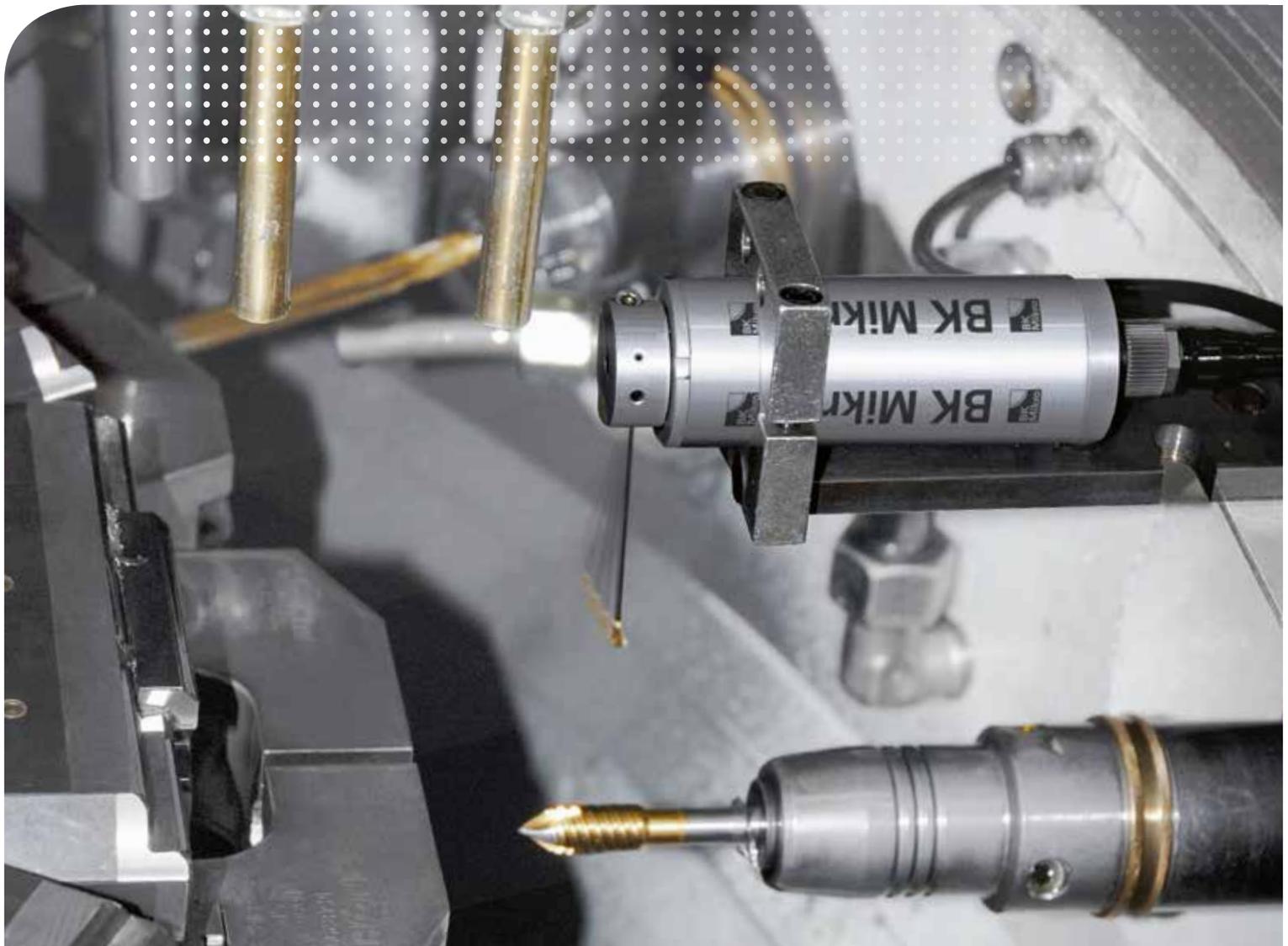


It simply works!



Safe Machining.

Process monitoring that simply works.

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BK Mikro

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It simply works! **BK Mikro**



We about us.

