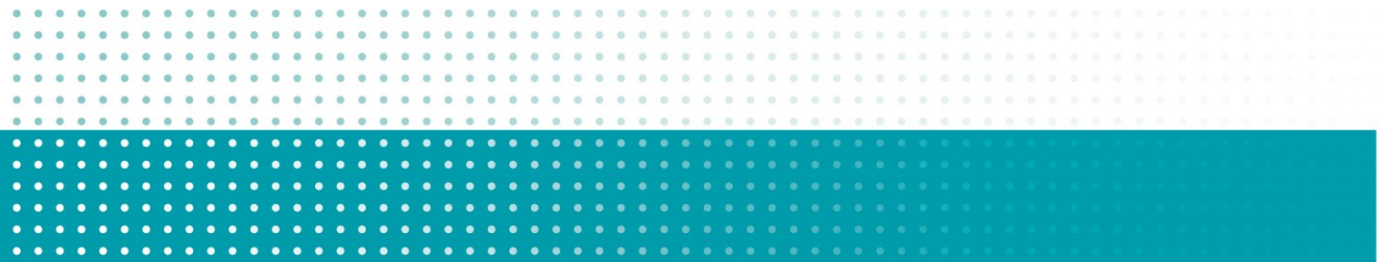


It simply works!



Troubleshooting Manual

BK Mikro9

Tool and Object Monitoring System
Protection against Follow-up Problems
in the Process of Production

Version 1.00

Aug. 27, 2018

General Notice

Safety guidelines

This document contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger.



Symbol with signal word: **Danger**

Immediate danger to life and limb of personnel and others.

Non-compliance will cause death or serious (crippling) injury.



Symbol with signal word: **Warning**

Hazardous situation to life and limb of personnel and others.

Non-compliance may cause death or serious injury.



Symbol with signal word: **Caution**

Potentially hazardous situation

Non-compliance may cause slight injury;
possible damage to property.

Notes on correct handling



Non-compliance may cause damage to the product and/or to parts/items in the vicinity.

Important information about the product, the handling of the product, or the part of the documentation onto which is supposed to be made especially attentive.



Environmental protection

Non-compliance may have an impact on the environment.

Intended use

Warning:

The products of Schubert System Elektronik GmbH may only be used for the applications described in the technical documents, and only in connection with devices or components from other manufacturers which have been approved or recommended by us.



Start-up must not take place until it is established that the machine which is to accommodate this component conforms to the guideline 2006/42/EC.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Qualification of personnel

Only qualified personnel may carry out the following activities on the products: installation, commissioning, operation, maintenance.

Qualified persons in accordance with the safety guidelines are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Disclaimer of liability

We have checked the contents of this document for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

Areas of use

Products of Schubert System Elektronik GmbH meet the applicable, harmonized, European standards for the respective area of applications.

Warranty

For the devices of Schubert System Elektronik GmbH, the agreements determined in the General Terms and Conditions (AGB) are valid.

Fitting conditions

The fitting conditions and safety notes in the submitted document must be adhered to when commissioning and operating the products.

Trade names and/or trademarks

All hardware and software names are trade names and/or trademarks of the respective manufacturer.

Copyright

Every user documentation is intended for the operator and the operator's personnel only. The transmission and reproduction of this document and the exploitation and communication of its contents are not allowed without express authority.

Offenders will be liable for damages.

ESD (Electrostatic discharge)



All modules and components are electrostatically sensitive.

The ESD notes are absolutely to be observed.

The adjacent symbol indicates the use of electrostatically sensitive modules.

Avoid touching electrostatically sensitive components (e.g. connector pins).

Discharge your body electrostatically before touching the device (e.g. by contacting a grounded metallic object).

EU Declaration of Conformity



The product of Schubert System Elektronik GmbH complies with EMC directive 2104/30/EU and RoHS directive 2011/65/EU.

The assessment of the requirements is based on the standards listed therein.

