [↓] key to move to the next field.

- 6.4. In the "**Resolution:**" field, press the [⇒] key until the field reads "400". Press the [↓] key to move to the next field.
- 6.5. In the "**Display:**" field use the [⇒] key to select "Overall Record". Press the [↓] key to move to the next field.
- 6.6. In the "**Every**" field use the [⇒] key to select "25". Press the [↓] key to move to the next field.
- 6.7. In the "**Define related tachs?:**" field use the [⇒] key to select "Yes". Press the [↓] key to move to the next field.
- 6.8. Under the "**Units:**" field use the [⇒] key to select "cm/sec". You must enter a value in any channel where a sensor is present. (For more detailed information regarding engineering units used see the Viper 4120 Users Manual [#4120-OM-01, P/N 75-900-4120], Chapter 6 or contact ACES Systems.) Press the [↓] key to move to the next field.
- 6.9. In the "**Mod:**" field use the [⇒] key to select "RMS". Press the [↓] key to move to the next field.
- 6.10. In the "**Max:**" field use the [⇒] key to select "2.00". Press the [↓] key to move to the next field.
- 6.11. To define TACHS, use the [↓] key to move between tach channels and the [⇒] key to designate the active tach for the corresponding vibration input channel as shown in the example above.
- 6.12. Repeat steps 6.8 through 6.11 as needed for each "**Channel**" to which a vibration sensor input will be applied. When all fields required are completed, press the [↓] key to move to the next field.
- 6.13. Under the "**Sensor:**" field use the [⇒] key to select "BK 4505 w/510-2". If this is not a sensor option, see Step 2.1 above for sensor setup. Press the [↓] key to move to the next field.
- 6.14. In the "**Desc**" field for Channel A, use the key pad to enter "AGB". Press the [↓] key to move to the next field.
- 6.15. Repeat Steps 6.13 and 6.14 for "**Channel**" B with the appropriate sensor and Description. Press the [↓] key to move to the next field.

Model 4120 VIPER Analyzer
Transient Survey Setup

Name: PT6 1ENG-1/3ENG-1ENF
 RPM: 0.00 to 40000.00
 Resolution: 400 lines
 Display: Overall w/Record Every 25 ms
 Define related tachs? (Yes)

Channel	Units	Mod	Max	Tach			
				1	2	3	4
A:	cm/sec	RMS	2.00	*			
B:	cm/sec	RMS	2.00		*		
C:	None						
D:	None						

Channel	Sensor	Desc
A:	BK 4505 / 510-2	AGB
B:	KISTLER 8044 / 510-3	RGB
C:		
D:		

Config			Plots	Limits
--------	--	--	-------	--------

- 6.16. Press [F1] to display the Configuration [Config] function key menu as shown in the first example screen below. From that screen, press [F1] to display the “Conditions” screen, the second example screen below. In the “Condition” column, enter a name for the test condition to identify it (Accel and Shutdown as appropriate for the engine model). Use the [↓] key to toggle to the “Spectrum” column. Then use the [⇒] key scroll until “Peak Hold” appears. Leave the “Max. Time” field reading “0” Repeat for each condition.

Model 4120 VIPER Analyzer
Transient Survey Setup

Name: PT6 1ENG-1/3ENG-1ENF
 RPM: 0.00 to 40000.00
 Resolution: 400 lines
 Display: Overall w/Record Every 25 ms
 Define related tachs? (Yes)

Channel	Units	Mod	Max	Tach			
				1	2	3	4
A:	cm/sec	RMS	2.00	*			
B:	cm/sec	RMS	2.00		*		
C:	None						
D:	None						

Channel	Sensor	Desc
A:	BK 4505 / 510-2	AGB
B:	KISTLER 8044 / 510-3	RGB
C:		
D:		

Conds	Speeds	Parms	Analog	Back
-------	--------	-------	--------	------

Model 4120 VIPER Analyzer		
Conditions		
Condition	Spectrum	Max. Time
1) ACCEL	Peak Hold	0
2) SHUTDOWN	Peak Hold	0
3) █	None	0
4) █	None	0
5) █	None	0
6) █	None	0
7) █	None	0
8) █	None	0
9) █	None	0
10) █	None	0
11) █	None	0
12) █	None	0
13) █	None	0
14) █	None	0
15) █	None	0

