



Tool Measurement



Hardwired



Linear Working Principle



Wear-Free Measuring System



Tool Breakage Detection



Tool Length Measurement



Axes Compensation

Operating instructions

English

Type

Z-Nano

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The language version of the manufacturer (DE/EN) is decisive for the technical content.

Subject to technical change without notice.

Original operating instructions

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Article number of this documentation: 180275_EN

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1. Introduction

Please read and observe the notes included in these instructions.
Subject to technical change without any notice.

1.1 Keys



CAUTION!

signifies a danger, which may cause injuries, if it is not avoided.

NOTICE

signifies measures to avoid material damages.



Advice for secondary literature



Additional advice



Don't use compressed air for this step.



The CE-label confirms, that the product as described complies with the product-specific European regulations.



green



red

1.2 Further applicable documents



Control-specific connection diagrams

These are available at Blum-Novotest.

1.3 Abbreviations

M_d tightening torque

U_B operating voltage

HP high precision

2. Safety



CAUTION!

Damages of the measuring system due to misuse are possible.

- ▶ Handle the measuring system like a precision tool.
 - ▶ Keep the measuring system clean.
 - ▶ Limit the measuring block over travel by programming, see chapter 6..
 - ▶ Read and observe all notes of the machine tool manufacturer. Do not disable safety interlockings.
-

NOTICE

Damage of the measuring system by a short circuit is possible

Aggressive liquids may destroy seals.

- ▶ Do not operate the measuring system in a working environment with aggressive coolants! Coolants must not contain aggressive contents, that can damage plastics or rubber parts (e.g.: acetone, alcohol, ethanol, methanol, cleaning benzine, solvents, ...).
 - ▶ Coolants may not exceed a ph-level of 9.5.
 - ▶ Please contact us if you have any questions! We also have solutions for special applications.
-

3. System overview

3.1 Description

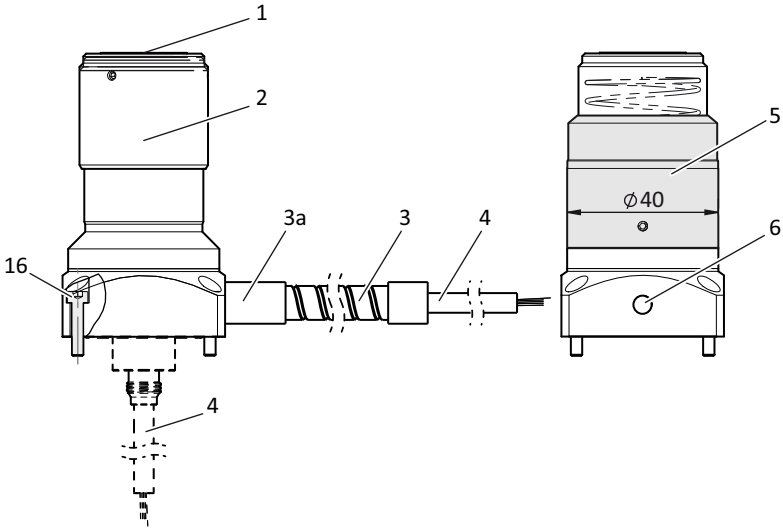




Fig. 3-1

- (1) Measuring surface
- (2) Protection hood
- (3) Spiral hose
- (3a) Hose nut
- (4) Cable
- (5) Chip protection (option)
- (6) LED
- (16) DIN EN ISO 4762 - M3 x 14 (DIN 912)

