



## HS-535 Triple Output Vibration Module

**1. Description.** The HS-535 Triple Output Vibration Module is designed to operate with a 100mV/g constant current type accelerometer to provide two DC outputs, one proportional to rms velocity and another proportional to peak-to-peak acceleration. These outputs can be set for 4-20mA or 0-10V by internal links as shown in Fig.1. A buffered AC output is provided, via a BNC connector to, allow vibration analysis. The unit is housed in a compact DIN-Rail mounting plastic case and operates from a 24VDC supply. Terminal connections are shown in Fig.2 overleaf.

**2. Accelerometer Power.** The HS-535 provides a 3.6mA constant current supply to a Hansford Sensors HS-100 series accelerometer which connects directly to the module input terminals.

**3. TDX OK LED.** A green LED on the front of the unit indicates proper connection of the accelerometer. The LED will not light if there are input wiring short-circuits or open-circuits. Under fault conditions 0-10V output is clamped to 0V, and the 4-20mA output clamped to 2mA.

**4. AC Output.** A buffered AC output, proportional to acceleration, is provided via a BNC connector mounted on the front panel. The 100mV/g signal is DC coupled to the accelerometer output and thus swings about the accelerometer bias voltage level (12VDC nominal). If a data-collector is used to monitor this signal for vibration analysis, it must have the sensor power function turned off.

**5. Velocity Output.** This output is proportional to rms velocity in mm/s. The output can be selected for 4-20mA or 0-10V and the output range selected for 10, 25, 50 or 100mm/s by internal links. The HS-535 velocity circuit incorporates high and low pass filters to limit the measurement bandwidth at 10Hz to 1kHz, as defined in ISO 10816 which lists recommended vibration limits for rotating machines. The output range is set at the factory for 4-20mA = 0-25mm/s. On request, this output can be configured at the factory to detect g rms.

**6. Acceleration Output.** This output is proportional to peak to peak acceleration in g pk-pk. The output can also be selected for 4-20mA or 0-10V and the output range selected for 10, 25, 50 or 100g pk-pk via internal links. The HS-535 g pk-pk circuit has a fixed high pass filter at 2Hz and a link selectable low pass filter of 1.5kHz, 3.5kHz or 5kHz. The output is useful for detecting higher frequency impacts caused by faulty ball or roller bearings, and in gearboxes. The default factory setting is 4-20mA = 0-10g pk-pk with 3.5kHz low pass filter.

**7. Connections.** The power supply and the accelerometer connections are duplicated, as shown in the drawing below, to enable wire looping to other signal conditioning modules if required.

**6. System Grounding.** To avoid spurious 50Hz pick-up from surrounding equipment, it is advisable for both the case of the accelerometer and the HS-535 power supply 0V to be grounded. This is achieved normally by the accelerometer being fitted to a grounded machine casing, and the HS-535 power supply 0V being grounded locally. In this instance the screen wire of the accelerometer should not be grounded at the measurement end in order to avoid ground loop currents. For this reason, the HS-535 accelerometer screen terminals are not internally connected to the power supply 0V.

In some applications the machine ground is sufficiently noisy to inject spurious signals into the measurement system. In this instance, the case of the accelerometer should be isolated from the machine casing using an isolating stud, and the screen wire connected, via wire links, from the HS-535 accelerometer screen terminals to the power supply 0V terminals and to ground.

## 8. Specifications

Power Input	+24VDC $\pm$ 10%, 80mA max.
Accelerometer Power	3.5mA $\pm$ 20% constant current , 23VDC driving voltage
Accel. Input Sensitivity	100mV/g
Filters	Velocity - 2 pole Butterworth 10Hz – 1kHz (-3db) g pk-pk - 2 pole Butterworth 2Hz – 1.5kHz, 3.5kHz, 5kHz
Detection	Velocity - True RMS (10% error for crest factor >6) G pk-pk – True peak detector
Velocity Ranges	10, 25, 50, 100 mm/s set by internal link
G pk-pk Ranges	10, 25, 50, 100 g pk-pk set by internal link
4-20mA Outputs	Max. load resistance - 450 $\Omega$ Max. output current (input overload) - 22mA
0-10V Outputs	Output Impedance – <200 $\Omega$ Max. output voltage ( input overload) – 12V
AC Output	Sensitivity 100mV/g (as accelerometer) Output resistance - <200 $\Omega$ DC level +12V nominal (as accelerometer) Connector - BNC (50 $\Omega$ )
Dimensions	134mm x 99mm x 22.5 mm (HxDxW) including BNC
Weight	0.11Kg

Fig. 1.