- 6.17. When all fields required are completed, press [ENTER].
- 6.18. The screen will once again display the “Transient Vibration Survey Setup” screen. Again press the [F1] “Config” key, and then press the [F2] “Speeds” key. The Speed Input Setup screen will be displayed.
- 6.19. Define each input channel for which a speed input is provided. Note that row “3)” in the example screen below is defined for the RMS DC input used to determine if the overall vibration is above the specified limits in a wider band width than is required for the normal survey. Row 3) need only be completed if you are using the Model 505 RMS-to-DC converter (Item 17) in conjunction with the Kistler 8044 sensor and 510-3 charge converter as shown in figure 4 above. (See the specification sheet for additional information on the Model 505 DC converter). In the Plot Info: section of the screen you will notice that the column of input fields to the far right is labeled “EU/dcV” which means Engineering Units Per dc volt.” Define this column for each tach input channel with the ratio of engineering units per dc volt on that channel. In the example screen below, the 505 RMS to DC converter will supply up to 8 volts to channel 3, representing a maximum reading of 200 gs. In this case the EU/dcV is “25” or 25 g’s (Engineering Units) per input of each dc volt. Enter a EU/dcV value for each channel according to the DAC requirements of your test cell.
- 6.20. When all fields are complete per the example below, press [ENTER].

Model 4120 VIPER Analyzer			
Speed Inputs Setup			
Measure	DESC	OFF/100%	Factor
1) Pulse D-H	NC	0.00000	2.97370
2) Pulse D-H	NF	0.00000	2.64000
3) Volts S	RGB C	0.00000	25.00000
4) None		0.00000	1.00000

Plot Info:			
	Min	Max	Div EU/dcV
1)	0.00	40000.00	8 0.00
2)	0.00	40000.00	8 0.00
3)	0.00	200.00	8 25.00
4)	0.00	0.00	0 0.00

6.21. The screen will once again display the “Transient Vibration Survey Setup” screen. Again press the [F1] “Config” key, then press the [F3] “Parms” key to define the parameters page. The example screen below depicts all parameter requirements for the PT6A engine. Complete the form as shown below in the example. When all fields are complete, press [ENTER] to continue.

Model 4120 VIPER Analyzer				
Transient Parameters Setup				
Description	Type	F(lower)	F(upper)	Speed
1ENG	Pwr	0.980	1.020	xCS1
1ENF	Pwr	0.980	1.020	xCS2
1/3ENG	Pwr	0.310	0.350	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1
	Pwr	0.000	0.000	xCS1

6.22. The screen will once again display the “Transient Vibration Survey Setup” screen. Press the [F4] “Plots” key. When the “Transient Plots Setup screen is displayed, use the [DOWN ARROW] key to move from field to field and the [RIGHT ARROW] key to toggle between the “Yes” and “No” answers to complete the form per the example below. When all fields are set, press [ENTER] to accept your selections and continue.

Model 4120 VIPER Analyzer				
Transient Plots Setup				
Parameter	Time	xCS1	xCS2	xCS3
Overall	No	Yes	Yes	No
1ENG	No	Yes	No	No
1ENF	No	No	Yes	No
1/3ENG	No	Yes	No	No

- 6.23. At the main Transient Survey Setup page, press [ENTER] again to save the setup and return to the main menu.

Vibration Spectrum Survey Setup

7. A Vibration Spectrum Survey is required at the peak value if Acceptance Limits are exceeded during the Transient Survey. To complete the setup for this required Vibration Spectrum Survey, do the following:
- 7.1 From the Main Menu screen, use the [↓] to select “Vibration Spectrum Survey”, then press [ENTER].

Model 4120 VIPER Analyzer				
Main Menu				
Propeller Balance				
Main Rotor Track & Balance				
Tail Rotor Balance				
Vibration Spectrum Survey				
Fan/Turbine Balance				
Fan Blade Optimizer				
Overall Vibration Survey				
Transient Vibration Survey				
TFE731 Performance - EMS				
Monitor Spectrum				
Monitor Magnitude and Clock				
Monitor Magnitude and Phase				
Monitor Overall				
Check Track				
Test Tach Power				
Miscellaneous Items				
Show Forms				

- 7.2 From the Vibration Spectrum Survey Jobs screen, select “Start Job” and press [ENTER].



