

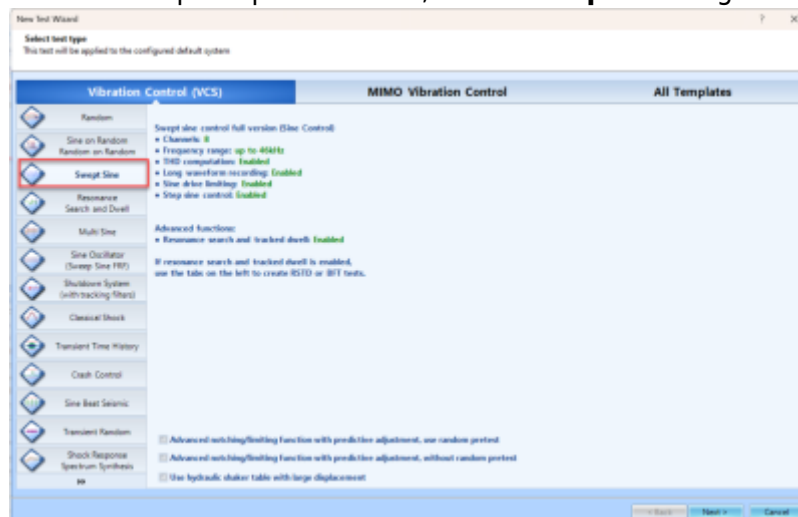
VCS Swept Sine Testing

Create New Test

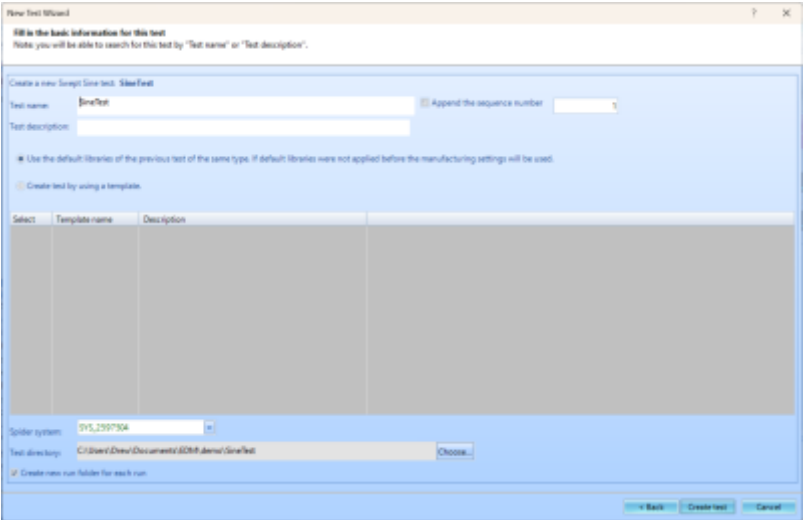
To create a new test, first open up EDM. On the VCS Start Page, select **Swept Sine** under the **Create a test** tab.



The **New Test Wizard** will now open up. From here, select **Swept Sine** again and then press **Next**.

