



## Electronic controllers

# NPS2100-20 / NPS2101 Controller

The NPS2100 series is a NanoSensor, high voltage amplifier and control electronics combined as a single channel standalone module, powered by an external  $\pm 15V$ , 130V and -30V DC supplies.

These controllers are most commonly used to provide closed loop position control of Y mirror steering mechanisms, which incorporate Queensgate piezo actuators (MTP-15N ) and sensors (NXB-3-AI).

The control electronics allows the user to optimize the NPS2100 series closed loop response. Closed loop operation gives vast improvements in stability and linearity over open-loop operation.

The NPS2100 has no negative voltage drive and has now been superseded by the NPS-2100-20 which incorporates a -20V input. The NPS-2101 also has positive and negative voltages inputs but has its Nanosensor screen driver disabled.

### Key features

- Subnanometer position resolution
- Linearity error down to 0.02%
- User adjustable measurement bandwidth (50Hz, 500Hz or 5kHz)
- User adjustable amplifier gain (for applications that do not use the full measuring range)
- Selectable long ('-L') or short ('-S') measuring range (2pF or 10pF capacitance)

### Applications

- Wafer inspection
- KLA 2135, 2138, 2139, 2367

### Variants

- 2100 superseded by 2100-20
- 2100-20 KLA Ref 750-660755-001
- 2101 - NanoSensor screen driver disabled KLA Ref 750-660755-002



# Electronic controllers: NPS2100-20 / NPS2101 Controller

## Specification

Parameter	Value	Units	Comments
<b>Static physical</b>			
Size	218 x 77 x 34	mm	
Power supply	$\pm 15 \pm 1$ @ 120mA	VDC	
	+120 to +130 @ 30mA	VDC	
	-32 to -27 @ 30mA	VDC	Note 1
Sensor output	-5 to +5	V	Note 2
Analogue input range	-10 to +10	V	
Digital input D/A resolution	14	Bits	
<b>NanoSensor Dynamic physical (Typical values)</b>			
Scale factor	0.1 to 0.01	GV <sup>-1</sup>	Note 3
Noise level (-S) (2100 / 2100-20 )	<0.03	ppmHz <sup>-1/2</sup> rms	Note 4
Noise level (-L) (2100/ 2100-20)	<0.15	ppmHz <sup>-1/2</sup> rms	Note 4
Thermal drift	5	ppmK <sup>-1</sup> Typ	Note 4
Warm-up time	10	minutes	
Warm-up drift	80	ppm	Note 4
PS Rejection	10	ppmV <sup>-1</sup>	Note 4
Linearity error	<0.2	%	Note 5
Bandwidth	50, 500, 5000 $\pm 10\%$	Hz	Note 6
<b>HV Amplifier Dynamic physical (Typical values)</b>			
Output voltage (2100)	0 to +120	V	
Output voltage (2100-20 / 2101)	-20 to +120	V	
Bandwidth	5	KHz	Note 7
Analogue input gain	6	V/V	Note 8
Digital input gain	7.3 m	V/bit	Note 8
Noise	0.2	mV <sub>rms</sub>	Note 9
Current limit	50	mA	

### Notes

1. Negative supply not required on 2100 variant.
2. Greater range is available at reduced performance.
3. G is the nominal gap. The scale factor is switch selectable through the side panel.
4. ppm refers to parts per million of the nominal gap.
5. 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.
6. The Bandwidth is switch selectable through the side panel.
7. Typical, depends on the actuator.
8. Open loop operation only.
9. Typical.