



User Manual

N-381.30 NEXACT® LINEAR ACTUATOR

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1 Legal Information



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The patents held by PI can be found in our list at <http://www.physikinstrumente.com/en/about-pi/patents>.

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2 About this Document

2.1 Objective and Target Group

This manual contains the information required for the intended use of the N-381.30 actuator (hereinafter referred to as "piezo actuator").

Basic knowledge of motion control concepts and applicable safety measures is assumed.

2.2 Other Applicable Documents

The devices and software tools that are mentioned in this documentation are described in separate manuals.

Document number	Document type	Product
PZ195E	User Manual	E-712 modular digital piezo controller
PZ205E	User Manual	E-861 PiezoWalk® NEXACT® controller / driver
E861T0013	User Manual	E-861.11C885 NEXACT® controller module
E862T0001	Technical Note	E-862 NEXACT® drive electronics
SM148E	Software Manual	PIMikroMove

The latest versions of the user manuals can be [downloaded \(p. 6\)](#) at www.pi.ws.



2.3 Explanation of Symbols

This chapter explains the symbols and markings used by PI in their user manuals.

2.3.1 Typographic Conventions

Symbol / Label	Meaning
1.	Action consisting of several steps whose sequential order must be observed
2.	
■	List item
p. 5	Cross-reference to page 5
RS-232	Labeling of an operating element on the product (example: socket of the RS-232 interface)
<i>Start > Settings</i>	Menu path in the PC software (example: to open the menu, the <i>Start</i> and <i>Settings</i> menus must be clicked successively)
POS?	Command line or a command from PI's General Command Set (GCS) (example: command to get the axis position)
<i>Device S/N</i>	Parameter name (example: parameter where the serial number is stored)
5	Value that must be entered or selected via the PC software

2.3.2 Symbols Used

Symbol / label	Meaning
	Risk of crushing
	General hazard symbol



DANGER

Dangerous situation

Failure to observe can lead to death or serious injury.

► Measures for avoiding the risk.



WARNING

Dangerous situation

Failure to observe can lead to serious injury.

► Action to take to avoid the risk.



CAUTION

Dangerous situation

Failure to observe can lead to minor injury.

► Actions to take to avoid the risk.

NOTICE



Dangerous situation

Failure to observe can lead to material damage.

► Action to take to avoid the risk.

Information

Additional information on the N-381.30 that can affect your application.

2.4 Figures

For better understandability, the colors, proportions and degree of detail in illustrations can deviate from the actual circumstances. Photographic illustrations may also differ and must not be seen as guaranteed properties.

2.5 Downloading Manuals

The latest versions of the user manuals can be [downloaded \(p. 6\)](#) at www.pi.ws.

For products that are supplied with software (data storage device in the scope of delivery), access to the manuals is protected by a password. Protected content is only displayed on the website after entering the access data. You need the data storage device for the product to get the access data.

If a manual is missing or problems occur with downloading, contact our [customer service department \(p. 23\)](#).

Downloading Manuals

1. Open the website www.pi.ws.
2. If the product was shipped with a data storage device: Log into the website:
 - a) Click **Login**.
 - b) Enter the login data.

The login data is in the *[...]**Releasenews**[...].pdf* in the **Manuals** directory on the data storage device.

If necessary: Follow the link and register yourself to get the login data.
 - c) Click **Login** or press the **Enter** key.
3. Search for the product:
 - a) Click **Search**.
 - b) Enter the product number up to the period (e.g., N-381) or the product family (e.g., NEXACT®) into the search field.
 - c) Click **Start search** or press the **Enter** key.
 - d) If necessary: Click **Load more results** at the bottom of the list.
4. Click the corresponding product in the list of search results.
5. Click the **Downloads** tab.

→ *The manuals are shown under **Documentation**.*
6. Click the desired manual and save it.

3 Safety

3.1 Intended Use

The N-381.30 is a laboratory device as defined by DIN EN 61010-1. It is intended for indoor use and use in an environment that is free of dirt, oil, and lubricants.

In accordance with its design, the N-381.30 is intended for positioning, adjusting and shifting loads in one axis at various velocities. The N-381.30 is **not** intended for applications in areas, in which a failure would present severe risks to human beings or the environment.

The intended use of the N-381.30 is only possible when completely mounted and connected. The N-381.30 must be operated with [suitable electronics \(p. 10\)](#). The electronics are not in the scope of delivery of the N-381.30.

The N-381.30 may not be used for purposes other than those stated in this user manual. The N-381.30 may only be used in compliance with the technical specifications and instructions in this user manual.