We consider ourselves as competent designers of customer-specific solutions in all core areas of industrial computer technology. Technological know-how, decades of experience with development and applications and comprehensive consulting are part of our distinctive performance identity. More than 130 employees design customized solutions with innovative technology, high reliability and long product life cycles – made in Germany.

Schubert System Elektronik provides a wide portfolio with high flexibility for specific customer wishes: hardware and software, assemblies and complete systems, electronics and mechanics.

Only measurable customer benefit ensures longterm success. Our customers include companies with highest demands in all areas of production: machine building and systems engineering, food and beverages industry, textile and wood processing, plastics, chemical, medical and measuring engineering. Take advantage of the synergies resulting from our comprehensive competence.

Risk and Safety.

Modern production facilities are only profitable if they work perfectly and produce to capacity. Without respective tool and process monitoring, however, this can no longer be achieved. For this reason, fully automated production processes require the automated monitoring of machining processes.



Reliable fault detection

The permanent automated monitoring of the machining processes detects such faults and prevents costly subsequent damages.



Quick reaction required

In order to allow for a quick reaction the erroneous production needs to be stopped at once. And this is exactly what BK Mikro does – reliably and fast.

It simply works! BK Mikro

The Risks: Production facilities are increasingly operated with full utilization of their performance potential. In machining centres, rotary transfer machines, transfer lines, machine tools and special machines (or other automated production plants) scrap and production downtimes lead to high losses due to consequential damages. The reason can be tool breakage or an incorrectly fed or missing tool. Clamping and ejection errors are problematic as well.

The Safety Solution: Reliable process monitoring systems guarantee a safe control of the production process. They detect slightest deviations from the nominal state and generate an instantaneous machine stop in order to avoid further damages or production losses. The quick and precise fault indication significantly reduces the time needed to remedy the problems. The benefit for the user lies in a higher degree of automation and lower operating costs.

Particular Benefits in Production

- Increased productivity
- Improved production quality
- Minimized rejection rate
- Reduced idle times
- Unmanned operation during breaks and at night
- Expanded operating time
- Maximum tool availability
- Protection of spindle and feeder
- Relief of machine operator
- Multiple machining

BK Mikro – Synonym for Safety.



It simply works! BK Mikro

The brand BK Mikro combines highest and binding values. BK Mikro not only stands for innovation, products and services but for a whole philosophy reflected in its brand identity.

It simply works.

BK Mikro stands for the absolutely safe monitoring of work processes in industrial production. This monitoring is achieved by intelligent sensor system solutions based on thorough technological knowledge and industry-specific application experience.

„It simply works“ gets to the heart of the matter as it communicates the simple and reliable functioning of BK Mikro – even under most adverse circumstances. In this way the user maximises the quality and efficiency of production.

Reliable: Precision and quality result in a maximum of constant safety. BK Mikro meets this high requirement, excels by long-term reliability and significantly increases production quality.

Innovative: At first sight BK Mikro with its electro-mechanic sensor principle does not appear to be high-tech – its particular innovation lies in the permanently process-optimized function.

Universal: Easy to handle, adaptable to any challenge, efficient in use. The crucial point is always customer benefit – which applies to modular hardware and intelligent software.

Made in Germany: This term is far more than a mere designation of origin – it stands for excellent engineering and is highly reputed on the international market.

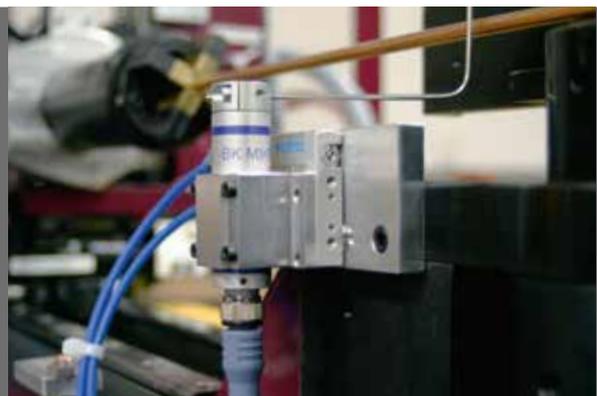
All Safely under Control: One System for All Purposes.