3.2 Display elements

Colour	LED (6)
	Standby
	Probe initial position
	Probe deflected

Tab. 3-1

3.3 Dimensions

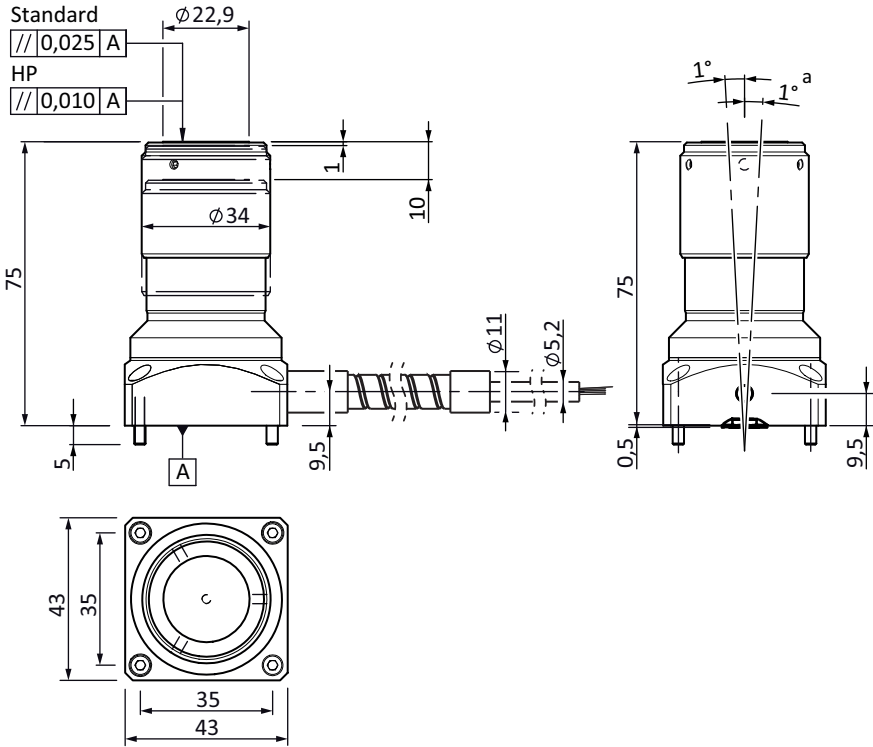


Fig. 3-2

^a adjustment range X/Y

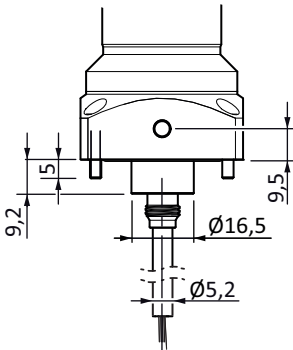


Fig. 3-3

3.4 Technical data

Protection class:	IP68
Power supply	U _B : 12-30 V stabilized direct voltage / 100 mA
Outputs	12-30 V / 50 mA
Approach direction	-Z
Measuring force ^a	
• vertical mounting:	2.2 N
• horizontal mounting:	3.0 N
Max. stroke	10 mm
Trigger point	1 mm
Repeatability	
• Standard	0.5 μm 2σ
• HP	0.2 μm 2σ
Max. probing speed	2 m/min
Min. tool diameter ^b	> 0,1 mm
• with chip protection	0.2 mm
Mass, incl. cable 10 m	700 g
Min. bending radius cable	
• static	26 mm
• flexible	60 mm
Storage temperature	-20 °C ... +70 °C
Operating temperature	+10 °C ... +50 °C

^a Measuring force with chip protection: see chap. 4.3

^b Depending on geometry and material of tool, Probing force must not result in damage of tool.

Tab. 3-2

4. Mounting and commissioning



CAUTION!

Physical injuries and material damages of the components caused by voltage

- ▶ Make sure that the components are volt-free during installation work.
-



CAUTION!

Physical injuries and material damages caused by compressed air

- ▶ Make sure that the components are depressurised during installation work.
 - ▶ Avoid visual and skin contact with air blow.
-

NOTICE

Damages caused by improper installation/dismounting

- ▶ Use original replacement parts only as well as the provided special tools.
 - ▶ Pay attention to the correct orientation of the interlocking disk (inscription pointing to the stylus).
 - ▶ Consider the maximum tightening torque.
-

4.1 Mounting variants

4.1.1 Mounting variant with cable (outgoing) on side

NOTICE

Damage to measuring system by lacking cable fixation possible.

- ▶ Fix the spiral hose with a pipe clamp as close as possible on the device.
- ▶ Observe the minimum bending radius, see chap. 3.4.

NOTICE

If the cable is layed flexibly:

- ▶ Provide sufficient strain relief.
- ▶ Limit the movable part of the spiral hose by pipe clamps.

To change or remove the spiral hose **before mounting of the tool setting probe**, bring the hose nut (3a) on slight strain and turn it counter clockwise.

