Hansford Sensors
Excellence in Vibration Monitoring

HS-556 Accelerometer Signal Conditioner Module

1. Description. The HS-556 Signal Conditioner is used with a 100mV/g constant current type accelerometer and provides a 4-20mA output suitable for direct input to a vibration monitoring PLC. The 4-20mA output is proportional to true RMS velocity in mm/s. A buffered AC output is provided via a BNC connector to enable vibration analysis using an FFT signal analyser. The unit is housed in a compact DIN-Rail mounting plastic case and operates from 24VDC at 50mA. Terminal connections are shown on the drawing overleaf.

2. Power Input The +24VDC power input terminals are duplicated to allow power looping to other modules in the measurement system.

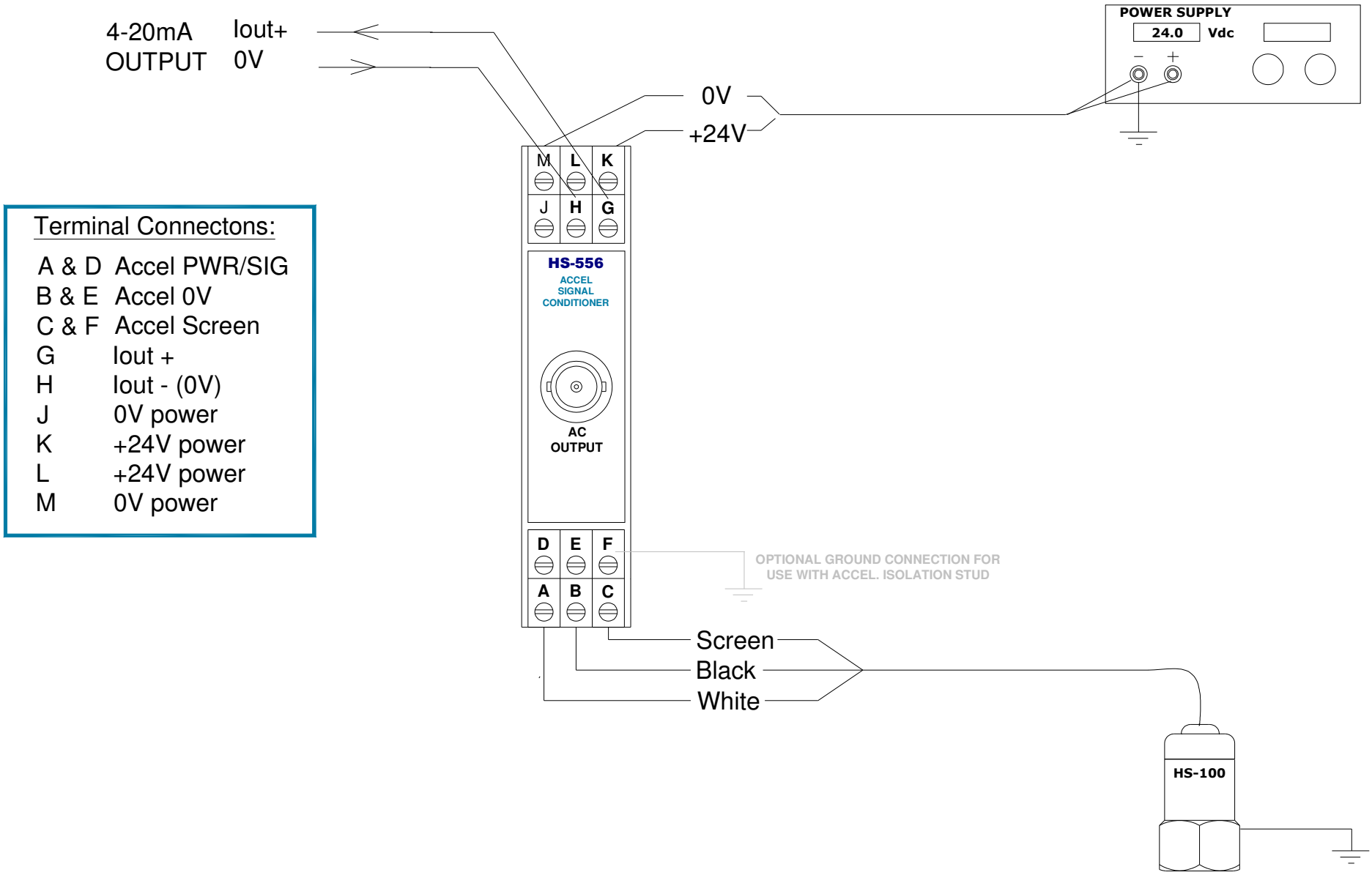
3. Accelerometer Input. The HS-556 provides a nominal 3.5mA constant current supply to an accelerometer, such as the Hansford Sensors HS-100 Series, which connects directly to the module input terminals. Two sets of accelerometer input terminals allow for looping in and out.