3.2 General Safety Instructions

The N-381.30 is built according to state-of-the-art technology and recognized safety standards. Improper use of the N-381.30 may result in personal injury and/or damage to the N-381.30.

- ▶ Use the N-381.30 only for its intended purpose and if it is in perfect condition.
 - ▶ Read the user manual.
 - ▶ Eliminate any faults and malfunctions that are likely to affect safety immediately.
- The operator is responsible for correct installation and operation of the N-381.30.

3.3 Organizational Measures

3.3.1 User Manual

- ▶ Always keep this user manual available with the N-381.30. The latest versions of the user manuals can be [downloaded \(p. 6\)](#) at www.pi.ws.
- ▶ Add all information from the manufacturer such as supplements or technical notes to the user manual.
- ▶ If you give the N-381.30 to a third party, also include this user manual as well as other relevant information provided by the manufacturer.
- ▶ Only use the device on the basis of the complete user manual. Missing information due to an incomplete user manual can result in minor injury and damage to equipment.
- ▶ Only install and operate the N-381.30 after you have read and understood this user manual.

3.3.2 General Personnel Qualification

The N-381.30 may only be installed, started up, operated, maintained, and cleaned by authorized and appropriately qualified personnel.

4 Product Description

4.1 Product Labeling

4.1.1 Type Plate

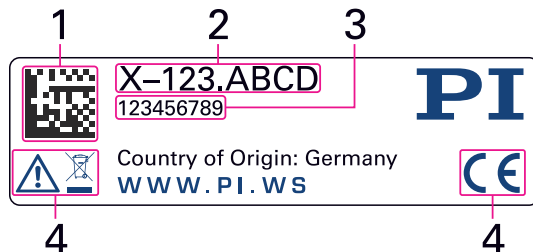


Figure 1: Type plate of the N-381.30

1. Data matrix code (example; contains the serial number)
2. Product number (example)
3. Serial number (example), individual for each N-381.30
Meaning of the position (counting from the left):
1 = internal information,
2 and 3 = year of manufacture,
4 to 9 = consecutive numbers
4. Warning and conformity symbols ([old equipment disposal \(p. 27\)](#), [CE mark \(p. 29\)](#))

4.2 Scope of Delivery

Product number	Description
N-381.30	NEXACTUATOR linear actuator, 30 mm, open loop
MP108EN	User manual for N-381.30

4.3 Overview

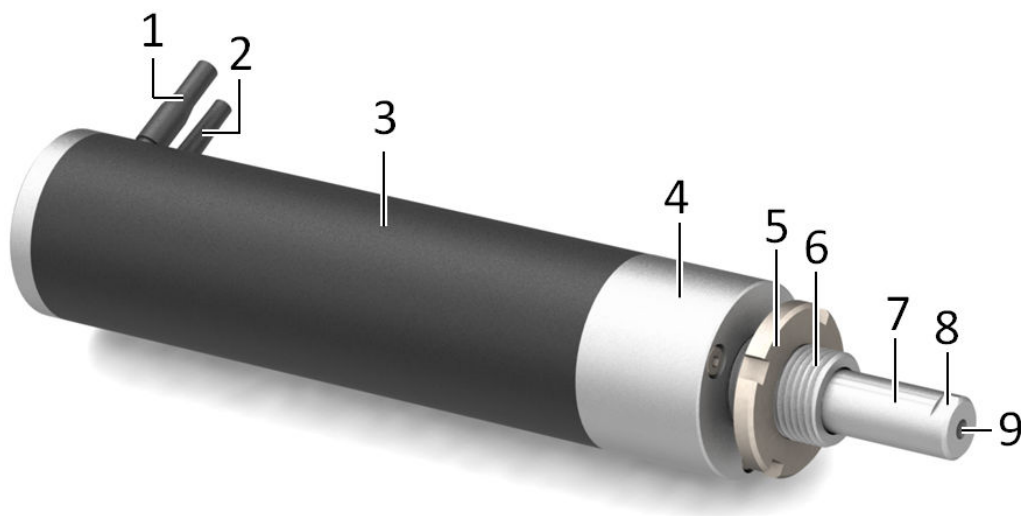


Figure 2: Example product view of the N-381.30

1. Sensor cable (N-381.3A only)
2. Motor cable for supply voltage
3. Carbon sleeve
4. Clamping surface
5. Clamping nut
6. Mounting shaft with M12 thread
7. Extendable pusher, nonrotating
8. Wrench flat for open-end wrench
9. M3 inner thread in the pusher

4.3.1 Motor Connector

The motor connector transmits the supply voltage for the N-381.30's drive.