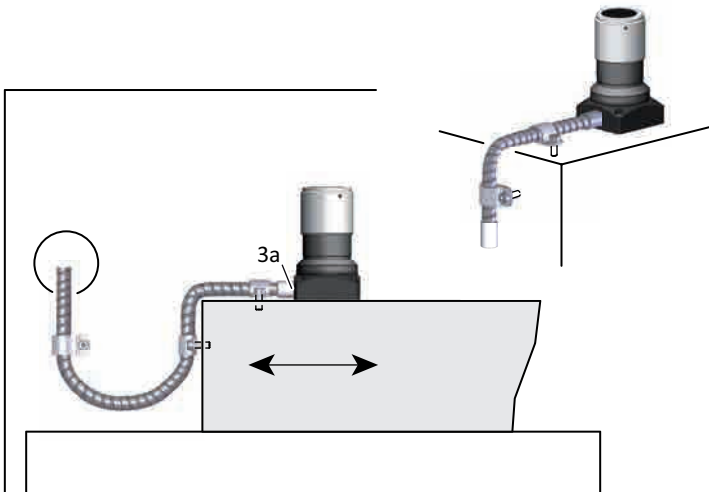


Fig. 4-1

(3a) Hose nut

4.1.2 Mounting variant with cable (outgoing) downward

NOTICE

Damage to measuring system by lacking cable fixation possible.

- ▶ Provide sufficient strain relief.
- ▶ Observe the minimum bending radius, see chap. 3.4.

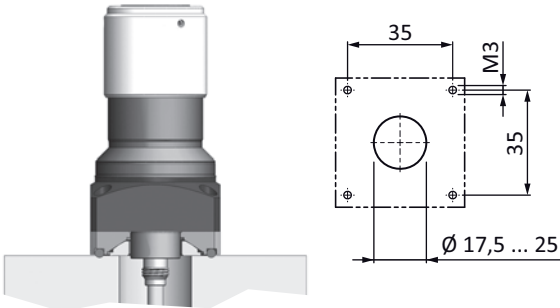


Fig. 4-2 Adjustment unit (order number 145808)

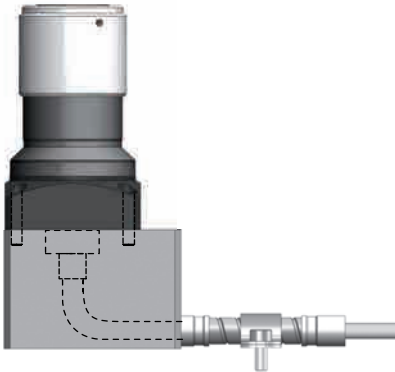


Fig. 4-3 Mounting system (option)

4.1.3 Mounting variant with chip protection

NOTICE

Influence on reliability of probing possible.

► Please ensure that the drainage bore is downwards.

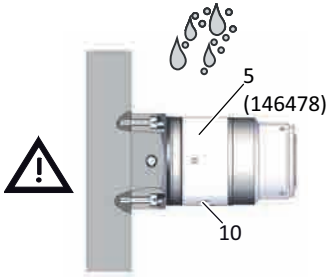


Fig. 4-4

(5) Chip protection

(10) Drainage bore

4.1.4 Mounting variant with nozzle



Installation instruction of mounting system | nozzle

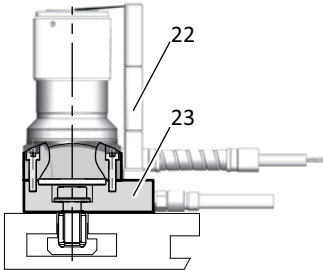


Fig. 4-5

(22) Nozzle

(23) Mounting socket

4.2 Adjustment of probe

4.2.1 Cable (outgoing) on side

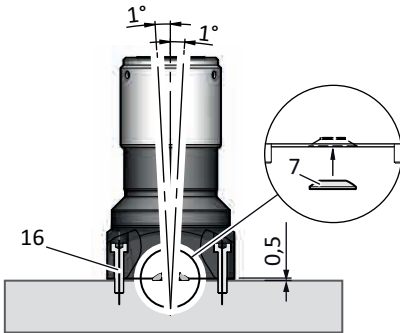


Fig. 4-6

(7) Rounded washer

(16) DIN EN ISO 4762 - M3 x 14 (DIN 912)

Adjustment possibility with rounded washer, in order to compensate possible angle errors of the installation.

