



Datasheet

# Scanning probe

# SPN4

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# SCANNING PROBE (SPN4)

Single axial velocity sensor.

SPN probes are available at 90, 45 and 0 degree orientations.

Scanning probe is based on a single particle velocity channel. It is specially designed for non-contact vibration tests, as it allows getting very close to the surface of the measured device.

Three different configurations are possible. The 90 degrees scanning probe has the measurement direction perpendicular to the probes' handle. The 0 degrees scanning probe can measure in the direction of the probes' handle. The third configuration is positioned at 45 degrees with respect to the probes' handle towards the handle, making easier manual operation.

These options are designed to facilitate the needs of any testing environment.

The design of the scanning probe has been upgraded as compared to its predecessor. The electronics are more robust, and more resistant against electric interference. The sensor body is made of a single aluminum mold, providing more protection and ensuring robustness against mechanical shocks. The sensor positioning is also refined, creating an acoustically transparent structure around the sensor for positioning and stability.

# I. SPN SENSOR

## THE VELOCITY SENSOR

The particle velocity sensor is a platinum based MEMS. The Microflown™ consists of two tiny wires which are kept heated at a constant temperature of 200 °C degrees. Motion of the air surrounding the sensor produces a temperature shift. This temperature difference is proportional to the resistance of the wires, providing a broadband (0.1 Hz to at least 10 KHz) and linear signal proportional to the particle velocity.

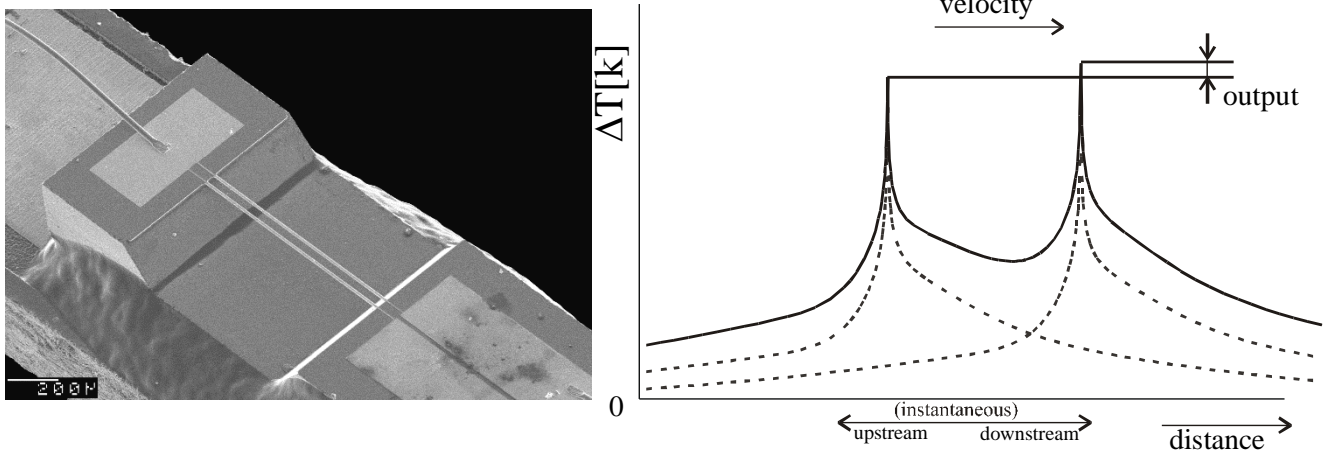


Figure 1. Sensor principle

## II. CHARACTERISTICS TABLE

Parameter	Value	Unit/ note
<b>Physical</b>		
Connector	7 pin Lemo	Microflown pinning
Diameter	12.7	mm
Length	128	mm
Weight	40	g
Outer body material	Stainless Steel	
<b>Probe Environmental Parameters</b>		
Operative temperature range	-20 to 85	°C
<b>Velocity sensor Environmental Parameters</b>		
Sensitivity variation due to temperature	< 0.006	dB/K
Sensitivity variation due to humidity: (30-90%)	0.06	dB/%HR
Sensitivity variation due to pressure: (1-0.82 bar)	< 0.5	dB
<b>Measurement range Velocity sensor</b>		
Maximum level range	135	dB [PVL ref: 50 nm/s]
Frequency response	0.1 – 10.000	Hz
Nominal sensitivity	12.5	V/ m/ s @ 250Hz
±1 dB	40–8.000	Hz
±2 dB	20- 10.000	Hz