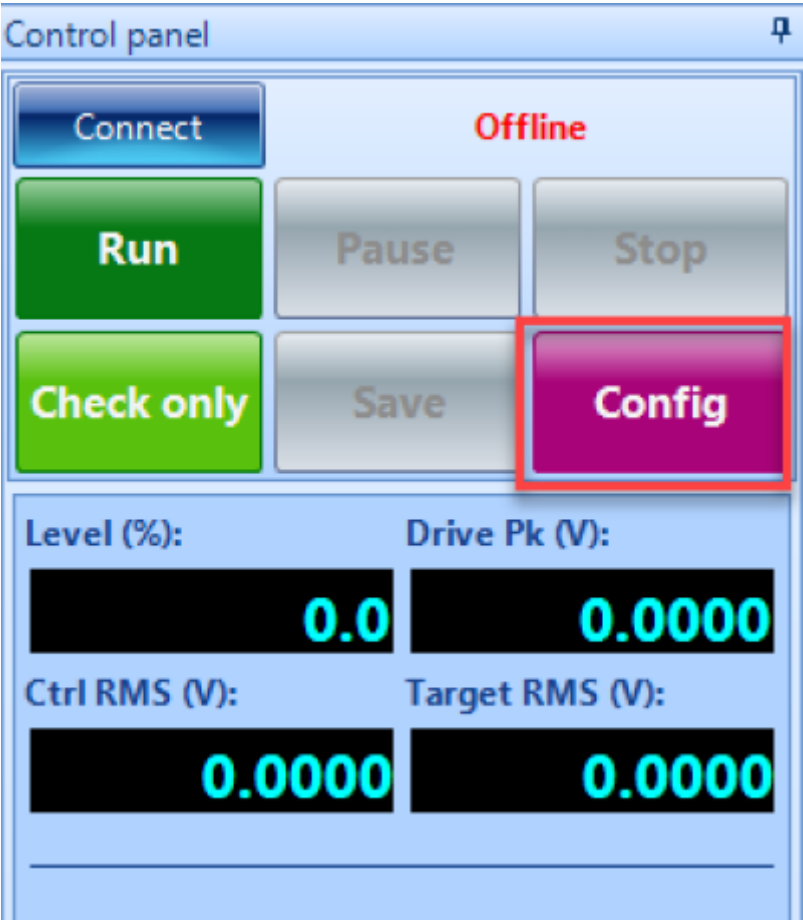


Finally, give the test a name and select the Spider system that will be used to run the test. Once all is complete, press **Create**.



Test Configuration

The test will now need to be configured to run. This includes inputting information regarding the shaker, creating the schedule for the test to follow, and determining the parameters for the frequency analysis. To access the **Test Configuration** menu, press the **Config** button that can be found on the right side of the screen.



Shaker Parameters

Click on **Edit Parameters** and enter the information from the shaker specifications. This is important for the safety of the shaker and testing unit.

Shaker Limits

?

×

Shaker details

Manufacturer

Anonymous

Shaker name

Default Shaker

Force and acceleration

Random Max. Force RMS (LBF)

100.022

Random Max. Acc. RMS (g)

16.66667

Sine Max. Force Peak (LBF)

2205.866

Sine Max. Acc. Peak (g)

75

Shock Max. Force Peak (LBF)

100.022

Shock Max. Acc. Peak (g)

50

Displacement

Max. positive displacement (mm)

6.35

Max. negative displacement (mm)

6.35

General settings

Max. drive voltage peak (V)

10

Max. velocity (m/s)

1.778

Min. drive frequency (Hz)

1

Max. drive frequency (Hz)

2500

Shaker orientation

Vertical

Shaker moving mass

Armature mass (lb)

0.4409245

Header expander (lb)

0

Slip table (lb)

0

Drive bar (lb)

0

Calc. acc. using force

Note: the Payload Mass can be entered in the shaker parameters page. Actual acceleration limits used in each test will be re-adjusted by following factor:
Actual Acc. = Min(Shaker param. force / (Armature mass + Payload mass + other mass), Shaker param. acc.)
Max. drive frequency should not be set too high, the recommended range within 10240 Hz.

OK

Cancel

Test Parameters

The **Test parameters** section in the **Test Configuration** window has settings for the analysis parameters, abort sensitivities and control strategy.

Test Configurations for SineTest [Swept Sine]

Shaker parameters

Shaker parameters

Test parameters

Test profile

Check against shaker

Run schedule

Limit channels

Event actions

File directory

Save/Recording setup

Output settings

Shaker information

Manufacturer

Anonymous

Shaker name

Default Shaker

Payload mass

0.22046

lb

Fixture mass

0

lb

Actual shaker limits used in this test

Force peak

2205.9

LBF

✓

Acceleration peak

75

g

✓

Max. velocity

1.778

m/s

✓

Max. positive displacement

6.35

mm

✓

Max. negative displacement

6.35

mm

✓

Shaker orientation

Vertical

Max. drive voltage peak

10

V

Min. drive frequency

1

Hz

Max. drive frequency

2500

Hz

Shaker moving mass

0.44092

lb

Note

The parameters listed above are for reference only. Click "Edit parameters" to view or edit shaker parameters. The acceleration limit is adjusted by the following factor:
Actual Acc. = Min(Shaker param. Force / (Armature mass + Payload mass + other mass), Shaker param. Acc.)

