

N-603.2SD PiezoMove® OEM Linear Actuator



Figure 1: N-603.2SD PiezoMove® OEM linear actuator

Contents

Intended Use	2
Scope of Delivery	2
Symbols and Typographic Conventions	2
Safety Precautions	3
Installation.....	3
Mounting the N-603.2SD.....	3
Start-Up and Operation	4
General Notes on Start-Up and Operation	4
Starting Up and Operating the N-603.2SD	4
Discharging the N-603.2SD.....	5
Maintenance.....	5
Cleaning the N-603.2SD	5
Customer Service	6
Technical Data	7
Dimensions	8
Pin Assignment	9
Motor Connector	9
Sensor Connector	10
Maximum Ratings.....	10
Ambient Conditions and Classifications	11
Old Equipment Disposal	12

Intended Use

The NEXACT®-driven N-603.2SD actuator is designed to provide a travel range of 2 mm in one axis (X axis). This actuator features a very low-profile design, flexure joints and strain gauge sensors. The N-603 is non-magnetic and vacuum compatible.

Based on its design and realization, the N-603.2SD actuator is intended to exert a holding force of 6 N in motion direction. The N-603.2SD can be mounted horizontally or vertically.

The N-603.2SD is a laboratory device as defined by DIN EN 61010-1. It is intended to be used in interior spaces and in an environment which is free of dirt, oil and lubricants.

The intended use of the N-603.2SD is only possible in combination with suitable electronics that is available from PI. The N-603.2SD can be operated using the E-861.1S1 NEXACT® servo controller.

Scope of Delivery

OrderNumber	Item
N-603.2SD	PiezoMove® linear actuator
N603T0001	Technical Note for N-603.2SD (this document)

Symbols and Typographic Conventions

The following symbols and typographic conventions are used in this Technical Note:

NOTICE



Dangerous situation

If not avoided, the dangerous situation will result in damage to the equipment.

- Actions to take to avoid the situation.

INFORMATION

Information for easier handling, tricks, tips, etc.

Safety Precautions

NOTICE



Damage due to manual displacement!

Manual displacement can cause irreparable damage to the piezo modules in the NEXACT® linear drives.

- Do not displace the moving platform of a NEXACT® stage or the runner of a NEXACT® linear drive manually!

NOTICE



Fixed operation frequency for permanent operation!

- For permanent operation of the drives do not exceed operation frequencies of 1500 Hz.

Installation

Mounting the N-603.2SD

Prerequisite

- ✓ You have read and understood the safety precautions (p.3).

Tools and accessories

- Screws for mounting the actuator on a surface.
- Suitable tools
- Suitable installation environment

Mounting the N-603.2SD

- Only mount the N-603.2SD on the four M2 mounting holes intended for this purpose (see figures below).

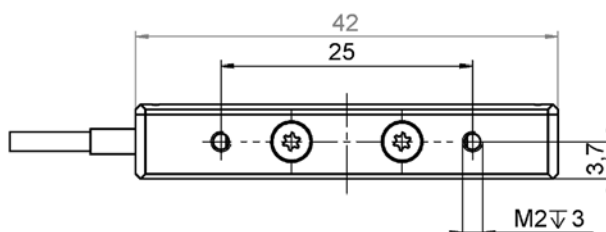


Figure 2: Lateral view on N-603.2SD

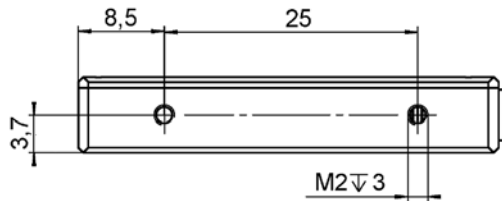


Figure 3: Front view on N-603.2SD

Start-Up and Operation

General Notes on Start-Up and Operation

NOTICE



Uncontrolled oscillation!

Oscillations can cause irreparable damage to the stage. Oscillations are indicated by a humming and can result from the following causes:

- The load and/or dynamics of operation differ too much from the calibration settings.
- The stage is operated near its resonant frequency.
- If you notice oscillations, stop the stage immediately.

INFORMATION

If your system was calibrated by PI, the controller and the stage must not be exchanged or substituted.

- Take note of the assignment indicated by the serial numbers on the calibration label on the controller.
- If the controller or the stage has to be replaced, contact our customer service department (p. 6).

Starting Up and Operating the N-603.2SD

Prerequisite

- ✓ You have read and understood the following sections:
 - Safety Precautions (p. 3)
 - General Notes on Start-Up and Operation (p. 4)

Starting Up and Operating the N-603.2SD

- Follow the instructions in the manual of the used piezo controller for start-up and operation of the N-603.2SD.

INFORMATION

To maintain the stages' function observe the following notes:

- Do not touch internal parts of the stage such as the ceramic bar.
- Handle and use stages only in clean environment.