4.4 Suitable Electronics

The N-381.30 must be connected to suitable electronics that supply the necessary voltage for operating the N-381.30. The following electronics are suitable for operating the N-381.30:

Product number	Description
E-712	Modular, digital piezo controller
E-861	PiezoWalk® NEXACT® controller / driver
E-861.11C885	NEXACT® controller module
E-862	NEXACT® drive electronics

To order, contact our [customer service department \(p. 23\)](#).

5 Unpacking

NOTICE

**Malfunction due to soiling!**

Any type of soiling; e.g., dust, oil, lubricant or condensation, will render the N-381.30 inoperable.

- ▶ Keep the N-381.30 free of dirt and condensation.
- ▶ Keep the N-381.30's drive free of lubricants.

NOTICE

**Damage due to tensile forces on the connecting cables!**

Tensile forces on the connecting cables can damage the N-381.30.

- ▶ Avoid tensile forces on the connecting cables.

NOTICE

**Destruction of the N-381.30 due to mechanical overload!**

Mechanical forces can destroy the N-381.30.

- ▶ Avoid knocks that affect the N-381.30.
- ▶ Do not drop the N-381.30.
- ▶ Do **not** move the N-381.30's pusher by hand.

Unpacking the N-381.30

1. Unpack the N-381.30 with care.
2. Compare the contents with the scope of delivery according to the contract and the delivery note.
3. Inspect the contents for signs of damage. If any parts are damaged or missing, contact our [customer service department \(p. 23\)](#) immediately.
4. Keep all packaging materials in case the product needs to be returned.

6 Installation

6.1 Mounting the N-381.30

You can choose from the following options for installing the N-381.30:

- [Clamping with the M12 nut supplied \(p. 13\)](#)
- [Tightening on the clamping surface \(p. 14\)](#)
- [Screwing the stud into an M12x1 threaded hole \(p. 14\)](#)



CAUTION



Risk of crushing by moving parts!

Risk of minor injuries from crushing between the N-381.30's pusher or the load and a fixed part or obstacle.

- ▶ Use safeguards to protect limbs in areas where they could be caught by moving parts.
- ▶ Maintain the safety distances according to DIN EN ISO 13857 when installing protective structures.

NOTICE



Mechanical overload due to high torques and high loads!

High torques when fixing the load as well as high loads can overload the N-381.30's pusher. Mechanical overload can damage the N-381.30 as well as lead to loss of accuracy.

- ▶ Pay attention to the [torque range \(p. 28\)](#) given for the screws used during installation.
- ▶ Avoid torques >1.1 Nm on the N-381.30's pusher.
- ▶ Do **not** exceed the maximum permissible loads according to the [specifications \(p. 24\)](#).

NOTICE



Damage due to collisions!

Collisions can damage the N-381.30, the load to be moved, and the surroundings.

- ▶ Make sure that collisions are not possible between the N-381.30, the load to be moved, and the surroundings in the motion range of the N-381.30.
- ▶ Do not place any cables or other objects in areas where they could be caught by moving parts.

NOTICE



Damage when moving the pusher by hand!

Moving the N-381.30's pusher by hand can damage the drive.

- ▶ Do **not** move the N-381.30's pusher by hand.
- ▶ Initiate all motion by sending motion commands to the controller.

6.1.1 Clamping the N-381.30 With the Clamping Nut

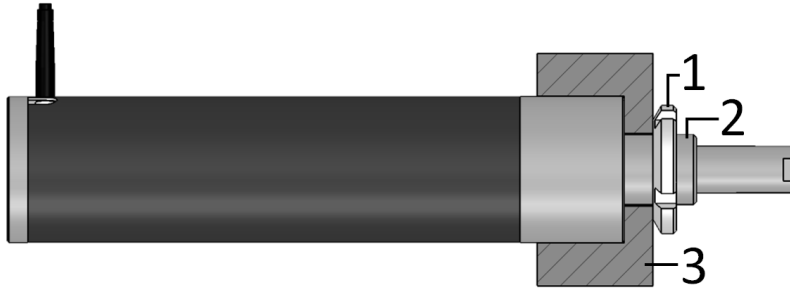


Figure 3: N-381.30 clamped with clamping nut

1. Clamping nut
2. Mounting shaft with M12 thread
3. Mechanical mounting for the actuator

Tools and Accessories

- Hook wrench for M10/M12 slotted nuts with an outer diameter from 25 to 28 mm

Requirements

- ✓ You have read and understood the [general safety instructions \(p. 8\)](#).
- ✓ The N-381.30 is **not** connected to the electronics.
- ✓ You have a suitable mounting with the following properties (see also ["Dimensions" \(p. 26\)](#)):
 - The mounting has a through-hole for the N-381.30's mounting shaft.
 - The N-381.30 and the entire [clamping surface \(p. 9\)](#) can be inserted completely into the mounting (see figure).
 - The mounting has a hard stop for the front side of the N-381.30.