# III. SYSTEM CHARACTERISTICS

## DYNAMIC RANGE

The dynamic range of the measurement chain formed by the Scanning probe (consisting of one particle velocity sensor) connected to the MFPA electronics is described by the following graph:

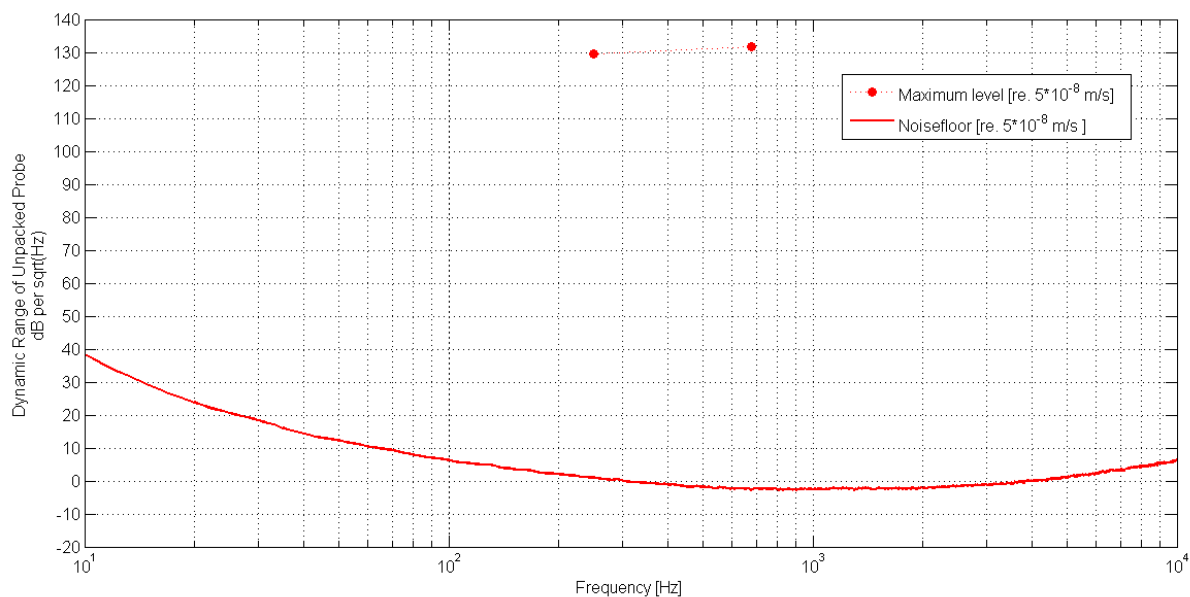


Figure 2. SPN4 probe and MFPA-1 dynamic range

## RESPONSE MODEL

The magnitude and phase response for every probe is calibrated, modeled and compiled in the calibration report.

Below is an example of the response of both sound pressure (not applicable) and particle velocity sensors.

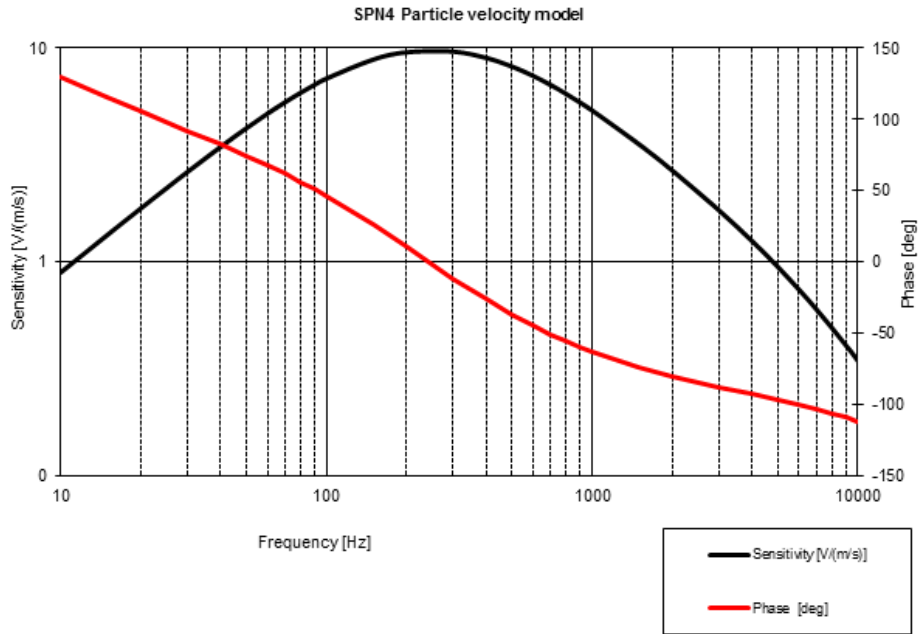


Figure 3. Typical SPN4 Microflown response model

To correct for the particle velocity sensor behavior, the model of the inverse response needs to be applied in order to obtain a flat response across the whole usable frequency range.