The EU declaration of conformity and the related documentation will be maintained in accordance with the directives at:

Schubert System Elektronik GmbH
take-off Gewerbepark 36
78579 Neuhausen ob Eck
Germany

Restriction of Hazardous Substances (RoHS) Compliance

RoHS-compliant

All products of the BK Mikro9 series are Pb-free / RoHS compliant referred to EU directive 2011/65/EU.

Standard(s) for Safety



The BK Mikro9 series is UL listed.

UL 508 - Standard for Industrial Control Equipment C22.2. No. 142-M1987
- Standard for Process Control

Note

This BK Mikro9 Troubleshooting Manual describes the procedure for errors occurring in the following system:

■ BK Mikro9

Please read the Troubleshooting Manual, and keep it carefully for the later use.

It is written for customers with prior knowledge in PC technology and automation.

Purpose



This Troubleshooting Manual is part of the Technical Documentation of the Tool and Object Monitoring System BK Mikro9. It provides service personnel and system advisors with the information required to install, commission, operate and maintain the system.

BK Mikro9

Troubleshooting Manual

Material no. 68 36 338

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1 General

This manual contains information about various error indications with the tool breakage control BK Mikro9 and is intended as an aid for independent troubleshooting.

If the following points are observed, errors caused, for example, by incorrect installation, incorrect alignment of the scanner or incorrect parameter settings, can be eliminated.

2 Error messages

2.1 General errors

2.1.1 Reference error, no Home Position found

Error description:

Error during referencing:

The "Home Position" could not be found.

Possible error causes	Corrective actions
Stop position not available	Check stop position.
Stop position dirty	Clean stop position if necessary. see "Cleaning of a dirty stop position" in chapter 3
Scanner heavily soiled	Clean scanner if necessary. see "Cleaning of a dirty scanner" in chapter 3
Wand jammed or external object in the swivelling range	Check wand for free movement. The wand must not come into contact with any external machine part or object in the swivelling range. The wand must be able to swivel freely. High accumulation of chips can also restrict the rotary movement.
Wand holder not firmly fixed to the scanner axis	Check mounting of the wand holder. Check tightening torques of the bolts. The tightening torques of the bolts of the wand holder can be found in the "Scanner Installation Manual".
Compressed air or coolant jet impacts the wand directly	Deflect the compressed air or coolant jet from the wand. see "Compressed air & coolant jet" in chapter 3
Wand holder grinds on the scanner case	Adjust the gap between scanner case and wand holder correctly. The correct gap dimension can be found in the "Scanner Installation Manual".
Balance weight of the wand not appropriate (only for wands including balance weight)	The balance weight and the wand must be in balance. The check of the balance weight is described in the "Scanner Installation Manual".
Wand and selected parameter setting not compatible	Select compatible scanner parameter setting. The assignment of the parameter settings for the respective wands can be found in the "Fieldbus Manual".
Scanner defective	Replace scanner.

2.1.2 Minimum teach angle not reached

Error description:

The minimum angle value to be achieved could not be reached.

Possible error causes	Corrective actions
Wand jammed or external object in the swivelling range	Check wand for free movement. The wand must not come into contact with any external machine part or object in the swivelling range. The wand must be able to swivel freely. High accumulation of chips can also restrict the rotary movement.
Balance weight of the wand not appropriate (only for wands including balance weight)	The balance weight and the wand must be in balance. The check of the balance weight is described in the "Scanner Installation Manual".
Scanner heavily soiled	Clean scanner if necessary. see "Cleaning of a dirty scanner" in chapter 3
Compressed air or coolant jet impacts the wand directly	Deflect the compressed air or coolant jet from the wand. see "Compressed air & coolant jet" in chapter 3
Wand holder grinds on the scanner case	Adjust the gap between scanner case and wand holder correctly. The correct gap dimension can be found in the "Scanner Installation Manual".
Wand and selected parameter setting not compatible	Select compatible scanner parameter setting. The assignment of the parameter settings for the respective wands can be found in the "Field Bus Manual".

2.1.3 Teach without a tool/object

Error description:

No tool or object could be detected during the 'Teach' process.