NOTICE



Excessive torque on the clamping nut!

Excessive torque on the clamping nut can damage the N-381.30.

- Do **not** exceed the maximum torque.

Clamping the N-381.30 with the clamping nut

1. Screw the clamping nut completely out of the mounting shaft of N-381.30.
2. Position the N-381.30 in the mounting of your application.
3. Tighten the clamping nut with a torque of 15 to 20 Nm.

6.1.2 Tightening the N-381.30 to the Clamping Surface

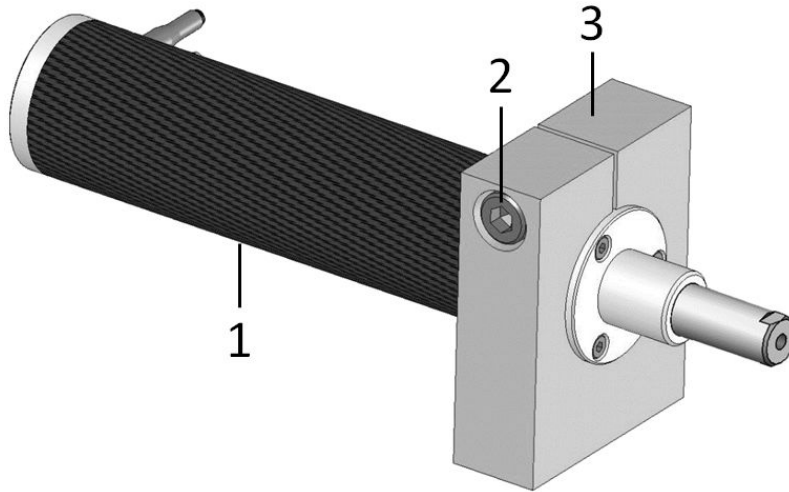


Figure 4: N-381.30 in the clamping mechanism

1. Carbon sleeve: Do **not** clamp here!
2. Clamping screw
3. Clamping mechanism

Tools and Accessories

- If your clamping mechanism has clamping screws: Suitable screwdriver for clamping screw(s)

Requirements

- ✓ You have read and understood the [general safety instructions \(p. 8\)](#).
- ✓ The N-381.30 is **not** connected to the electronics.
- ✓ You have a suitable clamping mechanism for the [clamping surface \(p. 9\)](#) of the N-381.30. For more details, see ["Dimensions" \(p. 26\)](#).

NOTICE



Damage due to incorrect clamping!

Clamping to the carbon sleeve will damage the N-381.30.

- ▶ Clamp the N-381.30 to the metal surface only.
- ▶ Do not overtighten the screw in the clamping mechanism.

Tightening the N-381.30 to the clamping surface

1. Push the N-381.30 far enough into the clamping mechanism so that it is resting on the metal clamping surface.
2. Position the N-381.30 in the clamping mechanism according to your application.
3. Clamp the N-381.30 in the clamping mechanism tightly. If your clamping mechanism has clamping screws, tighten the screw(s) only as much as necessary.

6.1.3 Screwing the N-381.30 into the M12x1 Thread

Requirements

- ✓ You have read and understood the [general safety instructions \(p. 8\)](#).
- ✓ The N-381.30 is **not** connected to the electronics.

- ✓ The M12 hole for mounting the [mounting shaft \(p. 9\)](#) has a minimum thread depth of 12.5 mm.