Max. drive frequency

should not be set too high, the recommended range within 10240 Hz.

Edit parameters

Load from library

Save to library

Import manufacturer shaker list

Export manufacturer shaker list

Import default library

Config. library

OK

Cancel

Control Strategy: Determines whether one or multiple control channels are used, and how the composite control signal is generated (if multiple channels are used).

Single channel

▼

Single channel

Weighted average

Maximum

Minimum

Sweep Type:

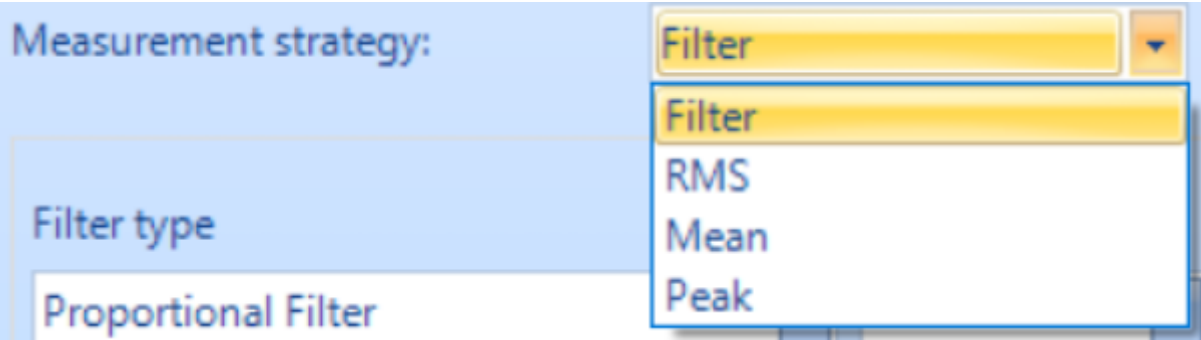
Logarithmic

▼

Linear

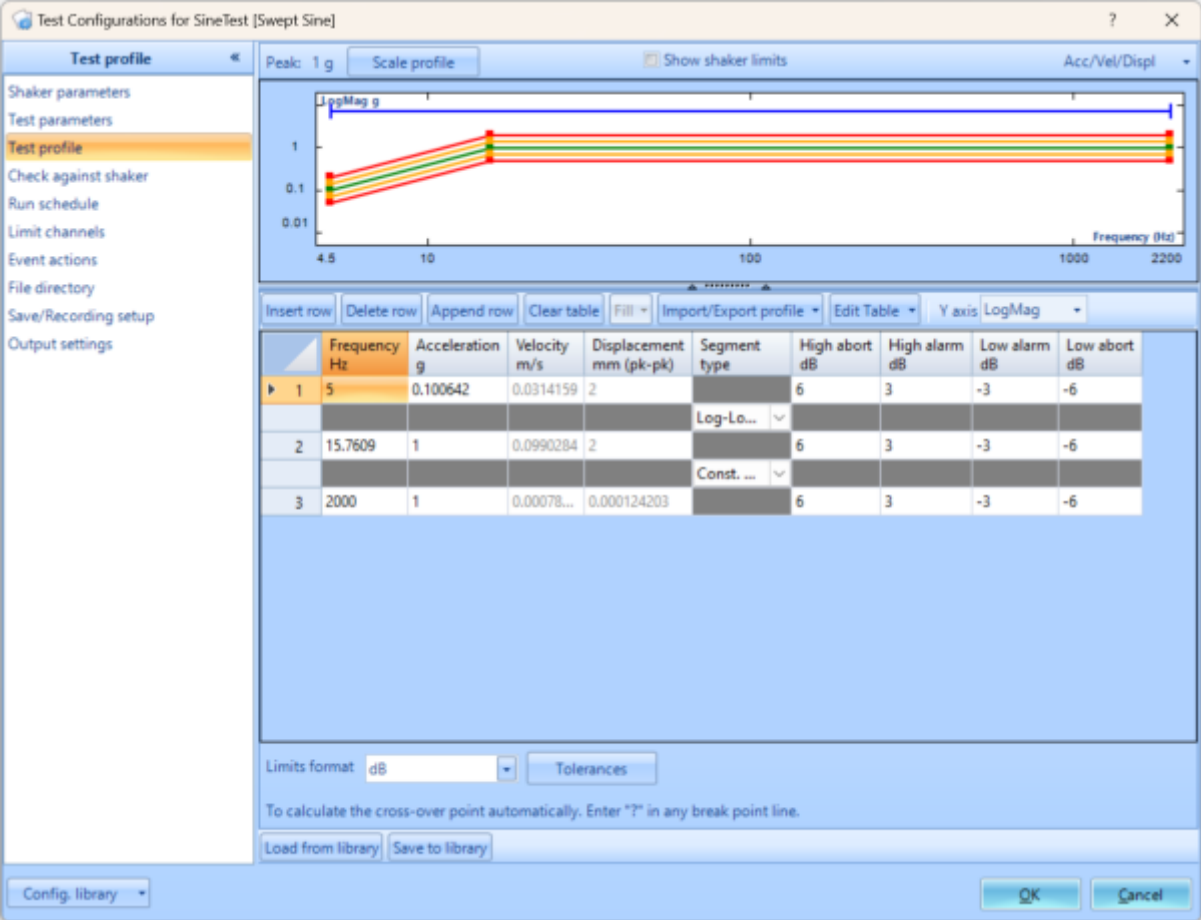
Logarithmic

Measurement Strategy:



Test Profile

The test profile is defined in the Test Profile section of the Test Configuration window. A graphical preview of the profile plot is displayed above, with a breakpoint table below for entering the profile. CSV import / export is also supported as an alternative to profile editing.



Breakpoint Table: Breakpoints can be added via **Insert row**, **Delete row** and **Append row**. Use **Clear table** to clear out all rows except for the first and last row.