In automated production there is an enormous range of possible applications for the systems BK Mikro.

Widespread use: Our tool monitoring systems provide for a higher degree of safety and reliability in automated production processes in over 90,000 installations worldwide.



Workpiece inspection: checking drill depths



Workpiece inspection: checking contours

It simply works! BK Mikro



Tool Monitoring

- Stationary and rotating tools
- Single spindle/ double spindles
- Breakage detection
- Radial scanning on spiral coil/cutting edge



Measuring of Hidden Geometries

- Borings/cavities
- Testing functions in narrow process areas
- Application-specific wand variants
- Linear scanning



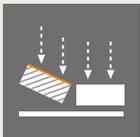
Object Inspection

- Feeding, ejection and free-space inspection
- Correct tool storage in magazine
- Measuring of length resp. diameter
- Radial or linear scanning



Testing of Contours/Profiles

- Checking contours for defects
- Registration of irregularities
- Monitoring of material feeding
- Radial or linear scanning



Position Recognition

- Detection of deviations
- Monitoring of tolerances
- Inspection of material thickness
- Radial or linear scanning

Universal Multi-Talent: BK Mikro excels by its versatility, making it applicable for a wide range of uses. BK Mikro offers the perfect solution for all production processes.

Functional Safety: The system has stood the test in rough fields of application and adverse ambient conditions. Wherever highest precision is required it fulfils its task with robust care.



Tool breakage inspection: unilateral scanning



Tool breakage inspection: bidirectional scanning

Clever, Robust and Tactile: The Interaction of Components.

The system achieves its high degree of flexibility and adaptability by its components.



The Scanner: BK Mikro offers scanner variants adapted to different performance classes. Rotary scanners fulfil orthogonal moving functions or the axial scanning of a tool tip, linear scanners are used for stroke movements.

[Scanners: see page 20](#)

The Control unit: In order to perfectly comply with the variety of uses several models are available which differ in terms of functional range and interface characteristics, e.g. for monitoring a multitude of objects or for individual monitoring functions as well as for application-specific configuration options.

[Control units: see page 28](#)

It simply works! BK Mikro

Advantages of the System

- Independent of the power of the spindle motor and of the machine control
- Applicable in working space and magazine
- Tool monitoring also possible in non-productive times
- Bilateral scanning possible (e.g. double or multiple spindles)
- Scanning of rotating tools with diameters ≥ 0.1 mm
- Easy mounting (no adjustment) and maintenance-free
- Individual retrofitting at any time
- Absolutely resistant to external influences (cooling media, chips, vibration, temperature, etc.)

The System: A system based on mechanical contact such as BK Mikro excels by its easy installation, is maintenance-free and comparatively economic. The tactile sensor works potential-free; due to the sturdy scanner it is absolutely unsusceptible to disturbances. The monitoring takes place inside the process area – there is no waste of time by moving the tool towards the testing device.

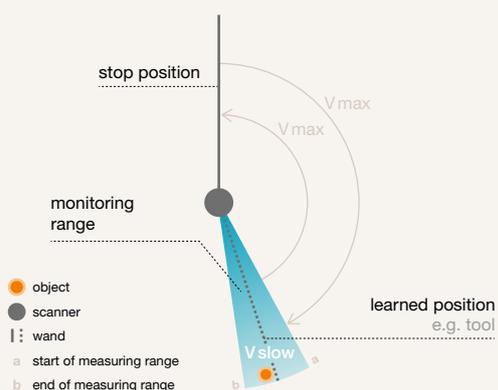
The Principle: The wand moved by the scanner scans object positions resp. areas in the machine cycle. A control unit with micro-computer triggers the wand movement by a signal (or order from the fieldbus-master). The result provided by the wand is compared to the parameters and nominal values defined in the control unit, resulting in an „OK“ or „KO“ signal transmitted to the machine control.