1. Insert the rounded washer into the recess of the bottom of the housing.
2. Adjust the probe by reciprocal loosening and tightening of the diagonally opposite hexagon screws ($M_d = 1.1 \text{ Nm}$).

4.2.2 Cable (outgoing) downward



Installation instruction of mounting system | nozzle

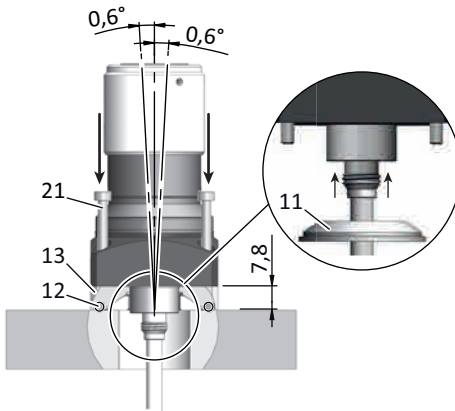


Fig. 4-7 Adjustment unit (order number 145808)

(11) Rounded washer for probe with downwards facing cable

(13) Adjusting washer for probe with downwards facing cable

(12) O-ring

(21) DIN EN ISO 4762 - M3 x 20 (DIN 912)

Adjustment possibility with rounded washer, in order to compensate possible angle errors of the installation.

1. Insert the rounded washer into the recess of the bottom of the adjusting washer.
2. Make sure that the O-ring is inserted and without any damage.
3. Adjust the probe by reciprocal loosening and tightening of the diagonally opposite hexagon screws ($M_d = 1.1 \text{ Nm}$).

4.3 Mounting of the chip protection

NOTICE

Damages of the measuring system due to distortion of the protection hood

► Loosen all setscrews before demounting the protection hood.

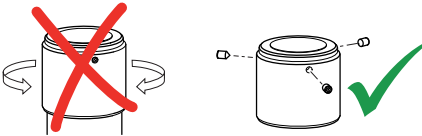


Fig. 4-8

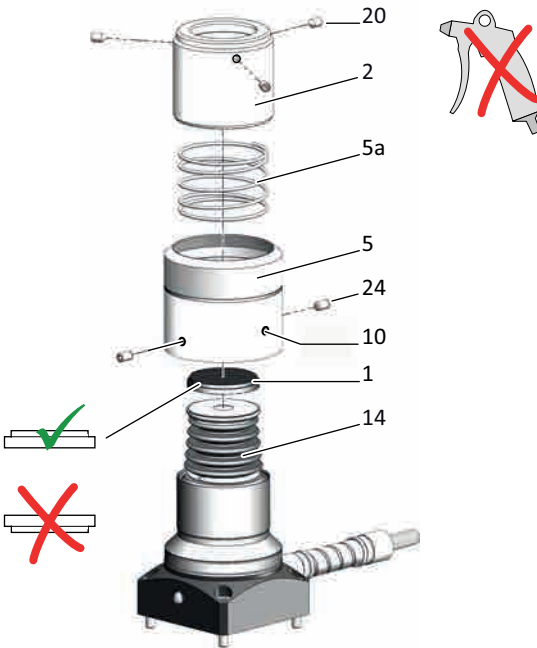


Fig. 4-9

- | | |
|-----------------------|-------------------------------------|
| (1) Measuring surface | (10) Drainage bore |
| (2) Protection hood | (14) Bellows |
| (5) Chip protection | (20) DIN EN ISO 4027 - M3 (DIN 914) |
| (5a) Auxiliary spring | (24) DIN EN ISO 4026 - M3 (DIN 913) |

1. Loosen the setscrews with minimum 4 revolutions and remove the protection hood.
2. Push the chip protection onto the probe housing and fix it with the setscrews ($M_d = 0.3 \text{ Nm}$).
Please pay attention to the position of the drainage bore, see chapter 4.1.3.
3. In case of heavy material pollution and therefore, to ensure the functionality, please insert the auxiliary spring centrically into the probe housing, if necessary.
Observe the correct mounting direction of the measuring surface, see chap. 7.1.
4. Put on the protection hood and clamp with the setscrews ($M_d = 0.3 \text{ Nm}$).
5. Check the tool setting probe after assembly concerning parallelism, i.e. the probe may not clamp on operation.