Possible error causes	Corrective actions
Tool broken	Insert intact tool.
Tool not present	Move the tool to the scanning position.
'Teach Limit' not set correctly	Increase the 'Teach Limit' parameter.
Wand holder not firmly fixed to the scanner axis	Check mounting of the wand holder. Check tightening torques of the bolts. The tightening torques of the bolts of the wand holder can be found in the "Scanner Installation Manual".

2.1.4 Stop before tool

Error description:

An object has been detected before the specified position.

Possible error causes	Corrective actions
Tool / object not taught-in correctly or wrong tool selected	Remove tool or put correct tool in scanning position.
Wand jammed or external object in the swivelling range	<p>Check wand for free movement.</p> <p>The wand must not come into contact with any external machine part or object in the swivelling range.</p> <p>The wand must be able to swivel freely.</p> <p>High accumulation of chips can also restrict the rotary movement.</p>
Compressed air or coolant jet impacts the wand directly	Deflect the compressed air or coolant jet from the wand. see "Compressed air & coolant jet" in chapter 3
Increased scanner inaccuracy due to incorrect balance weight (only for wands including balance weight)	<p>The balance weight and the wand must be in balance.</p> <p>The check of the balance weight is described in the "Scanner Installation Manual".</p>
Increased scanner inaccuracy due to not correctly tightened wand holder (wand holder slips on the scanner axis)	<p>Check mounting of the wand holder.</p> <p>Check tightening torques of the bolts.</p> <p>The tightening torques of the bolts of the wand holder can be found in the "Scanner Installation Manual".</p>
Wand and selected parameter setting not compatible (resulting in increased scanner inaccuracy)	<p>Select compatible scanner parameter setting.</p> <p>The assignment of the parameter settings for the respective wands can be found in the "Field Bus Manual".</p>
Increased scanner inaccuracy due to incorrectly aligned wand	<p>The wand must strike the tool cleanly.</p> <p>The repeat accuracy of the scanner can be impaired if the tool is not struck correctly.</p> <p>The correct alignment of the wand can be found in the "Scanner Installation Manual".</p>
Stop position dirty, resulting in increased scanner inaccuracy (reference run incorrect measurement)	<p>Clean stop position if necessary.</p> <p>see "Cleaning of a dirty stop position" in chapter 3</p>
Scanner heavily soiled, resulting in increased scanner inaccuracy (reference run incorrect measurement)	<p>Clean scanner if necessary.</p> <p>see "Cleaning of a dirty scanner" in chapter 3</p>
Tolerance set too small	Increase tolerance.

2.1.5 No object at set position

Error description:

No object can be detected on the specified position.

Possible error causes	Corrective actions
Tool broken / object not present	Insert intact tool.
Increased scanner inaccuracy due to incorrect balance weight (only for wands including balance weight)	The balance weight and the wand must be in balance. The check of the balance weight is described in the "Scanner Installation Manual".
Increased scanner inaccuracy due to not correctly tightened wand holder (wand holder slips on the scanner axis)	Check mounting of the wand holder. Check tightening torques of the bolts. The tightening torques of the bolts of the wand holder can be found in the "Scanner Installation Manual".
Wand and selected parameter setting not compatible (resulting in increased scanner inaccuracy)	Select compatible scanner parameter setting. The assignment of the parameter settings for the respective wands can be found in the "Fieldbus Manual".
Increased scanner inaccuracy due to incorrectly aligned wand	The wand must strike the tool cleanly. The repeat accuracy of the scanner can be impaired if the tool is not struck correctly. The correct alignment of the wand can be found in the "Scanner Installation Manual".
Stop position dirty, resulting in increased scanner inaccuracy (reference run incorrect measurement)	Clean stop position if necessary see "Cleaning of a dirty stop position" in chapter 3
Scanner heavily soiled, resulting in increased scanner inaccuracy (reference run incorrect measurement)	Clean scanner if necessary. see "Cleaning of a dirty scanner" in chapter 3
Tolerance set too small	Increase tolerance.

2.1.6 Preposition not reached

Error description:

The position for the 'PrePos' function could not be reached.

