

Using vibDaq for Pump Test

Cal-Bay Systems

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Solutions for Test, Measurement, & Automation

Lowering Your Risk in Functional Test

Nuclear Power Plant Charge Pumps

- For Pressurized Water Reactors (Most Commercial Nuclear Power Plants are PWR)
- Supplies high pressure water to the reactor
- Reconditioned Pumps need to pass two key tests
 - Pump Performance
 - Vibration



Example: 11 Stage Centrifugal Charging Pump

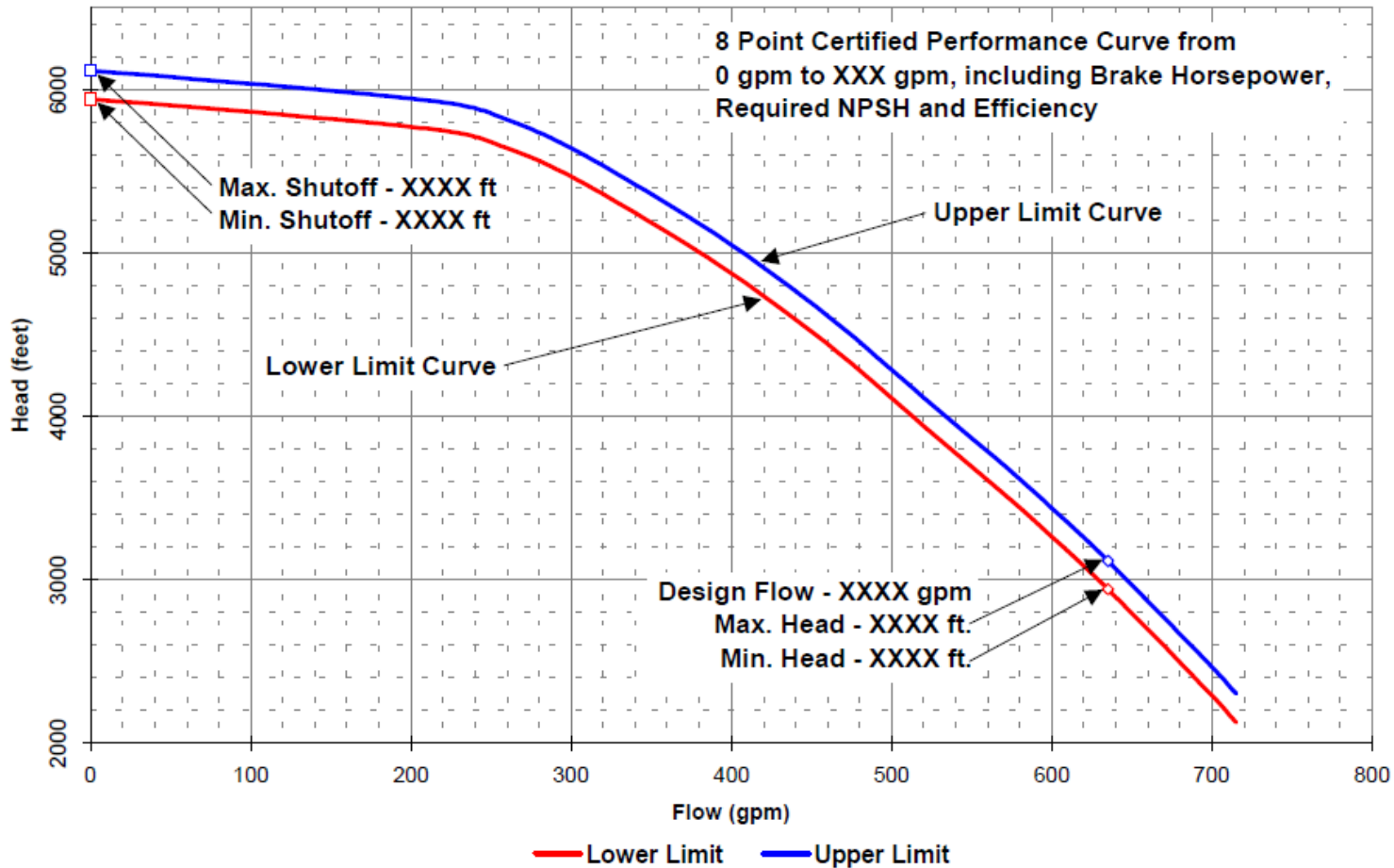