Measuring force with chip protection:	without spring	with spring (5a)
vertical mounting:	2.4 N	5.4 N
horizontal mounting:	3.2 N	6.2 N

Tab. 4-1

5. Electrical connection

NOTICE

Damage and malfunction of the measuring system is possible caused by faulty cable mounting

- ▶ Connect or disconnect connecting cables or plug connections without power supply only.
- ▶ Observe fail-safe cable laying according to the regulations for measuring system cables.
- ▶ Connect the cable shielding on the control side with the machine earth. At adapter connections the shielding must be directed over the plug housing and the complete plug connection must be mounted isolated.
- ▶ Observe intactness of gasket and adjusting groove of plug connector.
- ▶ Tighten the plug connector firmly ($M_d = 2.0 \dots 2.5 \text{ Nm}$).

NOTICE

Damage to the measuring system by short circuit possible.

The outputs cannot be connected in parallel!

- ▶ Connect each individual wire to its own terminal.

NOTICE

Damages of the measuring system by chips are possible.

- ▶ Never install cables and wires without protection in the working area.
- ▶ Protect cables and wires in the working area against flying chips, e.g. by protection hose, protection spring, cover, etc.

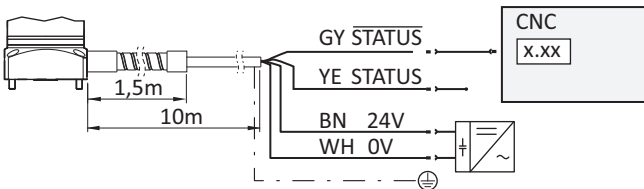


Fig. 5-1

Colour / Pin	Connection	Designation	Data
white	GND	Ground	0 V
brown	U_B	Power supply	12 ... 30 V (stabilized) / 100 mA
yellow	STATUS	Output static	12 ... 30 V / 50 mA
grey	STATUS	Output static	12 ... 30 V / 50 mA
Housing	---	Shielding	

Tab. 5-1

5.1 Output signals

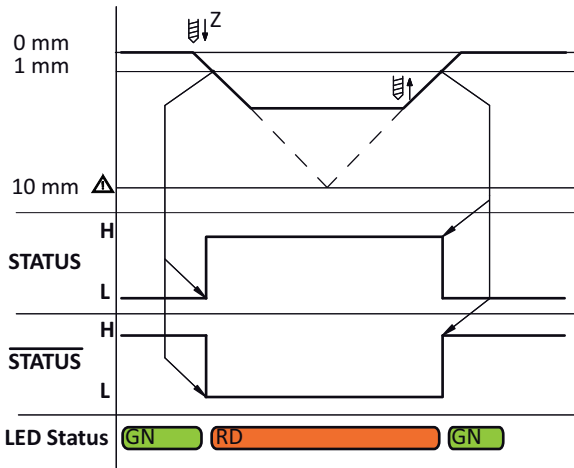


Fig. 5-2

6. Notes concerning measuring sequence

NOTICE

The measuring system could be damaged by collision.

- ▶ Limit measuring block overtravel by programming: Z: < 9 mm
-

NOTICE

Measuring error is possible.

- ▶ Observe max. feedrate of the machine manufacturer.
 - ▶ Execute calibration and tool measurement at the same constant feedrate.
-

7. Maintenance

NOTICE

Damages of the measuring system due to distortion of the protection hood

- ▶ Loosen all setscrews before demounting the protection hood.

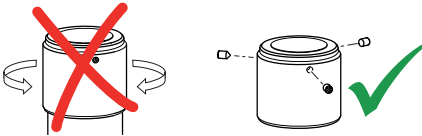


Fig. 7-1

- The probe is at low maintenance.
- Check the bellows on damages and clean it regularly and carefully with a brush.
- Depending on application conditions lubricate the measuring surface occasionally, e.g. with multi-function oil WD40.
- Check the probe after assembly concerning parallelism.