- 7.3 At the Setup List page, if the “PT6A RGB” is not listed, press the [F1] “New” key.
- 7.4 At the Spectra Setup page, complete the form as follows:
- 7.4.1 In the “Name:” field, use the keypad to enter “PT6A RGB” then press the [DOWN ARROW] key to move to the next field.
- 7.4.2 In the frequency filed, press the [RIGHT ARROW] key to toggle between selections until the filed reads “Hz” then press the [DOWN ARROW] key to move to the next field.
- 7.4.3 In the lower frequency filed, the default should be “0.00”. Leave the field at 0.00 or use the keypad to enter that value if it displays anything else. Press the [DOWN ARROW] key to move to the next field.
- 7.4.4 In the upper frequency field, use the keypad to enter “25000.00” then press the [DOWN ARROW] key to move to the next field.
- 7.4.5 In the “Resolution” field, use the [RIGHT ARROW] key to select “400” then press the [RIGHT ARROW] key to move to the next field.
- 7.4.6 In the “Average Type” field, use the [RIGHT ARROW] key to toggle the field until it reads “Peak” then press the [DOWN ARROW] key to move to the next field.
- 7.4.7 In the “Blocks” field, use the keypad to enter “4” then press the [DOWN ARROW] key to move to the next field.
- 7.4.8 In the “Units” column of the Channel B: row, use the [RIGHT ARROW] key to toggle the filed until it reads “g’s” then press the [DOWN ARROW] key to move to the next field.
- 7.4.9 In the “Mod” field, use the [RIGHT ARROW] key to toggle the field until it reads “RMS” then press the [DOWN ARROW] key to move to the next field.
- 7.4.10 In the “MaxValue” field, use the [RIGHT ARROW] key to toggle the field until it reads 110, then press the [DOWN ARROW] key three times until the dark cursor is at the Channel B Sensor selection then press the [RIGHT ARROW] key to toggle the

field until it reads “Kistler 8044 w/510-3”. Press the [DOWN ARROW] key to move to the next field.

- 7.4.11 In the “Desc” field, use the keypad to enter “RGB” then press [ENTER] to save the setup.

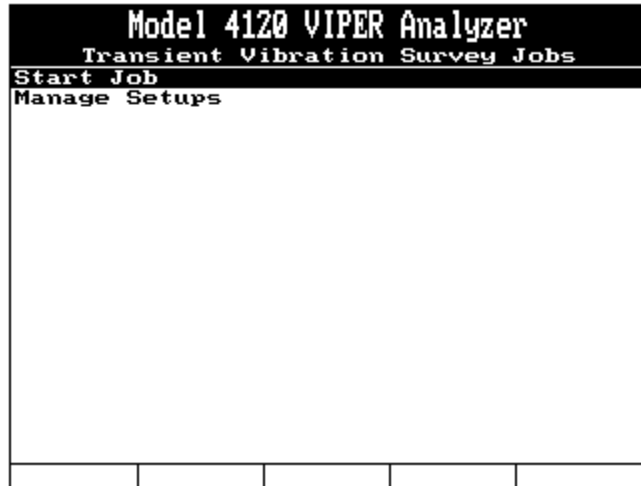
Model 4120 VIPER Analyzer			
Spectra Setup			
Name: PT6A RGB			
Hz: 0.00		to 25000.00	
Resolution: 400 lines			
Average Type: Peak		Blocks: 4	
Channel	Units	Mod	MaxValue
A:	None		
B:	g's	RMS	110.
C:	None		
D:	None		
Channel	Sensor	Desc	
A:			
B:	KISTLER 8044 / 510-3	RGB	
C:			
D:			
Edit Conds	Speeds	Limits	

D. Data Acquisition

- To begin a new job, select Transient Vibration Survey from the Main Menu.