Possible error causes	Corrective actions
Incorrect specified position	Correct specified position.
Wand jammed or external object in the swivelling range	Check wand for free movement. The wand must not come into contact with any external machine part or object in the swivelling range. The wand must be able to swivel freely. High accumulation of chips can also restrict the rotary movement.
Compressed air or coolant jet impacts the wand directly	Deflect the compressed air or coolant jet from the wand. see "Compressed air & coolant jet" in chapter 3

2.1.7 Cable broken or scanner error → power off

Error description:

The connection to the scanner could not be established.

Possible error causes	Corrective actions
Loose contact in the plug connector of the control cable	The control cable must be firmly connected to the counterparts at both connectors. The specified torque for the M12 knurled nut can be found in the "Scanner Installation Manual".
Poor contact in the plug connector of the control cable due to soiling	Check the plug connector at the scanner for soiling and clean if necessary. see "Cleaning of the plug-in contacts on the scanner" in chapter 3
Control cable defective	Replace control cable.
Scanner defective	Replace scanner.
Control unit defective	Replace control unit.

2.2 Cable error

2.2.1 Motor current too low at start up

Error description:

The motor current is too low during initialisation of the scanner.

Possible error causes	Corrective actions
Loose contact in the plug connector of the control cable	The control cable must be firmly connected to the counterparts at both connectors. The specified torque for the M12 knurled nut can be found in the "Scanner Installation Manual".
Poor contact in the plug connector of the control cable due to soiling	Check the plug connector at the scanner for soiling and clean if necessary. see "Cleaning of the plug-in contacts on the scanner" in chapter 3
Control cable defective	Replace control cable.
Scanner defective	Replace scanner.
Control unit defective	Replace control unit.

2.2.2 Cable break detected

Error description:

There is a fault in the cable connection.

Possible error causes	Corrective actions
Loose contact in the plug connector of the control cable	The control cable must be firmly connected to the counterparts at both connectors. The specified torque for the M12 knurled nut can be found in the "Scanner Installation Manual".
Poor contact in the plug connector of the control cable due to soiling	Check the plug connector at the scanner for soiling and clean if necessary. see "Cleaning of the plug-in contacts on the scanner" in chapter 3
Control cable defective	Replace control cable.
Scanner defective	Replace scanner.

2.3 Scanner error

2.3.1 Scanner error (scanner could not move)

Error description:

Scanner cannot start any rotary movement.

Possible error causes	Corrective actions
Loose contact in the plug connector of the control cable	The control cable must be firmly connected to the counterparts at both connectors. The specified torque for the M12 knurled nut can be found in the "Scanner Installation Manual".
Poor contact in the plug connector of the control cable due to soiling	Check the plug connector at the scanner for soiling and clean if necessary. see "Cleaning of the plug-in contacts on the scanner" in chapter 3
Control cable defective	Replace control cable.
Scanner defective	Replace scanner.

2.3.2 Critical error – position change to high

Error description:

The detected position change is too high.

Possible error causes	Corrective actions
Loose contact in the plug connector of the control cable	The control cable must be firmly connected to the counterparts at both connectors. The specified torque for the M12 knurled nut can be found in the "Scanner Installation Manual".
Poor contact in the plug connector of the control cable due to soiling	Check the plug connector at the scanner for soiling and clean if necessary. see "Cleaning of the plug-in contacts on the scanner" in chapter 3
Control cable defective	Replace control cable.
Scanner defective	Replace scanner.

2.3.3 Wrong scanner

Error description:

Unauthorised scanner detected.

The connected scanner is not compatible with the used control unit.

Possible error causes	Corrective actions
Connected scanner not compatible with the used control unit.	Use different scanner. Use different control unit.

2.4 Control unit error

2.4.1 Internal power supply error 1

Error description:

Internal voltages of the control unit are outside the tolerance.

Possible error causes	Corrective actions
Out of date firmware version	Perform firmware update.
Control unit hardware is defective	Replace control unit.

2.4.2 Control box error

Error description:

Control unit defective.

Possible error causes	Corrective actions
Control unit hardware is defective	Replace control unit.