- Frequency response: Signal [Volts] /  $S_u$
- Phase response: Signal [Volts] -  $\phi_u$

$$S_u \left[ \frac{V}{m/s} \right] = \frac{S_u @ 250 \text{ Hz} \left[ \frac{V}{m/s} \right]}{\sqrt{1 + \frac{f^2 c_{1u}^2}{f^2}} \sqrt{1 + \frac{f^2}{c_{2u}^2}} \sqrt{1 + \frac{f^2}{c_{3u}^2}} \sqrt{1 + \frac{f^2 c_{4u}^2}{f^2}}}$$

$$\phi_u [deg] = \arctan \frac{c_{1u}}{f} - \arctan \frac{f}{c_{2u}} - \arctan \frac{f}{c_{3u}} + \arctan \frac{c_{4u}}{f}$$

## DIRECTIVITY

- **VELOCITY SENSOR:**

The polar pattern of the Particle Velocity sensor has a figure of eight response (green in figure 4).

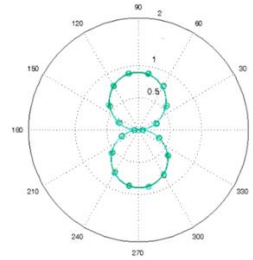


Figure 4: SPN4 polar pattern

### DC-FLOW

The maximum level of DC-flow that the scanning probe 45 degrees can withstand is consistent with 1 m/s.

### RECALIBRATION

The Scanning probes require a qualified calibration every 2 years.

## IV. USAGE AND PRECAUTIONS



- Do not submerge the electronics in water as this will lead to permanent damage.
- Only use the 7 pin to 7 pin Lemo cable supplied with the kit. Any modifications to this cable or the use of cables of a different brand or type may result in permanent damage to the probe or the signal conditioner.
- The Scanning probe must be powered via a Microflown™ signal conditioner, the new MFPA series or the prior MFSC/ Router. Do not power the sensor with any other device; this might cause permanent damage to the system.
- Access exposure to dust/dirt particles could damage the Microflown™ sensor.

## V. TECHNICAL SUPPORT

For any problem or doubt with your equipment, please contact Microflown™ Technologies Customer service:

- Mail: [cs@microflown.com](mailto:cs@microflown.com)
- Skype: cs.microflown
- Telephone: +31(0) 88 001 08 11 Monday to Friday, from 9:00 to 17:00 (UTC+1).

# VI. WARRANTY POLICY, REPAIRS AND REPLACEMENTS

## WARRANTY AND REPLACEMENT OR SUBSTITUTION

During the first two years (24 months) the seller offers a warranty on all its products, except for trading items and third party manufactured items. The seller warrants that all products will be free from defects in materials and workmanship for this period of two years. During this two year period, the seller will repair or replace defect products free of charge. Products damaged by accident, abuse, misuse, natural disaster or by any unauthorized disassembly, repair or modification are not covered by this warranty. The incurred transportation costs of returning the products to seller will be borne by the buyer. The logistical cost for returning the products back to the buyer will be borne by the seller. Several products come with a “VOID if seal is broken” sticker, the warranty is void at all times when this sticker is broken.

## GRACE PERIOD (YEAR 3 AND 4)

During the third and fourth year the seller offers a grace period. In the grace period the products purchased at an earlier date can be replaced by completely new state of the art products of the same scope of the original purchase. This applies only for the products known as standard probes and signal conditioners. In the first year of the grace period, (year 3) customers have an option to replace their products for 25 % of the actual ex works end-user price. The full freight and packaging charges apply.

In the second year of the grace period, (year4) customers have an option to replace their products for 50 % of the actual ex works end-user price. The full freight and packaging charges apply.

The new products are accompanied by a new warranty. Both the two years warranty and grace period become applicable again from the date of invoice.

## REPAIRS OUTSIDE WARRANTY POLICY

Replaced/repared parts come with a six month warranty under the same conditions as the two year warranty.