Discharging the N-603.2SD

The N-603.2SD is to be discharged before demounting to provide a long lifetime of the stage's piezo actuators. Demounting is necessary e.g. before cleaning or transporting the N-603.2SD as well as for modifications. Discharging takes place via the PI controller.

Discharging a N-603.2SD that is connected to the controller

- Set the piezo voltage to 0 V on the controller.

Discharging a N-603.2SD that is not connected to the controller

- Connect the stage to the switched-off PI controller for a few seconds.

Maintenance

NOTICE**Misalignment from loosening screws!**

The N-603.2SD is maintenance-free and precisely aligned.

- Do not loosen any sealed screws on the N-603.2SD.

Cleaning the N-603.2SD

Prerequisites

- ✓ You have discharged the piezo actuators of the N-603.2SD.
- ✓ You have disconnected the N-603.2SD from the controller.

Cleaning the N-603.2SD

- Clean the surface of the N-603.2SD with a towel that is lightly dampened with a mild cleanser or disinfectant, with alcohol or with isopropanol.
- Do **not** do any ultrasonic cleaning.

Customer Service

For inquiries and orders, contact your PI sales engineer or send us an e-mail (info@pi.ws).

If you have questions concerning your system, have the following information ready:

- Product codes and serial numbers of all products in the system
- Firmware version of the controller (if present)
- Version of the driver or the software (if present)
- Operating system on the PC (if present)

The latest versions of the relevant user manuals for your system are available for download on our website (<http://www.pi.ws>).

Technical Data

Preliminary data	N-603.2SD
Active axes	X
Motion and positioning	
Integrated sensor	SGS
Closed-loop travel	2 mm
Closed-loop resolution	0.5 µm
Linearity	5 µm
Repeatability	1 µm
Velocity	2 mm / 0.25 s
Mechanical properties	
Unloaded resonant frequency	750 Hz
Holding force in motion direction	6 N
Drive properties	
Piezoceramics	NEXACT® Piezo stepping drive
Miscellaneous	
Operating temperature range	0 °C to 50 °C
Material	Titanium, non-magnetic
Mass, without cables	28 g
Dimensions	42 mm × 42 mm × 7.4 mm
Cable length	1 m
Sensor / voltage connection	LEMO / HD Sub-D 15-pin (m)
Recommended controller / amplifier	E-861.1S1

Dimensions

Dimensions in mm. Note that the decimal places are separated by a comma in the drawings.