2.4.3 No tool in table programmed

Error description:

The tool number to be checked has not been taught-in.

Possible error causes	Corrective actions
Function number to be checked does not exist in the control unit	Teach in tool / function number.

2.4.4 PROFINET hardware error

Error description:

Control unit defective.

Possible error causes	Corrective actions
Control unit hardware is defective	Replace control unit.

2.4.5 Internal power supply error 2

Error description:

Internal voltages of the control unit are outside the tolerance.

Possible error causes	Corrective actions
Out of date firmware version	Perform firmware update.
Control unit hardware is defective	Replace control unit.

2.4.6 Temperature error

Error description:

Controller temperature has increased.

Possible error causes	Corrective actions
Ambient temperature too high	Reduce ambient temperature.
Control unit hardware is defective	Replace control unit.

2.4.7 Micro SD card error

Error description:

SD card cannot be detected.

Possible error causes	Corrective actions
SD card defective	Replace control unit.

2.5 Wand error

2.5.1 Move to Home Position problem

Error description:

Wand stops before HomePos area during the return travel.

Possible error causes	Corrective actions
Wand jammed or external object in the swivelling range	<p>Check wand for free movement.</p> <p>The wand must not come into contact with any external machine part or object in the swivelling range.</p> <p>The wand must be able to swivel freely.</p> <p>High accumulation of chips can also restrict the rotary movement.</p>
Wand and selected parameter setting not compatible (resulting in increased scanner inaccuracy)	<p>Select compatible scanner parameter setting.</p> <p>The assignment of the parameter settings for the respective wands can be found in the "Fieldbus Manual".</p>

2.5.2 GoPosition not reached

Error description:

The specified position for the 'GoPos' function could not be reached.

Possible error causes	Corrective actions
Incorrect specified position	Correct specified position.
Wand jammed or external object in the swivelling range	<p>Check wand for free movement.</p> <p>The wand must not come into contact with any external machine part or object in the swivelling range.</p> <p>The wand must be able to swivel freely.</p> <p>High accumulation of chips can also restrict the rotary movement.</p>
Compressed air or coolant jet impacts the wand directly	<p>Deflect the compressed air or coolant jet from the wand.</p> <p>see "Compressed air & coolant jet" in chapter 3</p>

2.5.3 Wand stepping failed – set position not reached

Error description:

The specified position in 'Stepping Mode / Manual Mode' could not be reached.

Possible error causes	Corrective actions
Wand jammed or external object in the swivelling range	<p>Check wand for free movement.</p> <p>The wand must not come into contact with any external machine part or object in the swivelling range.</p> <p>The wand must be able to swivel freely.</p> <p>High accumulation of chips can also restrict the rotary movement.</p>

2.6 Set value error

2.6.1 GoPos set position larger than Limit Position

Error description:

The specified position for this function is larger than the set limit position of the system.

Possible error causes	Corrective actions
Limit position selected too small	Adjust limit position.
Specified position selected too large	Adjust specified position.

2.6.2 PrePos set position larger than Limit Position

Error description:

The specified position for this function is larger than the set limit position of the system.

Possible error causes	Corrective actions
Limit position selected too small	Adjust limit position.
Specified position selected too large	Adjust specified position.

2.6.3 Teach/Check set position larger than Limit Position

Error description:

The specified position for this function is larger than the set limit position of the system.

Possible error causes	Corrective actions
Limit position selected too small	Adjust limit position.
Specified position selected too large	Adjust specified position.

2.7 Parameter error

2.7.1 Parameter Position P1 and P2 equal

Error description:

Parameter error for parameters P1 and P2.

Possible error causes	Corrective actions
P1 & P2 set identically	Adjust parameters P1 & P2.

2.7.2 Parameter P1 larger than Limit Position

Error description:

Parameter error for parameter P1

Possible error causes	Corrective actions
Parameter value P1 selected larger than limit position	Adjust parameter P1.

2.7.3 Parameter P2 larger than Limit Position

Error description:

Parameter error for parameter P2

Possible error causes	Corrective actions
Parameter value P2 selected larger than limit position	Adjust parameter P2.