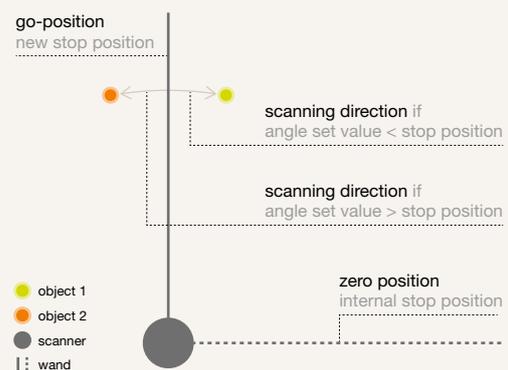
Manifold Functions, Consistently Developed for Practice.

Just a few examples are given here in order to present the profound functionality of BK Mikro. Technological developments and customer wishes ensure the constant perfecting of BK Mikro.

Position / Range Monitoring



Bidirectional Position Monitoring



It simply works! BK Mikro

Unidirectional Scanning: Depending on the preset parameters in the control unit resp. on the test instructions transmitted by the machine control the wand rotates left or right until it reaches the test object. Upon reaching the object or transgressing the monitoring range it changes its rotational direction and returns to home position.

Bidirectional Scanning: By means of a preset angle the wand can be assigned a freely definable home position between two objects to be monitored. After the wand has reached this position both objects can be charged and scanned. The order of the scanning direction is freely selectable.

Teach-in: In learning mode the wand rotates until it reaches an object. The angle measured is then stored in the tool data base under the selected tool number. The exact preset angle for the actual scanning is then defined by the stored position plus the preset tolerance value.

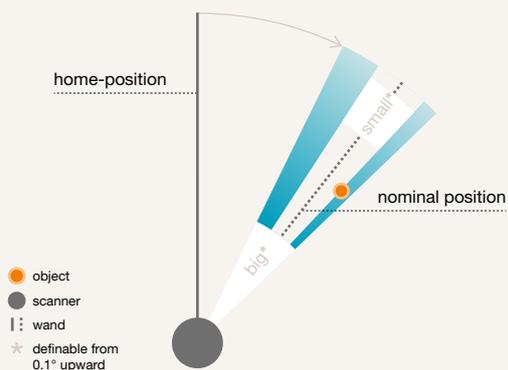
Start: A measuring process is triggered by the function "start". If the wand reaches the object inside the angle position learned by „Teach“ or preset by parameters the „OK“ signal is sent. If the wand stops before the monitoring range or goes beyond it a „KO“ signal occurs.

Reference Run: This function is required every time the parameters of a measuring system have changed, e.g. after replacement of a scanner. By means of the reference run the wand can be assigned a new home-position.

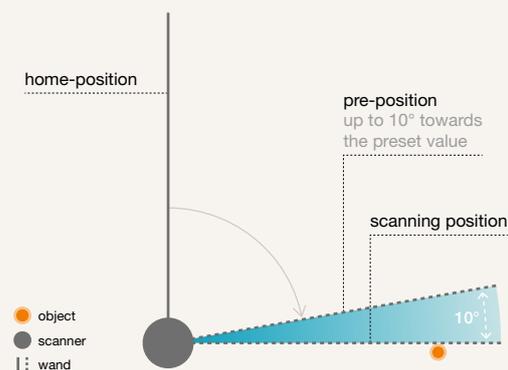
Optimized Scanning Time: The scanning process can be optimized to 150 ms in order to shorten the time during which the tool has to remain in its position.

- During the forward travel and before the actual scanning the wand is moved by command towards the object to be monitored up to 10° (pre-position), while the tool can still be positioned.
- During the backward travel the tool can be moved again before the wand has reached its home-position.

Tolerance Area



Pre-Position Principle



Flexible and Open for Connections.

Basically, BK Mikro offers three types for a system network, depending on machine coupling and programming technique.

Operation via fieldbus: The monitoring is performed according to the parameters (angle/tolerance etc.) from PROFIBUS resp. DeviceNet-master (PLC). An unlimited number of tools can be scanned. With this model the full functional range is available.

Parameterization via PC: The parameterization of the tool and object data is performed at the PC, transmitted to the control unit via USB and digitally controlled via I/O channels by the PLC during operation. In connection with an extension module up to 512 objects/tools can be programmed and monitored via the selection inputs.