7.1 Change of the measuring surface

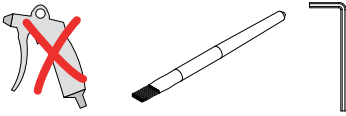
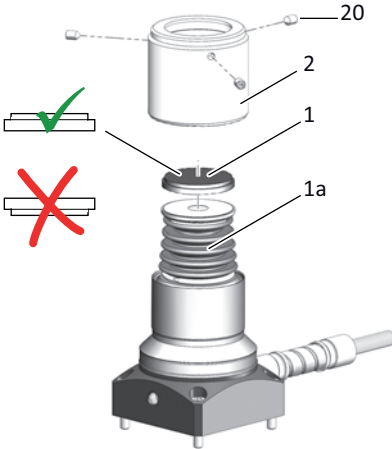


Fig. 7-2



(1) Measuring surface

(2) Protection hood

(1a) Measuring surface reception

(20) DIN EN ISO 4027 - M3 (DIN 914)

Exchange the measuring surface with traces of heavy use or wear.

1. Loosen the setscrews with minimum 4 revolutions and remove the protection hood.
2. Clean the measuring surface and the measuring surface reception.
Insert the measuring surface in the centre of the measuring surface reception. Observe the correct mounting direction of the measuring surface.
3. Put on the protection hood and clamp with the 3 setscrews ($M_d = 0.3 \text{ Nm}$).
4. Check the tool setting probe after assembly concerning parallelism, i.e. the probe may not clamp on operation.

For systems with chip protection see the differing description acc. to Fig. 7-4.

7.2 Cleaning of tool setting probe

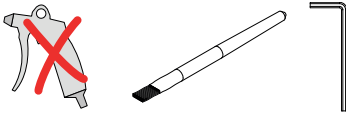
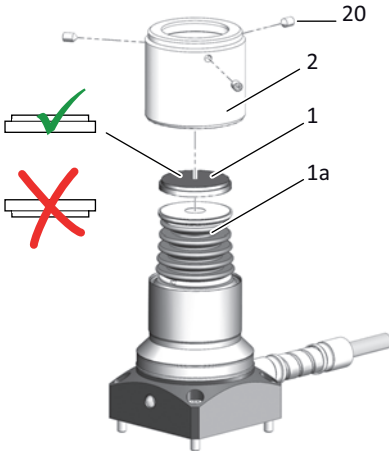


Fig. 7-3



(1) Measuring surface

(2) Protection hood

(1a) Measuring surface reception

(20) DIN EN ISO 4027 - M3 (DIN 914)

Cleaning of tool setting probe (system without chip protection):

1. Loosen the setscrews with minimum 4 revolutions and remove the protection hood.
2. Clean all parts with a brush and check the bellows for damages.
3. Put on the protection hood and clamp with the setscrews.
4. Check the tool setting probe after assembly concerning parallelism, i.e. the probe may not clamp on operation.

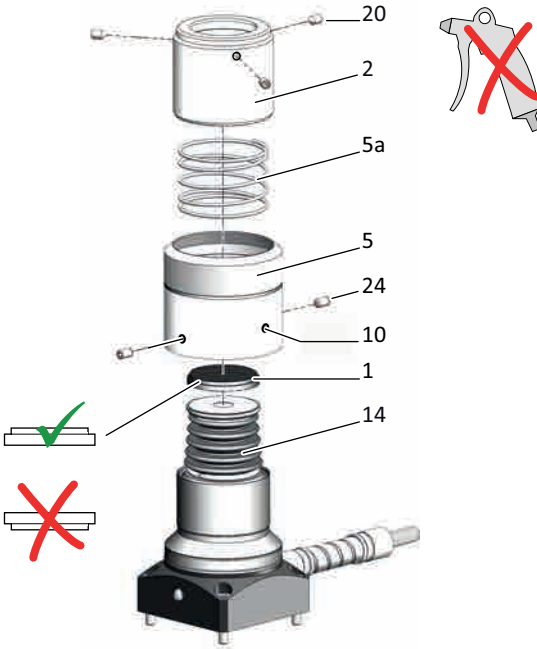


Fig. 7-4







- | | |
|-----------------------|-------------------------------------|
| (1) Measuring surface | (10) Drainage bore |
| (2) Protection hood | (14) Bellows |
| (5) Chip protection | (20) DIN EN ISO 4027 - M3 (DIN 914) |
| (5a) Auxiliary spring | (24) DIN EN ISO 4026 - M3 (DIN 913) |