**HS-535**  
**INTERNAL LINK POSITIONS**

**LINK 1 VELOCITY RANGE**

- 1 - 100mm/s
- 2 - 50mm/s
- 3 - 25mm/s
- 4 - 10mm/s

**LINK 2 & 3 g pk-pk LP FILTER**

- 1 - 5kHz
- 2 - 3.5kHz
- 3 - 1.5kHz

**Note: Links 2 & 3 must be in the same position.**

**LINK 4 g pk-pk RANGE**

- 1 - 100g pk-pk
- 2 - 50g pk-pk
- 3 - 25g pk-pk
- 4 - 10g pk-pk

**LINK 5 VELOCITY OUTPUT**

- 1 & 2 - 4-20mA
- 2 & 3 - 0-10V

**LINK 6 g pk-pk OUTPUT**

- 1 & 2 - 4-20mA
- 2 & 3 - 0-10V

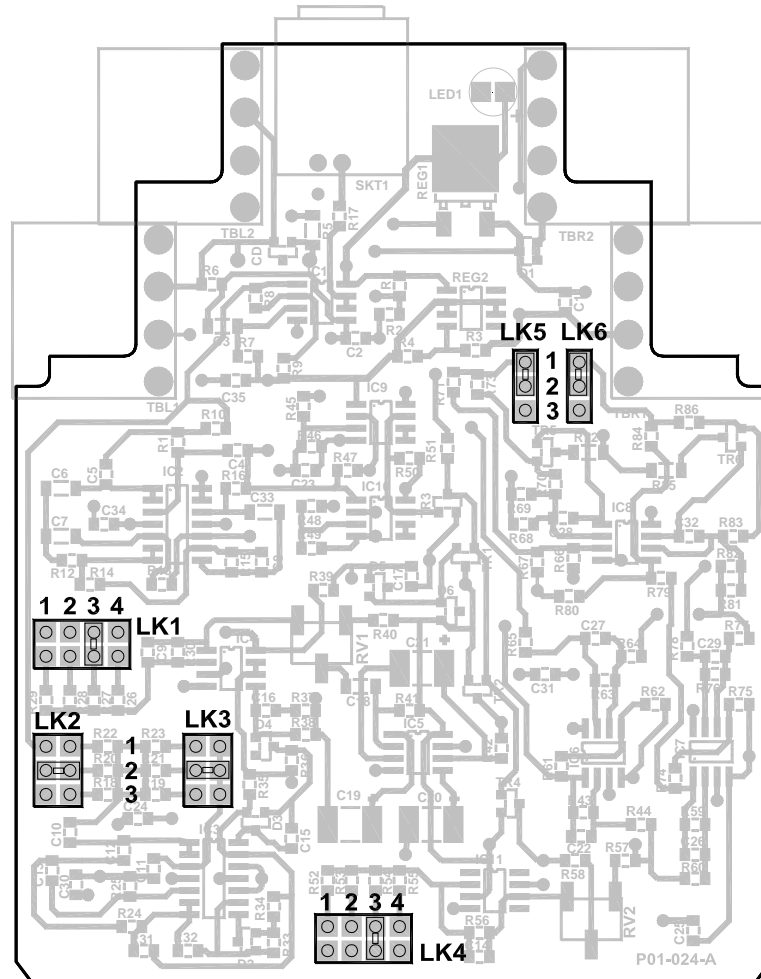


Fig. 2.

**HS-535 Terminal Connections**

- 13 - 0V Power In
- 14 - 0V Power Out
- 15 - 0V (gpk-pk Output)
- 16 - 0V (Vel./grms Output)

- 9 - +24V In
- 10 - +24 V Out
- 11 - gpk-pk Output +
- 12 - Vel./grms Output +

- 5 - As 1
- 6 - As 2
- 7 - As 3
- 8 - No Connection

- 1 - Accel. + IN
- 2 - Accel. 0V IN
- 3 - Accel. Screen
- 4 - No Connection