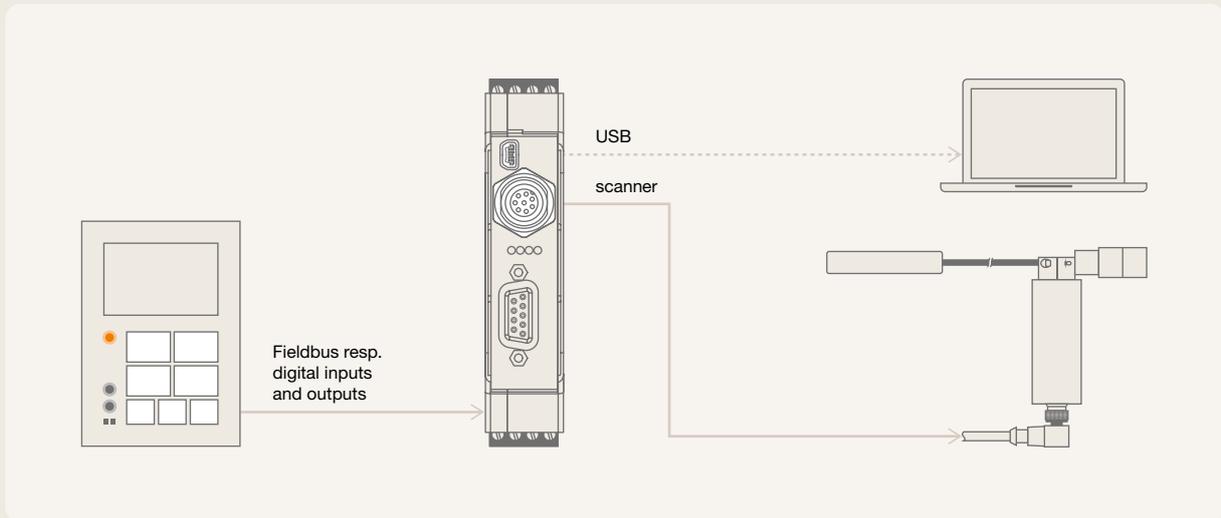
Parameterization without PC: For a simple handling without PC the major functions (right/left rotation of the wand, object resp. free space monitoring, definition of scanning intensity) can be set via toggle switch at the I/O extension module. During operation programming by the PLC is also performed via digital I/Os.

Instructions and parameterization data are transmitted from the PLC to the control unit. Reversely, the control unit sends its status reports to the machine control.