Screwing the N-381.30 into the M12x1 thread

1. Screw the mounting shaft of the N-381.30 into the threaded hole.

6.2 Fixing the Load

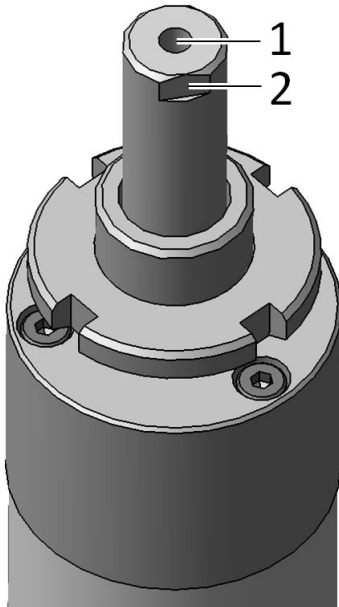


Figure 5: Fixing the load with an M3 screw

1. M3 inner thread in the pusher
2. AF7 wrench flat for open-end wrench

Tools and Accessories

- M3 screw of suitable [length \(p. 26\)](#)
- Screwdriver for M3 screw
- SW7 open-end wrench for fixing the pusher

Requirements

- ✓ You have read and understood the [general safety instructions \(p. 8\)](#).
- ✓ The N-381.30 is **not** connected to the electronics.
- ✓ You have fixed the N-381.30 properly.
- ✓ The distance between the center of gravity of the load and the center of the hole in the pusher is as small as possible in all directions.

NOTICE



Mechanical overload due to high torques and high loads!

High torques when fixing the load as well as high loads can overload the N-381.30's pusher. Mechanical overload can damage the N-381.30 as well as lead to loss of accuracy.

- ▶ Pay attention to the [torque range \(p. 28\)](#) given for the screws used during installation.
- ▶ Avoid torques >1.1 Nm on the N-381.30's pusher.
- ▶ Do **not** exceed the maximum permissible loads according to the [specifications \(p. 24\)](#).

Fixing the Load

1. Use an open-end wrench with a matching jaw size to hold the pusher in place.
2. Fix the load to the mounting hole in the pusher with a suitable screw.
3. Remove the open-end wrench from the pusher.

6.3 Connecting the N-381.30

Tools and Accessories

- If necessary: Suitable screwdriver for the locking screws of the connectors.

Requirements

- ✓ You have read and understood the [general safety instructions \(p. 8\)](#).
- ✓ You have read and understood the user manual for the electronics used.
- ✓ You have installed the electronics properly.
- ✓ The electronics are switched off.

NOTICE**Damage due to incorrect connection of the N-381.30!**

Connecting unsuitable electronics or a wrong cable can damage the N-381.30 or the electronics.

- ▶ Connect the N-381.30 only to [suitable electronics from PI \(p. 10\)](#).
- ▶ Use cables from PI only to connect the N-381.30 to the electronics.

Connecting the N-381.30

1. Connect the N-381.30's voltage connector to the corresponding connector of the electronics.
2. Secure the connectors against unintentional removal.

7 Startup / Operation

7.1 Starting and Operating the N-381.30

Tools and Accessories

- [Electronics from PI \(p. 10\)](#)

Requirements

- ✓ You have read and understood the [general safety instructions \(p. 8\)](#).
- ✓ For startup with a load or in a multi-axis system: You have installed the N-381.30 [properly \(p. 12\)](#).
- ✓ You have read and understood the user manual for the electronics used.
- ✓ If a digital controller is used: You have read and understood the manual for the PC software used.
- ✓ The electronics and if required, the PC software, have been installed (see the user manual for the electronics).



CAUTION



Risk of crushing by moving parts!

Risk of minor injuries from crushing between the N-381.30's pusher or the load and a fixed part or obstacle.

- ▶ Use safeguards to protect limbs in areas where they could be caught by moving parts.
- ▶ Maintain the safety distances according to DIN EN ISO 13857 when installing protective structures.

NOTICE



Destruction of the piezo actuator due to electric flashovers

Using the N-381.30 in environments that increase the electrical conductivity can lead to the destruction of the piezo actuator by electric flashovers. Electric flashovers can be caused by moisture, high humidity, liquids, and conductive materials (e.g., metal dust). In addition, electric flashovers can also occur in certain air pressure ranges due to the increased conductivity of the air.

- ▶ Avoid operating the N-381.30 in environments that can increase the electrical conductivity.
- ▶ Operate the N-381.30 only within the permissible [ambient conditions and classifications \(p. 25\)](#).

NOTICE



Reduced lifetime of the piezo actuator due to permanently applied voltage!

Applying a continuous voltage to piezo actuators leads to a considerable reduction in the lifetime of the piezo ceramic.

- ▶ When the N-381.30 is not being used (e.g., to ensure temperature stability of the electronics), [discharge \(p. 18\)](#) it.
- ▶ If possible, limit the maximum operating voltage during continuous operation.