Insert row	Delete row	Append row	Clear table	Fill	Import/Export profile	Edit Table	Y axis	LogMag	
	Frequency Hz	Acceleration g	Velocity m/s	Displacement mm (pk-pk)	Segment type	High abort dB	High alarm dB	Low alarm dB	Low abort dB
1	5	0.100642	0.0314159	2	Log-Le...	6	3	-3	-6
2	15.7609	1	0.0990284	2	Const. ...	6	3	-3	-6
3	2000	1	0.00078...	0.000124203		6	3	-3	-6

Breakpoint Calculation: In the profile editor, EDM can calculate the crossover point given a specified slope and point value. If a '?' is entered as a Frequency or Amplitude value, EDM will interpolate that value given the slope before and after that point.

	Frequency Hz	Acceleration g	Velocity m/s	Displacement mm (pk-pk)	Segment type
1	5	0.100642	0.0314159	2	
					Const. Acc. Ampl. ▾
2	15.7609	?	0.0990284	2	
					Const. Ampl. ▾
3	2000	1	0.000780388	0.000124203	

	Frequency Hz	Acceleration g	Velocity m/s	Displacement mm (pk-pk)	Segment type
1	5	0.100642	0.0314159	2	
					Const. Acc. Ampl. ▾
2	15.7609	0.100642	0.00996641	0.201283	
					Log-Log Const. Slope ▾
3	2000	1	0.000780388	0.000124203	

Segment Type::

Segment type

High ab
dB

6

Const. Ampl. ▾

Const. Ampl.

Const. Acc. Ampl.