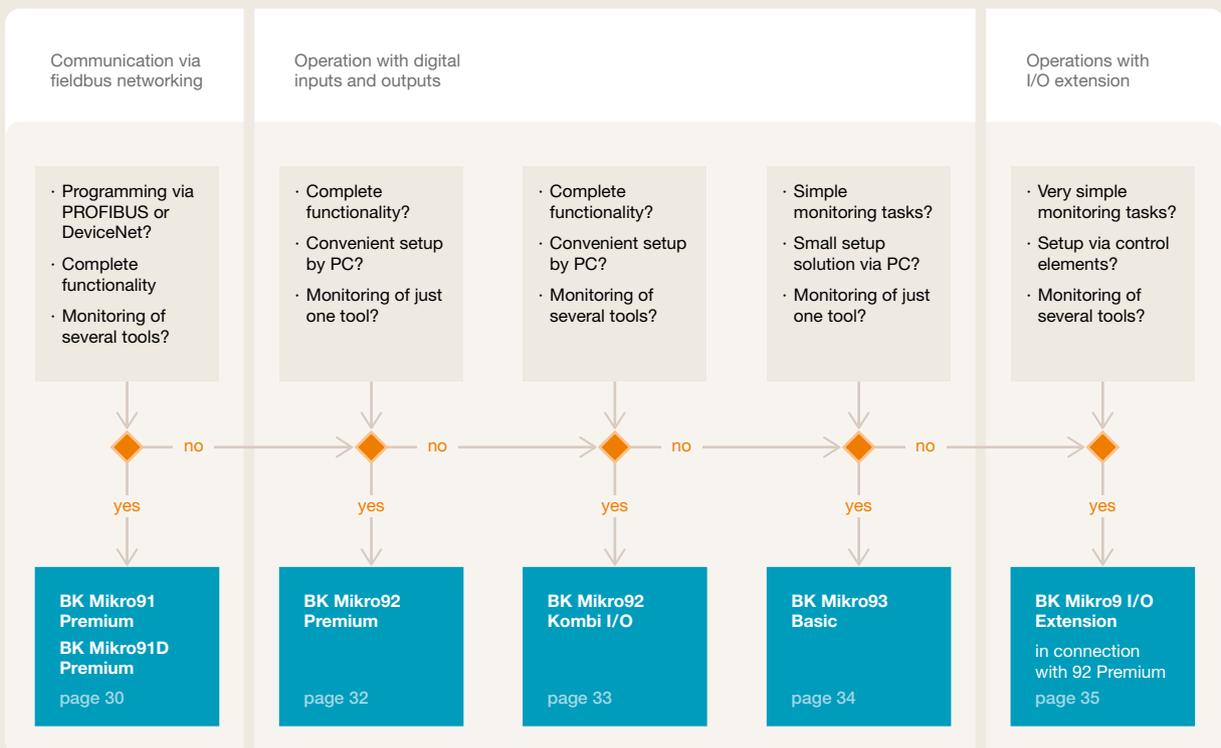


It simply works! BK Mikro

Components in the System Network



Determine your System Requirements



Intelligent Software for Configuration.

The desktop software specifically designed for BK Mikro serves to create and administer tool resp. workpiece monitoring cycles in CNC machining programmes. The programming is achieved by interactive input.

Programme Structure: Premium mode allows for the full functional range, basic mode for reduced options only. Both programmes offer a system setup which can be programmed online and offline.

Programming Mode: In this mode the attributes of up to 512 tools can be defined (e.g. angle set value or tool length, tolerance and scanning intensity). If there is a USB-connection to the control unit the current status is already displayed during the projecting. It is also possible to test individual orders or initiate a teach-in process.

Manual Mode: This mode serves to check and monitor programmed functions and processes. Here the status of BK Mikro is displayed extensively as well. Furthermore, manual traverse movements of the wand can be triggered. All results can be recorded as long-term monitoring („trace“).

Help-File: This file provides an up-to-date help platform which supports the user by a simple training of the programming and application functions.



The configuration software „System Setup BK Mikro9“ can be downloaded free of charge at www.bkmikro.com.

It simply works! BK Mikro

Basic Mode – Easy Programming, Instant Production.

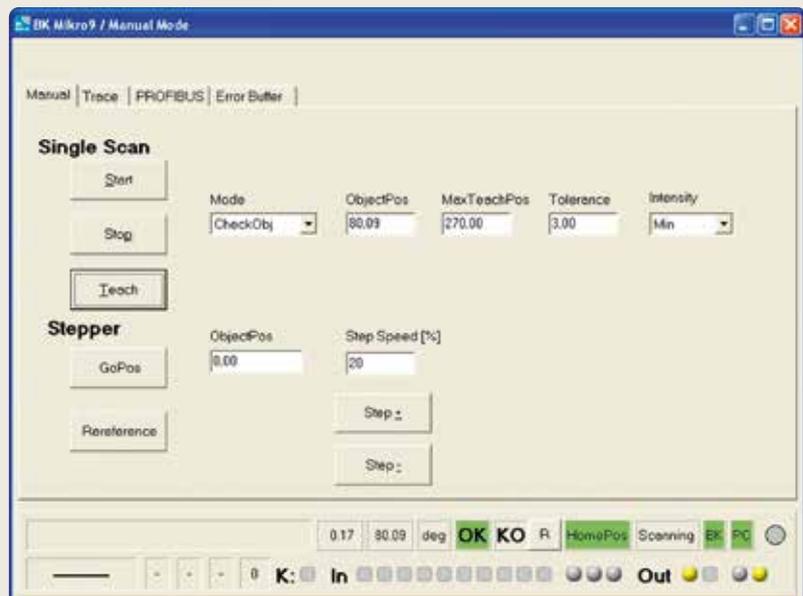
Programming Mode

Attribute „Tool Settings“:
For monitoring instructions
such as position check
(„Check Object“) or free-space
check („FreeSpace“)



Manual Mode

Attribute „Scan“:
For quick monitoring
and displaying of angles,
tolerances and intensities



Premium Mode – Innovative and Convenient Projecting.