NOTICE**Operating voltage excessively high or incorrectly connected!**

Operating voltages that are too high or incorrectly connected can cause damage to the N-381.30.

- ▶ Pay attention to the [operating voltage range \(p. 24\)](#), which is specified for the N-381.30.
- ▶ Pay attention to correct [pin assignment \(p. 28\)](#).

NOTICE**Damage due to collisions!**

Collisions can damage the N-381.30, the load to be moved, and the surroundings.

- ▶ Stop the motion immediately if an electronics malfunction occurs.
- ▶ If possible, adapt the travel range limits of your mechanical system in the software that you use for commanding the motion.

NOTICE**Uncontrolled oscillation!**

Oscillation can cause irreparable damage to the N-381.30. Oscillation is indicated by a humming noise and can be caused by the following:

- A change in the load and/or dynamics requires the operating parameters to be adjusted.
- The N-381.30 is operated near to its resonant frequency.
- ▶ If you notice oscillation, stop the N-381.30 immediately.

NOTICE**Unintentional motion!**

The N-381.30 can move unintentionally when connecting the electronics. Defective or incorrect operation of the software can also result in unintentional motion.

- ▶ Do not place any objects in areas where they can be caught by moving parts.
- ▶ Before connecting the N-381.30, check whether a startup macro has been defined in the electronics and if necessary, cancel the selection.

Starting and Operating the N-381.30

1. Start up the electronics (see the user manual for the electronics).
2. Configure the electronics for the N-381.30 during startup:
 - If you are using a digital controller from PI: Select the **DEFAULT_STAGE-N** entry in the positioner database with the PC software.
 - If you are using drive electronics from PI: Configure the electronics according to the instructions in the user manual for the electronics.
3. Start a few motion cycles for testing purposes (see the user manual for the electronics).

7.2 Discharging the N-381.30

The N-381.30 must be discharged in the following cases:

- When the N-381.30 is not in use but the electronics remain switched on to ensure temperature stability
- If the N-381.30 is accidentally disconnected from the electronics during operation

Requirements

- ✓ You have read and understood the [general safety instructions \(p. 8\)](#).

Tools and Accessories

- [Electronics from PI \(p. 10\)](#)

Information

The N-381.30 is driven by NEXACT® piezo actuators. Temperature changes and compressive stress can induce charges in piezo actuators. After disconnection from the electronics, piezo actuators can remain charged for several hours. Touching or short-circuiting the contacts in the N-381.30's motor connector can lead to electric shocks (max. 45 V).

- Discharge the N-381.30 before disconnecting the connector from the electronics.

Discharging a N-381.30 Connected to the Electronics

1. Set the piezo voltage to 0 V on the electronics.

Discharging a N-381.30 not Connected to the Electronics

1. Insert the N-381.30's motor connector into the **switched-off** electronics from PI and maintain the connection for a few seconds.

8 Maintenance

NOTICE

**Damage due to improper maintenance!**

The N-381.30 is maintenance-free. Improper maintenance can result in the failure of the N-381.30.

- ▶ Loosen screws only when instructed in this manual.
- ▶ Do **not** open the N-381.30.

8.1 Cleaning

Requirements

- ✓ You have disconnected the N-381.30 from the electronics.

Auxiliary Materials Required

- Soft, lint-free cloth
- Mild cleaning agent or disinfectant

If you have any questions on the auxiliary materials recommended for the N-381.30, contact our [customer service department \(p. 23\)](#).

NOTICE

**Damage due to unsuitable cleaning agents!**

Some cleaning agents can cause rusting on the N-381.30 or dissolve plastics, paints or adhesives.

- ▶ Do **not** clean with water or acetone.

Cleaning the N-381.30

1. Dampen the cloth with the cleaning agent or disinfectant.
2. Carefully wipe the surfaces of the N-381.30.

9 Troubleshooting

The positioner does not move	
Cable not connected correctly	▶ Check the cable connections.
Unsuitable cable used. If unsuitable cables are used, interference is possible in the signal transmission between the N-381.30 and the electronics.	▶ Only use genuine PI parts for connecting the N-381.30 to the electronics. ▶ If you need extension cables, contact our customer service department (p. 23) .
Defective actuator	▶ If possible, replace the defective actuator with another actuator and test the new combination.
Reduced positioning accuracy	
Excessive load	▶ Do not exceed the maximum permissible loads according to the specifications (p. 24) .
Uncontrolled oscillation	
Large changes to the load or the alignment of the N-381.30	▶ Switch off the electronics immediately. ▶ Check the settings of the operating parameters (see the user manual for the electronics). ▶ If necessary, correct the settings for the operating parameters.
Increased wear	
Moving to the hard stop	▶ Only command target positions that are within the travel range. ▶ Stop the axis in time.
Reduced holding force and feed force	
Ceramic rail of the NEXACT® drive is dirty	▶ Contact our customer service department (p. 23) .