Model 4120 VIPER Analyzer			
Main Menu			
Propeller Balance			
Main Rotor Track & Balance			
Tail Rotor Balance			
Vibration Spectrum Survey			
Fan/Turbine Balance			
Fan Blade Optimizer			
Overall Vibration Survey			
Transient Vibration Survey			
TFE731 Performance - EMS			
Monitor Spectrum			
Monitor Magnitude and Clock			
Monitor Magnitude and Phase			
Monitor Overall			
Check Track			
Test Tach Power			
Miscellaneous Items			

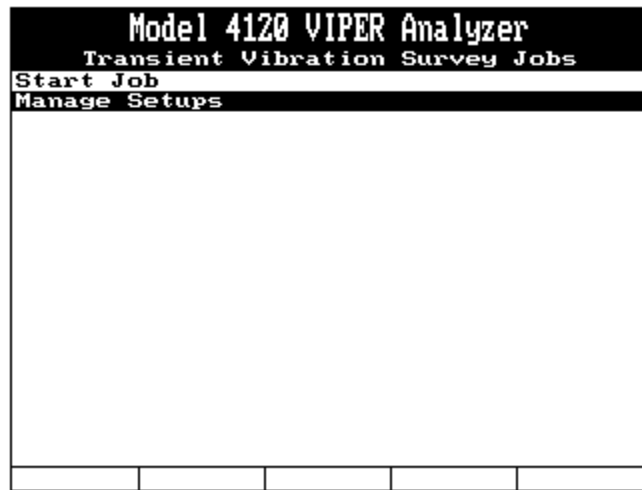
- From the Transient Vibration Survey Jobs screen, select “Start Job” and press [ENTER].



NOTE: The default mode of operation is for the 4120 to be user controlled for data acquisition. If, and *only* if you wish the 4120 to operate in the automatic acquire mode, that is to automatically begin scanning data upon analyzer power up, complete step 3. Other wise, go to step 4 below and continue with operator controlled acquisition.

3. SET AUTO ACQUIRE MODE:

3.1. Select "Manage Setups" and press [ENTER].



3.2. Select "Select Setup For Remote Job" and press [ENTER].

Model 4120 VIPER Analyzer				
Transient Vibration Survey Setups				
Edit				
New				
Print				
Print All				
Delete				
Select Setup for Remote Job				

- 3.3. In the Name: field, use the [RIGHT ARROW] key to select “PT6A 1ENG 1ENF 1/3 ENG”. Press the [DOWN ARROW] key to move to the next field.

Model 4120 VIPER Analyzer				
Transient Remote Setup				
Select the name of a transient survey job to use as the REMOTE transient job.				
Name: (PT6 1ENG 1ENF 1/3ENG)				
Start: (Automatically)				
Typical acquisition time (seconds): 00				

- 3.4. In the “Start:” field, use the [RIGHT ARROW] key to select “Automatically”. This selection will allow the analyzer to automatically select the specified feature (Transient Vibration Survey) and setup (PT6 1ENG 1/3 ENG 1ENF) and begin scanning data when the analyzer is powered up and the boot process completed. It will remain in this scanning state and begin recording data only when you press the [F5] “Record” key.
- 3.5. In the “Typical Acquisition Time (seconds)” field, use the keypad to enter a “00” as this field does not apply to the Automatic setting. Press [ENTER] to accept and continue.
4. From the setup list, select “PT6 1ENG 1/3ENG 1ENF” and press [ENTER].

Select				
Setup List				
1)	PT6	1ENG	1/3ENG	1ENF
New			Copy	

5. To complete the “Job Identification” screen(s), as shown below, do the following:

Model 4120 VIPER Analyzer				
Job Identification				
Name:	JOHN DOE			
A/C Registration:	N1234			
A/C Total Time:	123.4			
Press ENTER to continue				
Names				

- 5.1. In the “Name:” field use the keypad to enter a customer name or identifying nomenclature (i.e. “John Doe” or “Cessna”). (Pressing the [F1] key will display a list of previously used names. If the name you desire is shown use the [↓] key to highlight it, then press [ENTER] to return to the “Job Identification” screen.) Press the [↓] key to move to the next field.
- 5.2. In the “A/C Registration:” field, use the keypad to enter the engine serial number. Press the [↓] key to move to the next field.
- 5.3. In the field “A/C Total Time:” use the key pad to enter the engine total time.
- 5.4. When all fields are completed as required, press [ENTER] to proceed.
6. Engine Information. In the “Position” field, use the [⇒] key to select the position of the engine being balanced (leave position as “1” for test cell procedures). Press the [↓] key to move through the fields. Enter information into the following fields for both the Propeller and the Engine as follows; “S/N” (serial number), Enter the number using the keypad or press

[F1] to view and select from a list of previously entered serial numbers), “Type” (engine/propeller type), “TSO” (time since overhaul) and “TSN” (time since new). When all fields are completed as required, press [ENTER] to proceed.