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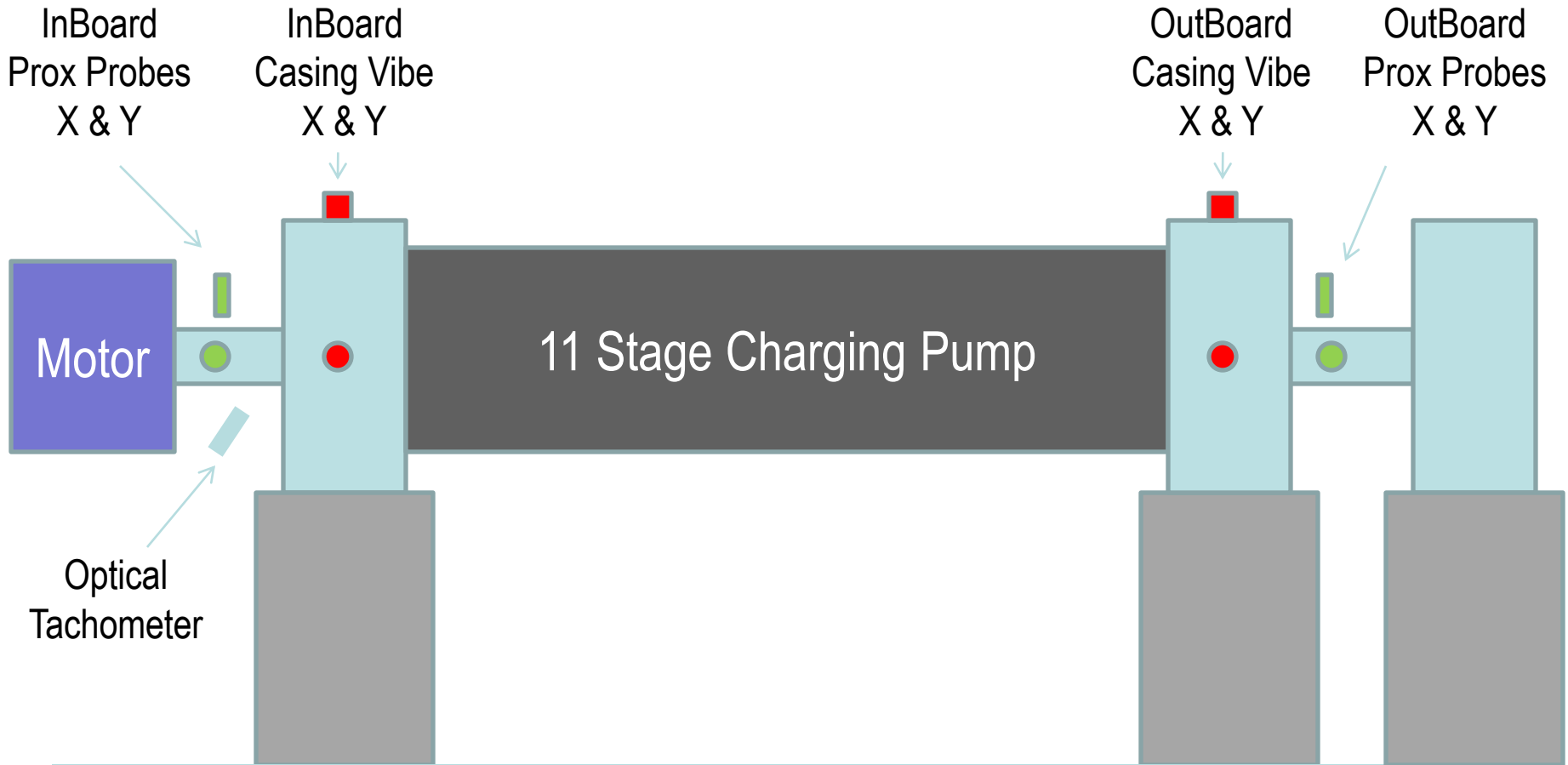
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Pump Performance – Flow vs. Pressure



Vibration Test – Sensors



Vibration Test – Specifications

- Bearing Cap Absolute Velocity
 - 10 to 500 Hz
 - RMS value scaled to peak
 - 0.15 in/second
- Bearing Cap Absolute Velocity
 - DC to 1000 Hz
 - Peak to Peak
 - 0.0015 inch limit
- “Recommended but not required” to account for effect of test stand skid.