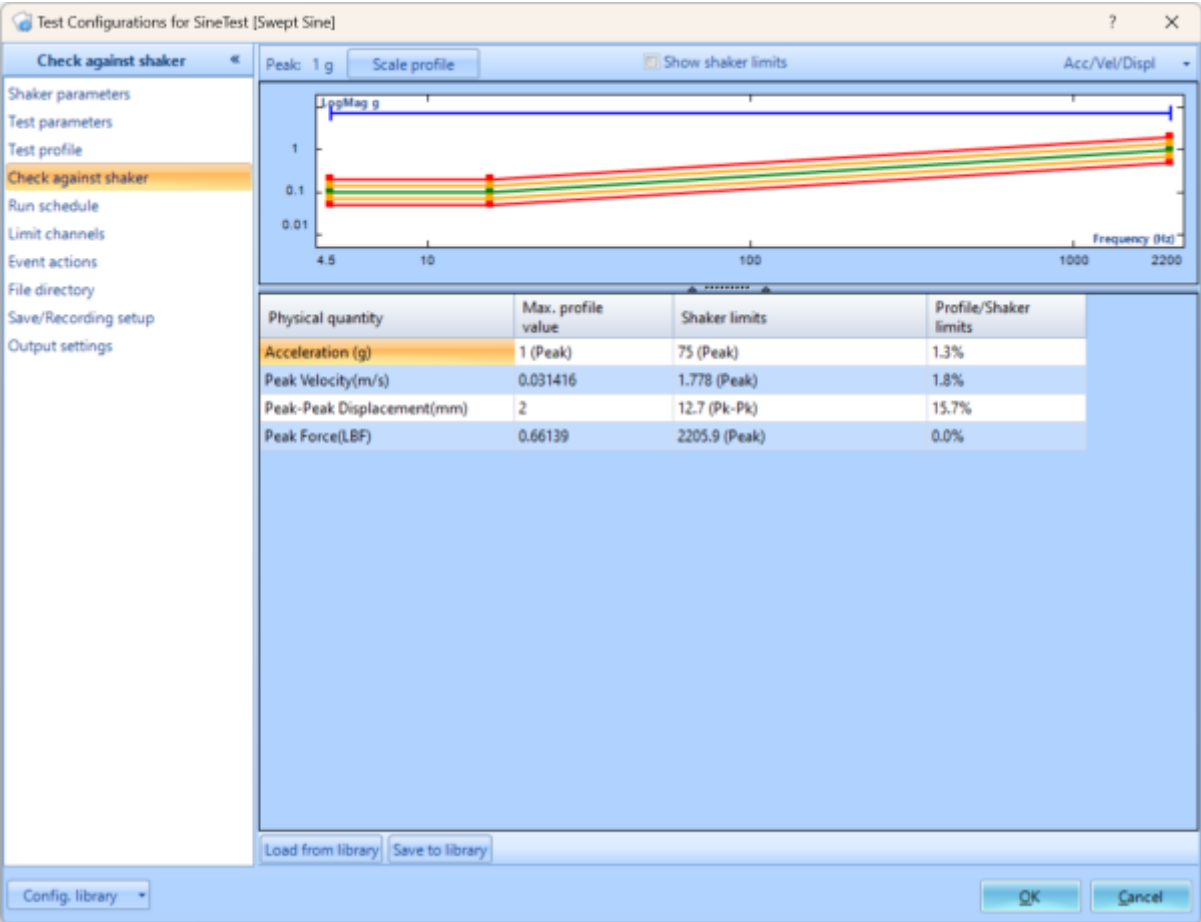
Const. Vel. Ampl.

Const. Displ. Ampl.