Cleaning of tool setting probe (system with chip protection):

1. Loosen the setscrews with minimum 4 revolutions and remove the protection hood and, if necessary, the auxiliary spring.
2. Loosen the setscrews on the chip protection and remove it.
3. Clean all parts with a brush.
4. Push the chip protection onto the probe housing and fix it with the setscrews ($M_d = 0.3 \text{ Nm}$).
Please pay attention to the position of the drainage bore, see chapter 4.1.3.
5. If required, insert the auxiliary spring centrally into the probing housing.
6. Put on the protection hood and clamp with the setscrews ($M_d = 0.3 \text{ Nm}$).
7. Check the tool setting probe after assembly concerning parallelism, i.e. the probe may not clamp on operation.






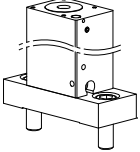



8. Troubleshooting

Keys

Error	= Error message
	= Error description
	= Check the following points
	= Remedy / Workaround
Error	Probe deflected
	Probe doesn't reach rest position after deflection
	Setscrews on protection ring resp. chip protection are tightened too much Check setscrews
	Setscrews: pay attention to tightening torque (~ 0.3 Nm)

9. Order numbers

Use original parts and accessories by Blum-Novotest only.

Tool setting probe Z-Nano Connecting mode -1	145793	
Tool setting probe Z-Nano Connecting mode -1	145803	
Chip protection for probe	146478	
Mounting socket (nozzle can be mounted) for cable on the side	145979, h = 14 mm	
Mounting socket (nozzle can be mounted) for cable on the side and down- wards facing cable	145981, h = 40 mm 145983, h = 60 mm 145985, h = 125 mm 145987, h = 150 mm 145989, h = 200 mm	
Mounting socket (nozzle can be mounted) for cable on the side and down- wards facing cable	145991, h = 250 mm	
Adjusting unit for probe with down- wards facing cable	145808	
Spare and wear parts		
Spare and wear parts are not subject to warranty.		
Measuring surface plasma nitrided (Standard)	145823	
Measuring surface carbide	145824	

10. Shipping instructions / storage

NOTICE

- ▶ If you return the measuring system for repair, please enclose a detailed error description.
- ▶ The measuring system has to be returned in the original packing only.
- ▶ The packing is not allowed to deflect the measuring system.
- ▶ The measuring system should be packed shock and pollution protected.

Service order

Please complete this repair order answering all questions in detail and attach it to the system. It will be more cost effective for both parties if we have all the information and will ensure a prompt repair service.

Blum-Novotest GmbH

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Company:	
Department:	
Contact:	
Address:	
Phone:	
Fax:	
Email:	
Measuring system type, serial No.:	
Machine type, manufacturer:	
Description of defect:	

11. EC Declaration of Incorporation

acc. to the EC Machine Regulations 2006/42/EC in the edition from 17 May.2006

We hereby confirm that the subsequently following components are defined for the installation into other machines and that they are in accordance with the following safety requirements of the EC regulations.

Commissioning is not allowed until it is ascertained that the machines, in which the components are installed, are in accordance with the EC regulations 2006/42/EC.

The relevant technical information is compiled acc. to annex VII part B and, where appropriate, we will send the information concerning the components to the different countries. The industrial property rights of Blum-Novotest GmbH will remain unaffected.

Component name	Z-Nano Probes for tool measurement
Safety requirements 2006/42/EC, Annex I	1.5.1
Applied standards:	
EC-Regulations:	2014/30/EU 2014/35/EU
Applied harmonized standards:	EN 61000-6 EN 60204-1 EN ISO 12100
Applied national standards:	DIN VDE 0100 DIN VDE 0113
Authorised representative for technical information:	Blum-Novotest GmbH Kaufstr. 14 88287 Gruenkraut, Germany

12. Service

BLUM

focus on productivity

Headquarters:

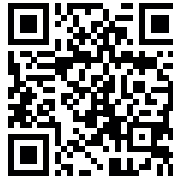
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