

# NS2000/NS2000SM

## Sensor Controller



- **Measures down to picometres**
- **Subnanometre levels of accuracy**
- **Flexibility with switchable settings**
- **Non Contact**

## NS2000/NS2000SM

### Single channel controllers for the NanoSensor series capacitive sensors.

The NS2000 series controllers operate by measuring the change in capacitance of a parallel plate capacitor and output an analogue voltage proportional to the NanoSensor gap. The voltage output varies linearly between -5V and +5V as the sensor gap changes from 50% to 150% of the nominal NanoSensor gap. Its compact size, standalone operation and high resolution makes this ideal for systems where NanoPositioning is required.

Key Features	Key Benefits
Subnanometre position resolution	Confidently measures position to atomic levels of accuracy
Linearity error down to 0.02% of the sensor range	Accurate measurement over the entire sensor range
User adjustable measurement bandwidth (50Hz, 500Hz or 5kHz)	Allows optimisation for either quick response or high stability
Selectable long ('-L') or short ('-S') measuring range (2pF or 10pF capacitance)	Allows the operator to use the sensors for multiple applications – for example using short range for stability measurement and long range
User adjustable amplifier gain (for applications that do not use the full measuring range)	Operating the sensor over a shorter range for enhanced linearity
Non Contact	Measurement doesn't influence the measured value
Position measurement maintained after power cycle – self zeroing	No set up time.
No Power dissipation at the point of measurement	Measurement doesn't influence the measured value

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### Typical Applications Include (when combined with NanoSensors):

- Monitoring structural deformation
- Precision engineering
- Vibration control and measurement
- Strain monitoring (e.g. robotic arm on the Space Station and Space Shuttle)
- Metrology
- Photolithography
- SPM Microscopy
- Drift measurement
- Building custom closed loop NanoPositioning systems
- Zero point reference systems

### SPECIFICATION

Parameter	Value	Units	Comments
Size	218 x 77 x 34	mm	
Power supply	±15 ±1	V	
Current requirement	70	mA Typ	
Sensor output	-5 to +5	V	Note1
<b>Dynamic physical (Typical values)</b>			
Scale factor	0.1 or 0.05 or 0.01	GV -1	
Noise level (-S)	<0.05	ppmHz -½ rms	Note 2
Noise level (-L)	<0.15	ppmHz -½ rms	Note 2
Thermal drift	5	ppmK -1 Typ	Note 2
Warm-up time	10	minutes	
Warm-up drift	80	ppm	Note 2
PS rejection	10 ppm	V -1	Note 2
Linearity error	<0.2	%	Note 3
Bandwidth	50, 500, 5000 ±10%	Hz	

### Notes

1. Greater range is available at reduced performance
2. ppm refers to parts per million of the nominal gap
3. Linearity error depends on the accuracy of the sensor installation.  
Linearity errors as low as 0.02% can be achieved. Please contact Queensgate Instruments Ltd. for further details.