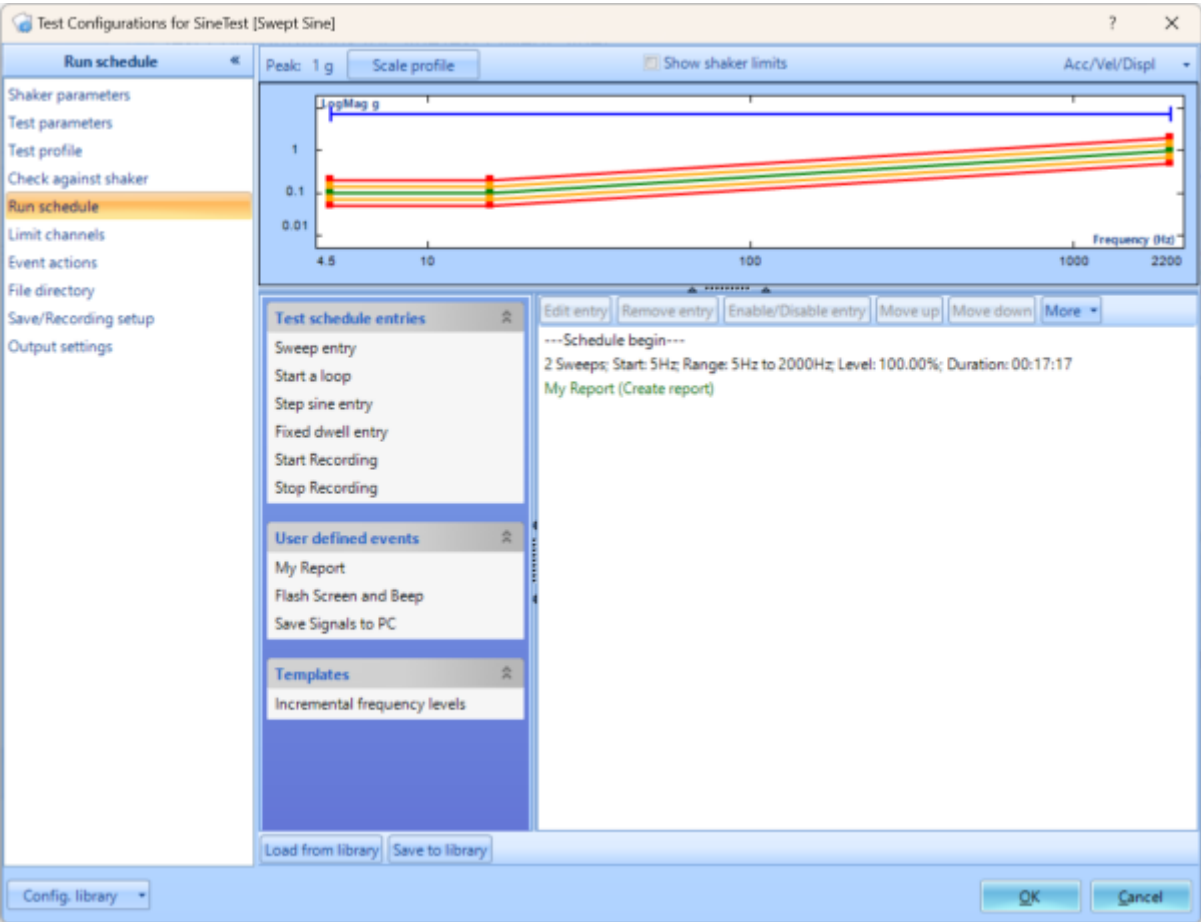
Log-Log Const. Slope

Lin-Lin Const. Slope

Check Against Shaker



Run Schedule

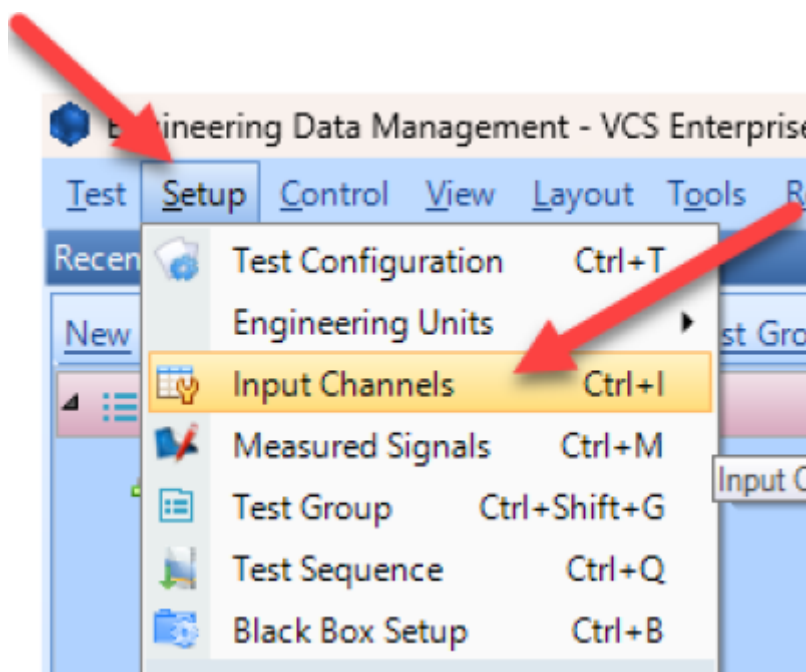


Sweep Entry:

The screenshot shows the 'Sweep Entry' dialog box. It has a title bar with a question mark and a close button. The 'Level (%)' is set to 100.00. Under 'Sweep range', 'Test profile (up)' is selected. 'Left frequency (Hz)' is 5, 'Right frequency (Hz)' is 2000, 'Start frequency (Hz)' is 5, and 'Initial sweep direction' is 'Up'. Under 'Sweep rate', 'Sweep speed' is selected with a value of 1 (Oct/Min). 'Time per sweep' is 00:00:38 (HH:MM:SS). 'Sweep#' is 2, and 'Total time' is 00:17:17 (HH:MM:SS). 'Total sine cycles' is 3453812. There is a checkbox for 'Hold sweep after target level reached.' and 'OK' and 'Cancel' buttons at the bottom right.