3 Actions for self-help

3.1 Cleaning of a dirty stop position

When using an external stop position, make sure that there is no dirt in the scanning area.

Soiling can cause an error when referencing the system.

This can falsify all subsequent measurements.

The following is an example.

The marked areas of the wand and of the external stop position would have to be cleaned here.

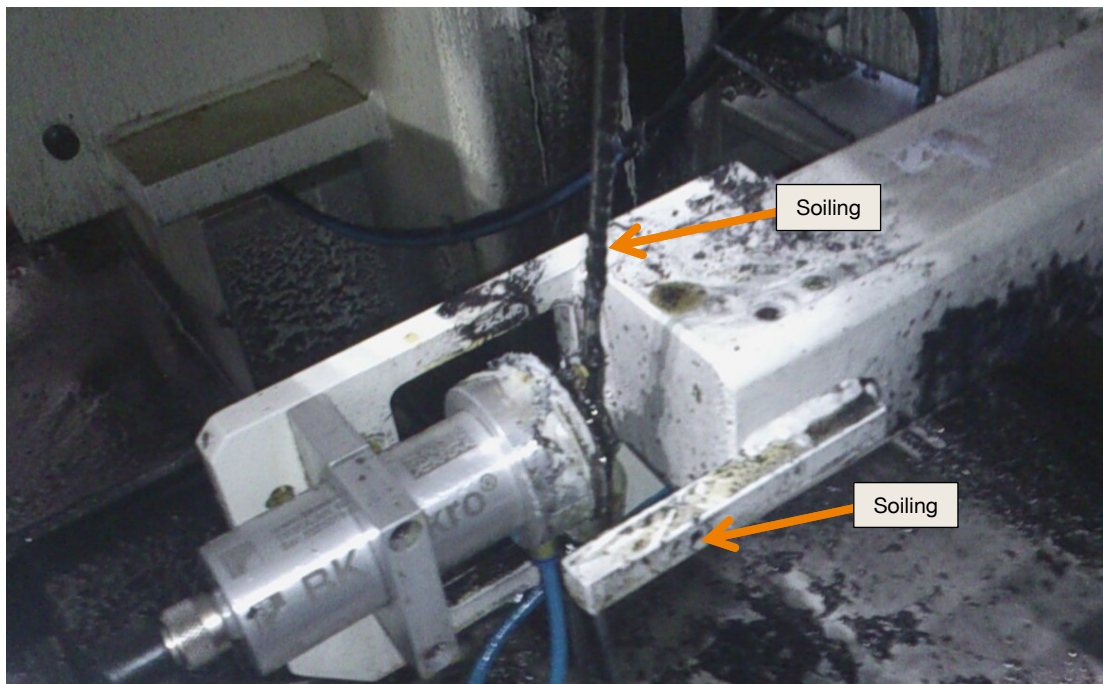


Fig. 3-1: Dirty external stop position

3.2 Cleaning of a dirty scanner

Drilling water and coolant can settle in the space between the scanner and wand holder over time.

These dried-in residues can stick the scanner to the wand holder, which can impair the rotary movement.

The following is an example.