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 (12VDC nominal). If a data-collector is used to monitor this signal for vibration analysis, it must have the sensor power function of the data-collector turned off.

5. 4-20mA Output. The 4-20mA output is proportional to RMS velocity in mm/s, and the circuit incorporates high and low pass filters to limit the measurement bandwidth at 10Hz to1kHz, as defined in ISO 10816. This standard lists recommended vibration limits for a range of sizes of rotating machines. The output range is set at the factory for 4-20mA = 0-20mm/s and alternative ranges can be specified at time of order. On request, this output can be configured at the factory to detect RMS acceleration (g).

6. System Grounding. To avoid spurious 50Hz pick-up from surrounding equipment it is advisable for the case of the accelerometer and the HS-556 power supply 0V to be grounded. This is achieved, normally by the accelerometer being fitted to a grounded machine casing, and the HS-556 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-556 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-556 accelerometer screen terminals to the power supply 0V terminals and to ground.

7. Connection details for **HS-556** Signal Conditioner

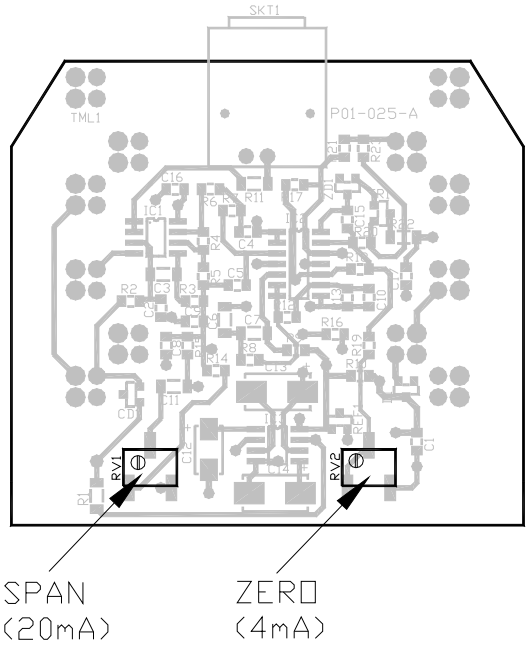


Terminal Connectons:

A & D	Accel PWR/SIG
B & E	Accel 0V
C & F	Accel Screen
G	Iout +
H	Iout - (0V)
J	0V power
K	+24V power
L	+24V power
M	0V power

8. HS-556 Calibration

The module is calibrated at the factory using a sine-wave signal generator to simulate a 100mV/g accelerometer. eg. 200mVrms @ 156Hz = 20mm/s rms velocity. Should periodic calibration be required, the zero and span adjustment potentiometers are accessible on removal of the left side panel of the module. First, with a milli-ammeter connected in series with the output terminals (G & H) and with no input signal applied, adjust potentiometer RV2 to set the measured output current to 4.0mA. Then apply a sinusoidal input signal, corresponding to the required full-scale velocity level, to the input terminals A & B. This is most easily achieved using the HS-661 Accelerometer Simulator which has switched velocity levels of 5 mm/s and 20mm/s and can be directly connected to the HS-556 input terminals.
If a signal generator is to be used to provide the input signal then it will be necessary to connect a 3.3Kohm resistor across the input terminals A & B in order to simulate an accelerometer bias voltage. The signal generator should then be connected to terminal A via 1 microFarad 35V capacitor to block the bias voltage from the signal generator. If a polarized capacitor is used, the positive leg should be connected to terminal A.
A signal generator frequency of 156Hz is convenient to use since the required amplitude for a given velocity is easily obtained. ie. 25mm/s = 250mVrms, 50mm/s = 500mVrms etc.
When the correct input signal is applied, corresponding to the maximum velocity level required, then adjust potentiometer RV1 to set the output current to 20.0mA.



9. HS-556 Specification

Power Input .....+24VDC ±10%, (regulated) 50mA max.

Accelerometer Power .....3.5mA ± 20% constant current , 23VDC driving voltage

Accel. Input Sensitivity 100mV/g

Filters.....2 pole Butterworth 10Hz – 1kHz (-3db)

Detection .....True RMS (10% error for crest factor >6)

4-20mA Output Max. load resistance - 450Ω
Max. output current (input overload) - 32mA

AC Output .....Sensitivity 100mV/g (as accelerometer)
Output resistance - <200Ω
DC level +12V nominal (as accelerometer)
Connector - BNC (50Ω)

Dimensions.....24mm(w) x 75mm(d) x 118mm (overall height)

Weight 0.1Kg