vibDaq System Used to Perform Test



vibDaq – Configuration

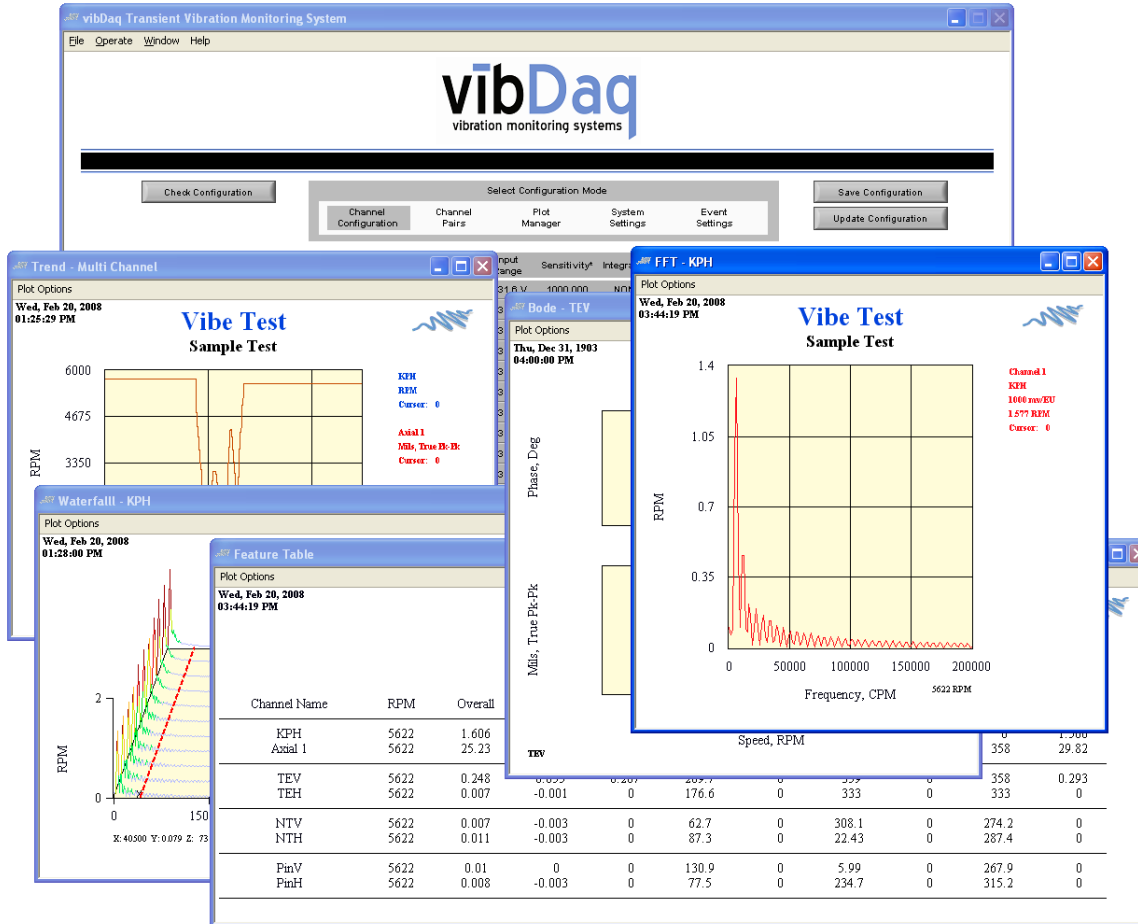
The screenshot displays the vibDaq configuration software interface, which is used for setting up vibration monitoring systems. The main window shows a 'Select Configuration Mode' section with options for Channel Configuration, Channel Pairs, Plot Manager, System Settings, and Advanced Settings. Below this is a table of channel configurations.

CH #	Description	Sensor Type*	Offset	AC* DC	IEPE*	Input Range	Sensitivity*	Integration*	Overall Type*	Display Units	Plot Color	Probe Angle	Tach Channel*
1	Tachometer	Tachometer	0.00	DC	OFF	± 10 V	500.000	NONE	RPM	RPM	█	0	NONE
2	Vertical Prox	Prox Probe	0.00	DC	OFF	± 10 V	1000.000	NONE	True Pk - Pk	mil	█	0	Tachometer
3	Horizontal Prox	Prox Probe	0.00	DC	OFF	± 10 V	200.000	NONE	True Pk - Pk	mil	█	-90	Tachometer
4	Vertical Accel	Accelerometer	0.00	AC	ON	± 10 V	100.000	G's -> In/Sec	Peak	in/sec	█	0	Tachometer
5	Horizontal Accel	Accelerometer	0.00	AC	ON	± 10 V	100.000	G's -> In/Sec	Peak	in/sec	█	90	Tachometer
6	Temp	Other	0.00	DC	OFF	± 10 V	10.000	NONE	Static	Deg C	█	0	Tachometer
7		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
8		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
9		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
10		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
11		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
12		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
13		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
14		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
15		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE
16		Accelerometer		AC	OFF	± 31.6 V	1.000	NONE	Static		█	0	NONE

Additional configuration panels shown include:

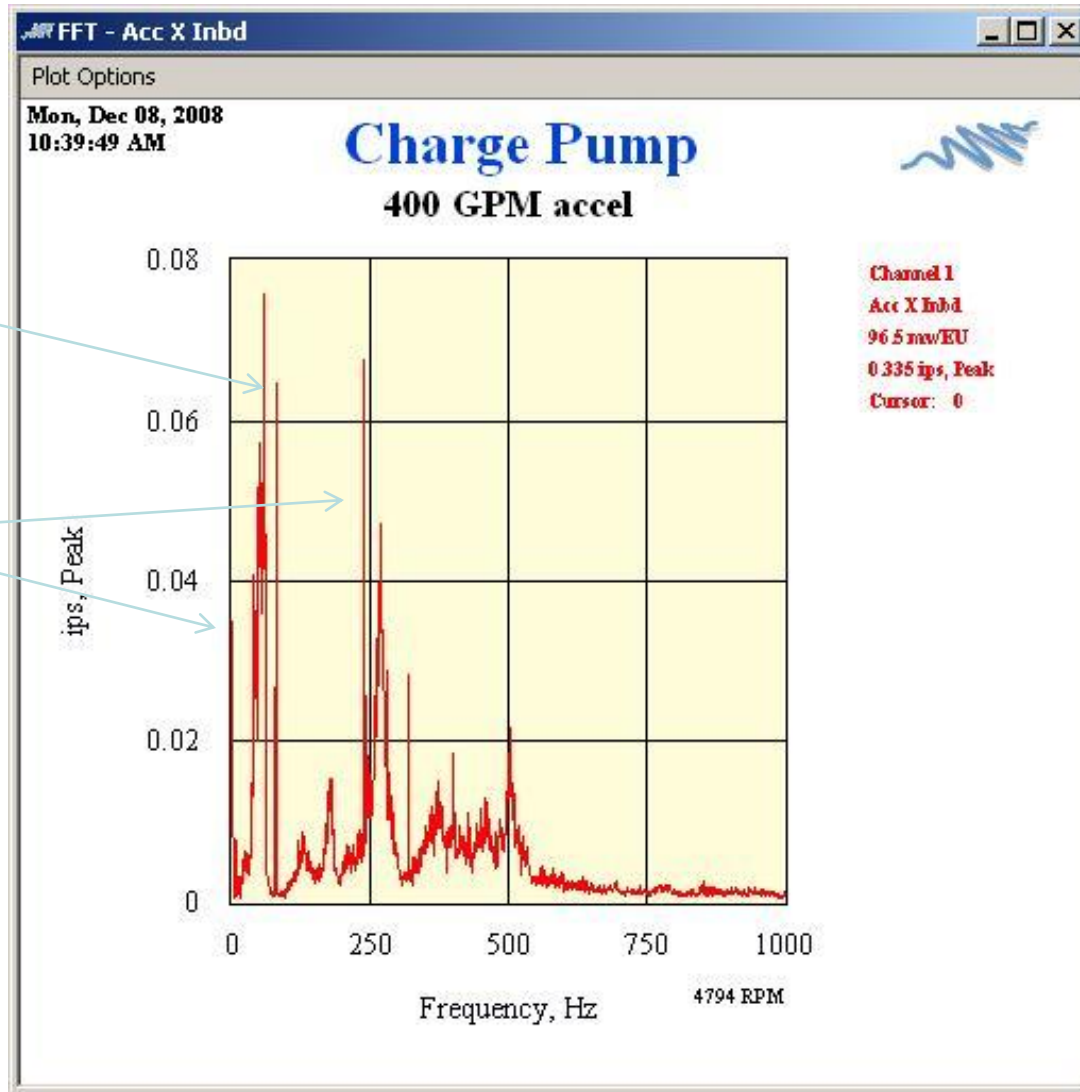
- Advanced Settings:** Includes options for 'Save Configuration', 'Retrieve Configuration', 'System Settings', and 'Advanced Settings'.
- DAQ & Bode:** Contains parameters for 'Max Speed' (20000 RPM), 'Tach Style' (Falling), 'Delta Time' (300 sec), 'Hysteresis' (50), and 'Burst Parameters'.
- Representation:** A circular plot showing 'Orientation' and 'Valid' status, with a 'Pair to Display' indicator and a 'Tach' label.
- Data Logging:** A section with 'Log Data?' checked and 'Data Logging Enabled' status, showing 'Features', 'Bode', and 'Burst' data sizes (all 0 KB).
- System Status:** A bottom status bar showing 'Over Range Analysis', 'Error Daq', 'CPU', 'System Status', and 'Tachometer Readings' (RPM 1, RPM 2, RPM 3).

vibDaq – Viewing Data



- Time Waveform
- FFT
- Orbit
- Bode
- Polar
- Shaft Centerline
- Waterfall
- Feature Table
- Trend

Test Data – Casing Vibration



Pump Related
Vibration @
4800 RPM

Flow
Noise



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Test Data – Shaft Vibration