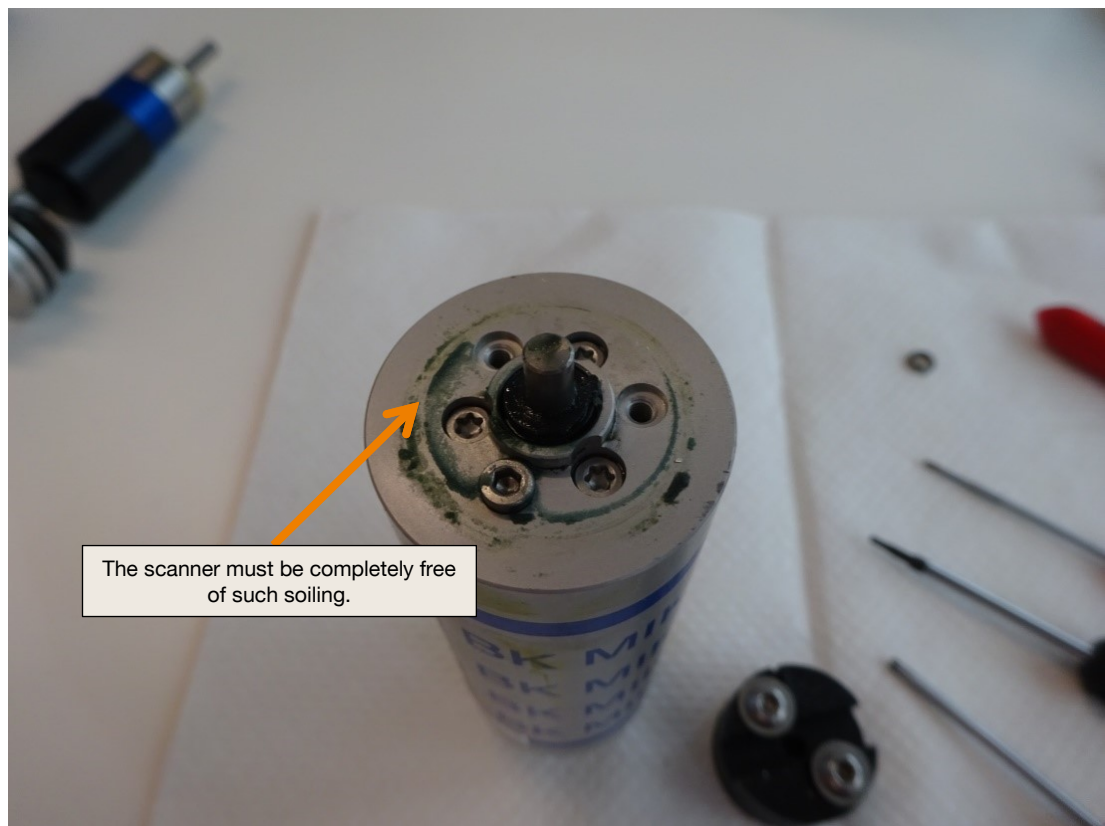


Fig. 3-2: Dirty scanner

The inside of the wand holder must also be inspected for soiling and cleaned if necessary.

3.3 Compressed air & coolant jet

No compressed air or coolant jet may be directed directly onto the wand, particularly the scanning plate (if present).

This can cause measurement errors or completely prevent rotation of the scanner.

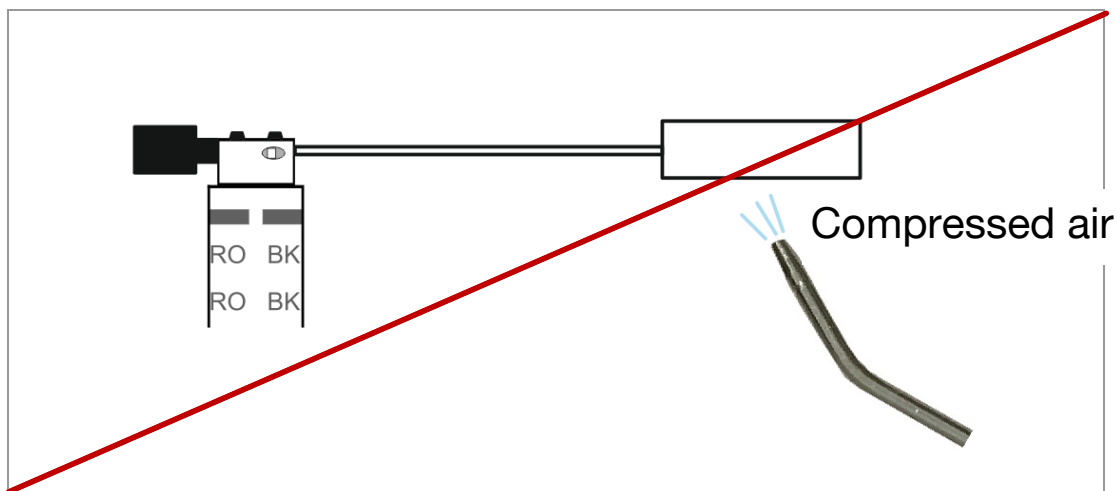


Fig. 3-3: Compressed air & coolant jet

3.4 Cleaning of the plug-in contacts on the scanner

If the knurled nut is not tightened sufficiently, coolant or oil may enter the interior of the connectors.