10 Transportation

Preparing the N-381.30 for Transportation

1. Pay attention to the [ambient conditions and classifications \(p. 25\)](#).
2. Pack the N-381.30 in the original packaging.
3. If the N-381.30 is to be sent, use a stable outer box.

11 Customer Service Department

For enquiries and orders, contact your PI representative or send us an [email](#).

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

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

If possible: Take photographs or make videos of your system that can be sent to our customer service department if requested.

Customer service address:

Physik Instrumente (PI) GmbH & Co. KG
Auf der Roemerstrasse 1
76228 Karlsruhe
Germany

service@pi.de
www.pi.de

12 Technical Data

12.1 Specifications

N-381.30	
Active axes	X
Motion and positioning	
Travel range	30 mm
Integrated sensor	-
Sensor resolution	-
Travel range in analog mode, open loop	±5 µm (max.)
Resolution, open loop	0.03 nm*
Resolution, closed loop	-
Max. velocity	10 mm/s**
Mechanical properties	
Max. push/pull force (active)	10 N
Max. holding force (passive)	15 N
Permissible lateral force	10 N (max.)
Drive properties	
Drive type	NEXACT® linear drive
Operating voltage	-10 V to +45 V
Miscellaneous	
Operating temperature range	0 to 50 °C
Material	Chromium steel / CFK
Mass	250 g
Cable length	1.5 m
Motor connector	HD D-sub 15 (m)
Sensor connector	-
Recommended electronics	E-712, E-861, E-861.11C885, E-862

* 1 nm with E-861. depends on the control electronics.


** With E-861. Depends on the control electronics.

All specifications based on room temperature (22 °C ±3 °C).

Ask about customized versions.

12.2 Maximum Ratings

The N-381.30 is designed for the following operating data:

	Maximum operating voltage	Maximum operating frequency	Maximum power consumption
	45 V	1500 Hz	20 W

12.3 Ambient Conditions and Classifications

The following ambient conditions and classifications for the N-381.30 must be observed:

Area of application	For indoor use only
Maximum altitude	2000 m above msl
Air pressure	1100 hPa to 0.1 hPa
Relative humidity	Max. 80 % for temperatures to 31 °C, linearly decreasing to 50 % at 40 °C
Storage temperature	-20 °C to 80 °C
Transport temperature	-25 °C to 80 °C
Supply voltage fluctuations	Max. ± 10 % of the nominal voltage
Overvoltage category	II
Degree of pollution	1
Protection class	I
Degree of protection according to IEC 60529	IP20