Model 4120 VIPER Analyzer			
Engine Information			
Position:			
I			
Propeller:			
S/N MC8799			
Type BLK MAX			
TSO 700			
TSN 1478			
Engine:			
S/N 34889			
Type 10540			
TSO 0			
TSN 1478			
Serial Nos			

- At the “Start the engine” screen below, conduct a FOD check then start the engine using normal procedures and allow it to warm up to normal operating conditions. When the engine reaches normal operating conditions (speed, temp, etc.), press the [ENTER] key to begin acquiring data. **NOTE:** If you have set “Conditions” in the setup, (such as **ACCELERATION** and **SHUTDOWN**) you must choose which condition you wish to collect before you begin data acquisition. A screen displaying all conditions will be shown. Select from the available conditions and press [ENTER] to begin data acquisition.

Model 4120 VIPER Analyzer			
Start Engine			
Perform FOD check, start the engine, and establish normal operating conditions			
Press ENTER to continue			
Swap Job			

- The “Overall Vibration” screen will appear on the screen showing numerical values for each of the parameters. Begin the acceleration to power as prescribed by the maintenance manual. When you reach the power setting, press [ENTER] to stop data acquisition.

9. The “**Store Data**” screen will display next, as shown below. If you do wish to save the data press **[F1]**. If you do not want to save the data press **[F5]** and you will be taken back to the “**Start Engine**” screen (step 7) to restart the survey.

Model 4120 VIPER Analyzer				
Store the data?				
Yes				No

E. Quit Job

After saving the run data the “**Shut Down Engines**” screen will be displayed. Press **[F5]** to end the survey.

Model 4120 VIPER Analyzer				
Shut Down Engines				
Shut down engine(s) per manual instructions				
	Swap Job			Continue

F. Manage Jobs (Review Data)

1. After the survey has been acquired and stored in the analyzer you may review the data on the analyzer screen or Transfer it to AvTrend® software (recommended) for review and storage.
2. To review the data in the analyzer:
 - 2.1 From the Main Menu, select Transient Vibration Survey and press [ENTER].
 - 2.2 At the Transient Survey Jobs screen, select “Manage Jobs” and press [ENTER].
 - 2.3 From the next screen, select “Review” and press [ENTER].
 - 2.4 From the Job List, select the job you wish to review by name, date and time from the list then press [ENTER].
 - 2.5 From the Select Condition screen, select the condition (ACCEL or SHUTDOWN) you wish to review and press [ENTER].
 - 2.6 From the “Select Item to Review” page, select “View Maximum Overall Values” and press [ENTER]. Review all values to insure the Maintenance Manual Limits were not exceeded. Note that the “RMS G” row reflects the Overall RMS readings up to 25KHz and up to 200g’s only if the optional Model 505 RMS to DC converter is being used. If any specific values are exceeded, a follow up Vibration Spectrum Survey may be required. If so, return to the Main Menu, select the Vibration Spectrum Survey Feature and select the PT6A Survey. Record the survey at the peak where the maximum amplitudes were exceeded. Refer to the PT6A Maintenance Manual for further required action.
 - 2.7 When your review is complete, press the [BACKUP] key to review all other parameters in a similar manner if needed.

Model 4040 VIPER Analyzer			
Review Overall Vibration			
Freq Units: RPM		Samples: 1441	
Min Frequency: 0.00			
Max Frequency: 40000.00			
	Max of	Max of	Max of
	RGE	AGE	
	cm/sec	cm/sec	
Chan	RMS	RMS	
RGE	0.40	0.40	
AGE	0.10	0.10	
NF	0.40	0.40	
NG	0.10	0.10	
RMS G	40.00	40.00	