

# NPC-D-5200 Series

## Digital Controllers

A standalone single axis closed loop piezo actuator controller designed to cover the most challenging applications requiring the best dynamic performance.

The controller is updated with the position of the stage 120,000 times per second which, combined with a high continuous power rating, allows stages to be driven at higher maximum speeds for faster step-settle times. This can be particularly important for longer range stages or stages designed for high load bearing.

Queensgate stage designs incorporate capacitive sensors which give precise positional feedback in closed-loop mode delivering high resolution, low noise and high linearity of movement. The stable system delivers repeatability of movement with improved precision and accuracy for static and dynamic motion applications.

There is no compromise: the NPC-D-5200 delivers precision, accuracy and speed.



## Key Features

- Precision capacitive sensor measurement circuit for closed loop operation.
- Update rate of 8.3 micro seconds (120KHz).
- Low electronic noise - the low noise design allows stage position noise as low as a few tens of picometres.
- High power rating, -30 to +150V drive with 160mA continuous current as standard.

## Interfacing

- Analog command and position output +/-10 V
- Digital commands over USB or optional RS232C.
- Easy to interface with OEM software using supplied DLL (Dynamic Link Library). In position digital outputs can be used to interface with external devices. Expansion slot to allow custom board for OEM integration.
- Examples of software in C/C++, Python and LabVIEW® provided.
- User programmable Function Playback of custom programmed waveforms such as constant velocity profiles.
- TTL input/output triggers for external control. Programmable when "Function playback" feature used.
- TTL In-Position output to indicate when NanoMechanism reaches the desired/set position (user selectable position accuracy).

## Technical specification

| Parameter  | Value                                      | Units      | Comments  |
|--|--|------------|---|
| <b>Mechanical</b>  |  |            |   |
| Size (Width x Depth x Height) Height includes feet Not including protruding components at front and rear of controller | 268 x 194 x 70                             | mm         | Additional space required for rear connectors and cables.                                   |
| Stage Mass   | 1.8  | kg         |   |
| Cooling  | Fan forced air                             |            | Vents on rear and base  |
| <b>Electrical</b>  |  |            |   |
| Power input  | 96 to 265<br>47 to 63                      | Vrms<br>Hz | Using external supply. Only use approved power supply provides protective earth connection. |
| DC power input   | $\pm 24 \pm 0.75@5A$                       | V          | Only use Queensgate approved power supply   |
| DC power input connector   | 4 pin DIN Plus protective earth connection |            | Rear panel  |
| <b>Connectivity</b>  |  |            |   |
| USB  | 2.0 compliant                              |            | USB type B connector. Note: power not taken from USB port.                                  |
| Analog input command   | BNC  |            | Per channel - front panel   |
| Analog Position Monitor output   | BNC  |            | Per channel - front panel   |
| “TRIG” input, “TRIG” output,<br>“IN-POS” output and<br>Quadrature Interface  | 25 pin D-type socket                       |            |   |
| Controller Synchronizing signals   | 9 pin D-type socket                        |            | Rear panel  |
| <b>Environmental - Operational</b>   |  |            |   |
| Temperature  | 10 to 40                                   | °C         |   |
| Relative Humidity  | 5 to 80                                    | %RH        | Non-condensing  |
| <b>Environmental - Storage and Shipping</b>  |  |            |   |
| Temperature  | -20 to 70                                  | °C         |   |
| Relative Humidity  | 0 to 95                                    | %RH        | Non-condensing  |
| <b>General</b>   |  |            |   |
| Warm up time   | 40 (typ)                                   | Min        |   |
| “ANA I/P” analog input position command per channel  | -10 to +10                                 | V          | Connector BNC – Single ended MAXIMUM input: $\pm 15V$                                       |
| “ANA I/P” analog input impedance (per channel)   | > 50k                                      | Ohms       |   |
| “POS MON” analog output position monitor per channel   | -10 to +10                                 |            | Connector BNC – Single ended MAXIMUM input: $\pm 15.5V$                                     |
| “IN- POSITION” Output  | Logic “0” < 0.8<br>Logic “1” 2.4 to 5      | V<br>V     | 15 pin D-Type on rear panel.<br>For OUTPUTS Load impedance: > 1k ohms. MAXIMUM              |
| “TRIG”   | Logic “0” < 0.8<br>Logic “1” 2.4 to 5      | V<br>V     | output: 5.5V For INPUTS Input impedance: 50 ohms.<br>MAXIMUM input: 5.5V                    |

## Technical specification

| Parameter  | Value              | Units | Comments                      |
|--|--------------------|-------|-------------------------------|
| NanoMechanism interfacing – controller – per channel |                    |       |                               |
| Connector  | 17W2 D type        |       | Mixed signal connector        |
| HV output swing                                      | -30 to +150        | V     | Factory set (default)         |
|  | -20 to +120        |       | Factory set (optional)        |
| HV drive current                                     | 160                | mA    | Factory set (default)         |
| HV amplifier bandwidth                               | >50                | kHz   |                               |
| HV amplifier intrinsic noise                         | 0.3                | mV    |                               |
| “ANA I/P” analog output position command             | -5 to +5           | V     | Connector BNC                 |
|  |                    |       | Differential input - core +ve |
| “POS MON” analog output position monitor             | -5 to +5           | V     | Connector BNC                 |
|  |                    |       | Single ended                  |
| “READY” output signal                                | Logic “0” <0.8     | V     | Connector BNC                 |
|  | Logic “1” 2.4 to 5 | V     |                               |
| “TRIG I/P” input signal                              | Logic “0” <0.8     | V     |                               |

## Ordering information

| Product Ref  | Description   |
|--------------|---|
| QGNPC-D-5200 | NPC-D-5200 Single axis high performance digital controller. |

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