12.4 Dimensions

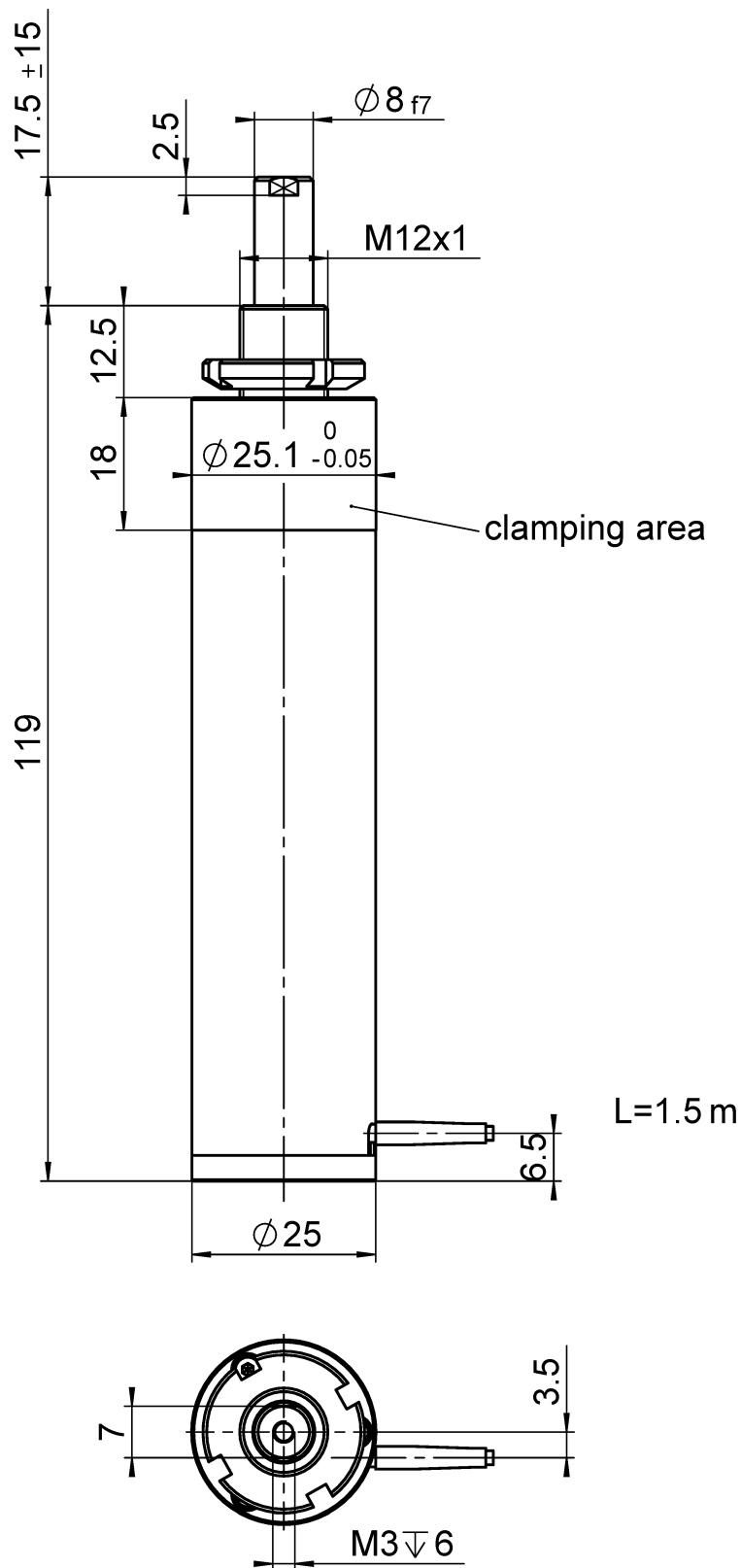


Figure 6: Dimensions of the N-381.30
Dimensions in mm.

13 Old Equipment Disposal

In accordance with EU law, electrical and electronic equipment may not be disposed of in EU member states via the municipal residual waste.

Dispose of your old equipment according to international, national, and local rules and regulations.

In order to fulfil the responsibility as the product manufacturer, PI undertakes environmentally correct disposal of all PI equipment free of charge, if it was made available to the market after August 13, 2005.

Any old PI equipment can be sent free of charge to the following address:

Physik Instrumente (PI) GmbH & Co. KG

Auf der Roemerstrasse 1

76228 Karlsruhe

Germany

info@pi.de

www.pi.de



14 Appendix

14.1 Pin Assignment

14.1.1 Motor Connector



Figure 7: HD D-sub 15 motor connector (m), front view (not the soldering side)

Pin	Signal	Function
1	Piezo 1	Input: Piezo 1 power supply
2	Piezo 3	Input: Piezo 3 power supply
3	NC	Not connected
4	NC	Not connected
5	NC	Not connected
6	Piezo 0	Input: Piezo 0 power supply
7	Piezo 2	Input: Piezo 2 power supply
8	Bridge	Bridge to pin 15
9	NC	Not connected
10	NC	Not connected
11	Piezo GND	Piezo voltage ground
12	Piezo GND	Piezo voltage ground
13	NC	Not connected
14	NC	Not connected
15	Bridge	Bridge to pin 8

The connector shell is connected to the cable shield.

14.2 Torque for Stainless Steel Screws (A2-70)

Screw size	Minimum torque	Maximum torque
M6	4 Nm	6 Nm
M5	2.5 Nm	3.5 Nm
M4	1.5 Nm	2.5 Nm
M3	0.8 Nm	1.1 Nm
M2.5	0.3 Nm	0.4 Nm
M2	0.15 Nm	0.2 Nm
M1.6	0.06 Nm	0.12 Nm

15 EU Declaration of Conformity

An EU Declaration of Conformity was issued for the N-381.30 in accordance with the following European directives:

- EMC Directive

- RoHS Directive

The applied standards certifying the conformity are listed below.

- EMC: EN 61326-1

- Safety: EN 61010-1

- RoHS: EN 50581