Input Channels

The input channels will now need to be set up. All sensors will to be properly configured before testing. The **Input Channels** menu can be found through **Setup → Input Channels**.

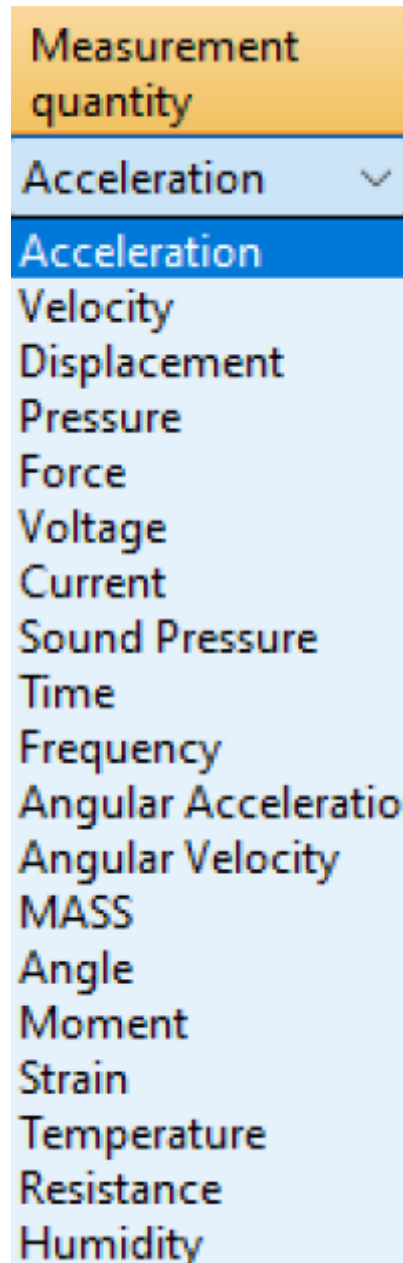


Channel Type

Control vs. **Monitor**. When running a test, there will need to be at least one control sensor. The control sensor is used to monitor the actual vibration levels that the shaker is producing. It then sends this data to the controller so that it maintains the targeted profile. This sensor should be mounted somewhere on the shaker/slip table itself, not the Device Under Test (DUT). Monitor sensors will show the levels that the DUT itself is experiencing.