Standard tolerance according to DIN ISO 2768 - f - H

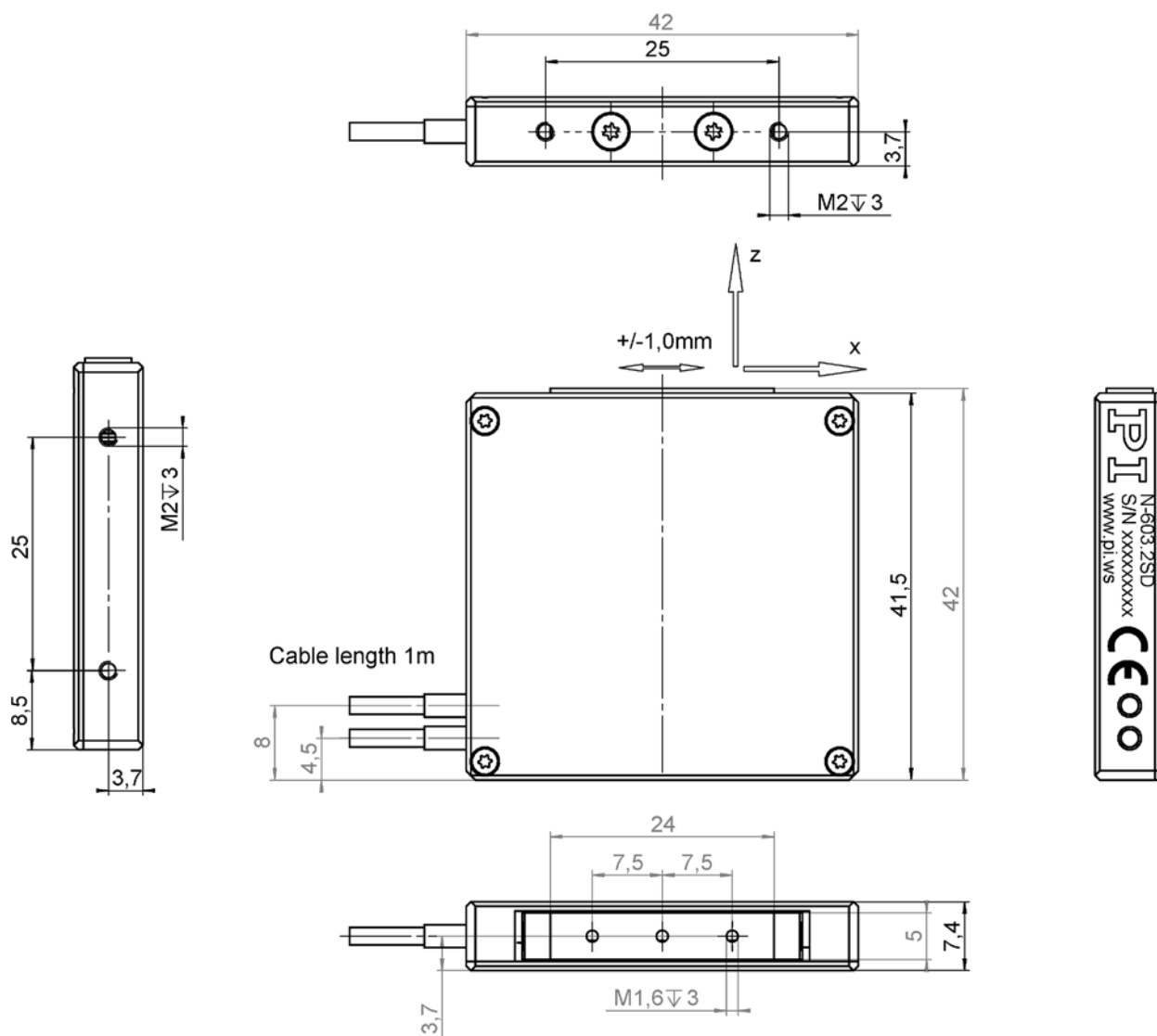


Figure 4: N-603.2SD

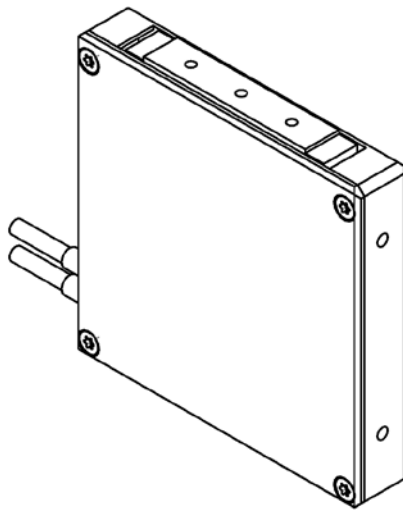


Figure 5: Three-dimensional view of N-603.2SD

Pin Assignment

Motor Connector

Connector type: HD Sub-D 15 (m)

Pin	Signal direction	Function
1	OUT	Piezo 1
2	OUT	Piezo 3
3	int. use	internal use
4	nc	nc
5	nc	nc
6	OUT	Piezo 0
7	OUT	Piezo 2
8	IN	AMP (amplifier enable)*
9	nc	nc
10	nc	nc
11	AGND	Piezo GND
12	AGND	Piezo GND
13	AGND	Piezo GND
14	GND	Digital GND
15	GND	Digital GND



*This pin is connected to GND in the connector shell of the NEXACT® drive to enable the amplifiers. If this connection is removed, all piezo voltages will be zero.

Sensor Connector






Connector type: LEMO FFA.0S.304.CLA32Y male, contact side

Pin	Function
1	V_{ref}
2	Sensor 1 (-)
3	Sensor 2 (+)
4	GND

Maximum Ratings

The N-603.2SD is designed for the following maximum ratings:

Maximum operating voltage	Maximum operating frequency (unloaded) ¹	Maximum power consumption
		
45 V	1500 Hz	20 W

¹) only with nanostepping mode

Ambient Conditions and Classifications

The following ambient conditions and classifications must be observed for the N-603.2SD:

Area of application	For indoor use only
Maximum altitude	2000 m
Air pressure	1100 hPa to 0.1 hPa (corresponds to roughly 825 torr to 0.75 torr)
Relative humidity	Highest relative humidity 80% for temperatures up to 31°C Decreasing linearly to 50% relative humidity at 40°C
Operating temperature	5°C to 50°C
Storage temperature	0°C to 70°C
Transport temperature	-20°C to 70°C
Overvoltage category	II
Protection class	I
Degree of pollution	1
Degree of protection according to IEC 60529	IP20

Old Equipment Disposal

In accordance with the applicable EU law, electrical and electronic equipment may not be disposed of with unsorted municipal wastes in the member states of the EU.

When disposing of your old equipment, observe the international, national and local rules and regulations.

To meet the manufacturer's product responsibility with regard to this product, Physik Instrumente (PI) GmbH & Co. KG ensures environmentally correct disposal of old PI equipment that was first put into circulation after 13 August 2005, free of charge.

If you have old PI equipment, you can send it postage-free to the following address:

Physik Instrumente (PI) GmbH & Co. KG
Auf der Römerstr. 1
D-76228 Karlsruhe, Germany