The consequence is short-circuit or inadequate electrical connection.

If dirt is present inside the connectors, it must be completely removed.

The plug connector on the scanner as well as the plug connector of the cable must also be cleaned.

The correct tightening torque of the knurled nut can be found in the "Scanner Installation Manual".

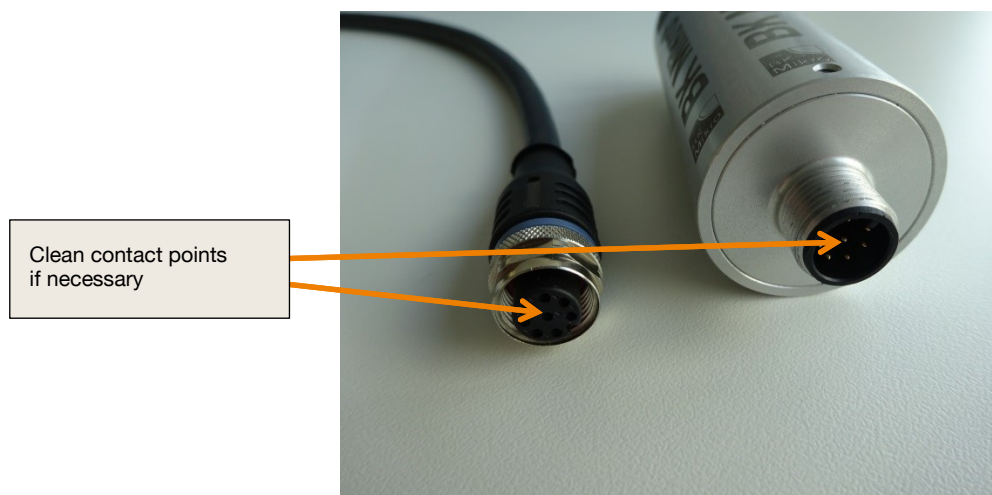


Fig. 3-4: Plug-in contacts cleaning

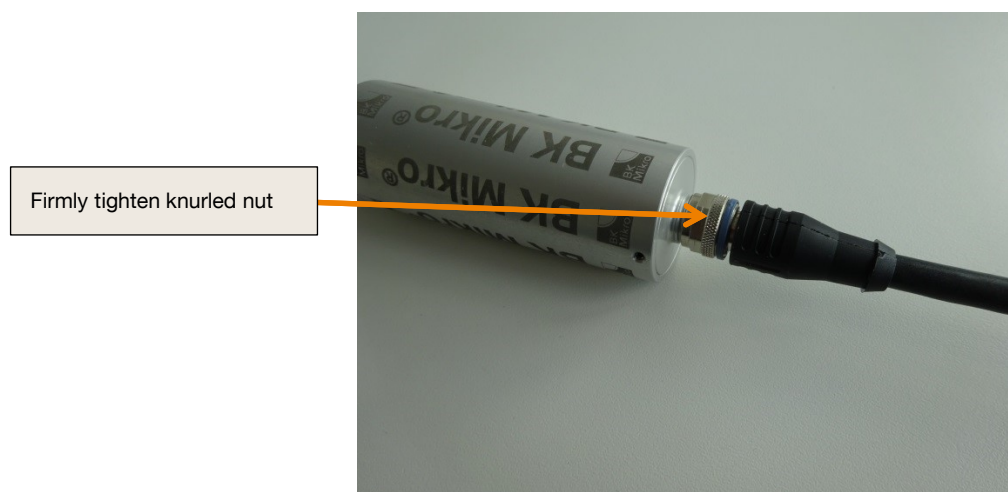


Fig. 3-5: Control cable knurled nut

4 For direct contact

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