On/Off	Channel type	Location ID
<input checked="" type="checkbox"/> On	Control	Ch1
<input checked="" type="checkbox"/> On	Monitor	Ch2
<input type="checkbox"/> Off	Monitor	Ch3
<input type="checkbox"/> Off	Monitor	Ch4
<input type="checkbox"/> Off	Monitor	Ch5
<input type="checkbox"/> Off	Monitor	Ch6
<input type="checkbox"/> Off	Monitor	Ch7
<input type="checkbox"/> Off	Monitor	Ch8

Measurement Quantity
Defines the physical unit that will be measured by the sensor connected to the channel.



Sensitivity

Sets the proportionality factor for the measurement (millivolts per engineering unit) given as a parameter of the sensor.**Input Mode**

There are five modes in which the inputs can operate:

DC-Differential- In the DC-Differential mode, neither of the input connections is referenced to the local ground. The input is taken as the potential difference between the two input terminals, and any potential in common with both terminals is canceled out. The Common Mode Voltage (CMV) will be rejected as long as the overall input voltage level does not saturate the input gain stage. Beware that very high CMV will cause clipping and may damage the input circuitry. Signals with a nonzero mean (DC component) can be measured in this mode.

DC-Single End- In single-ended mode, one of the input terminals is grounded and the input is taken as the potential difference of the center terminal with respect to this ground. Use this mode when the input needs to be grounded to reduce EMI noise or static buildup. Do not use this mode when the signal source is ground referenced or ground loop interference may result. This mode also allows signals with a non-zero mean to be measured.

AC-Differential- AC-Differential is a differential input mode that applies a low-frequency high-pass (DC-

blocking) analog filter to the input. It rejects common mode signals and DC components in the input signal. Use this when DC and low-frequency AC voltage measurements are not required or when a DC bias voltage is present. The analog high-pass filter has a cutoff frequency of -3dB at 0.3 Hz, and -0.1dB at 0.7 Hz for the IEPE input mode.

AC-Single End- AC-Single End grounds one of the input terminals and enables the DC-blocking analog filter. Use this mode for non-ground referenced sources where measuring the DC or low-frequency components are not required. It shares the same high-pass filter as that of AC-Differential.

IEPE (ICP)- All Crystal Instruments products support IEPE (Integral Electronic PiezoElectric) constant current output type input channels. IEPE refers to a class of transducers that are packaged with built-in voltage amplifiers powered by a constant current. These circuits are powered by a 4 mA constant current source at roughly 21 Volts.

Charge- Some sensors provide a high-impedance charge output. Usually, these are high-sensitivity piezoelectric units that lack a built-in voltage mode amplifier (i.e. IEPE), allowing them to be used in high-temperature environments. The Spider-81 front-end module has a built-in charge amplifier that allows the system to read the output of these sensors

Sensitivity	Input mode
100 (mV/g)	IEPE
100 (mV/g)	IEPE
100 (mV/g)	IEPE
100 (mV/g)	AC-Single End
100 (mV/g)	DC-Single End
100 (mV/g)	AC-Differential
100 (mV/g)	DC-Differential
100 (mV/g)	In-Line Charge Converter
100 (mV/g)	External Charge Amplifier
100 (mV/g)	External Charge Amplifier
100 (mV/g)	AC-Single End

Running the Test

Now that all of the parameters for the test have been setup, the test is ready to run. Here are the final steps to start the test.

1. Press the **Connect** button to connect to the controller.
2. Press the **Run** button.
3. The **Spider Check List** will now appear. Here you can check the settings of the test and verify that all is set up properly. Press **Start** once this has been verified.
4. The Pre-Test will now begin. This will verify that the control loop is properly established and provide data that the control loop needs.
5. The test is now running

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