Programming Mode

Attribute „Tool Settings“:
To edit a new tool and to change the data of an existing tool; supports the programming of data for up to 512 functions

The 'New Tool Settings' dialog box is divided into several sections:

- Function Definition:** Includes fields for FuncNo (dropdown), Name (Drill 1,2mm), Actual Counter (0), Counter Limit (2000), NextFunc (no), and KDFunc (no). A 'Clear' button is located below the Actual Counter field.
- Command:** Includes Mode (CheckObj dropdown), Back Mode (HomePos dropdown), ReturnPos (0.00), and an Error Stop checkbox. 'Start' and 'Stop' buttons are on the right.
- Object Data:** Includes ObjectPos (12.50), MaxTeachPos (270.00), Tolerance (0.50), Intensity (Min dropdown), and a 'Teach' button.
- Output Settings:** Includes Out1 Function (OK dropdown), Out2 Function (KO dropdown), Out3 Function (NoDefined dropdown), and Out4 Function (NoDefined dropdown).
- Area:** Includes Area (Absolute dropdown), Warning Min (80.00), Warning Max (100.00), Error Min (70.00), and Error Max (110.00).

Buttons at the bottom include 'Ok', 'Cancel', and 'Set Default'.

Programming Mode

Attribute „Global Settings“:
For individual base settings of the control unit with application-relevant values

The 'BK-Config / Settings / Controller' dialog box has tabs for 'Tool Settings', 'Global Settings', 'Output Settings', 'Input Settings', 'Fieldbus', and 'Default Settings'. The 'Global Settings' tab is active, showing:

- FSW Version: V01.18.65 06/27/2012
- Firmid Version: V01.03.00 07/28/2010
- Control Unit ID: 6304242 / 0000000.000 / 1.10
- Scanner ID: 0000000 / 0000000.000
- Scanner: TK_AutoDetect (dropdown)
- Rotation Direction: Counter-Clockwise, Clockwise
- Power On Move: Inactive, Active
- Return Travel Monitoring: Inactive, Active

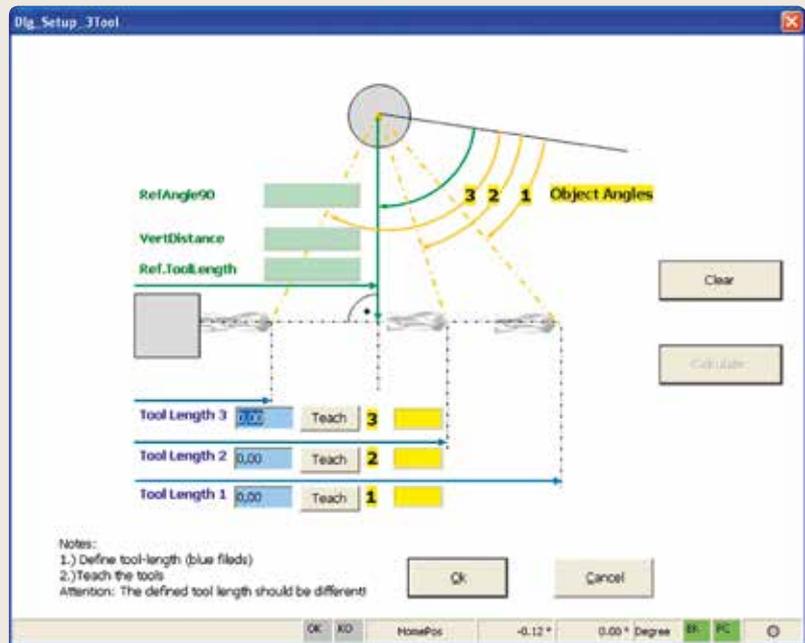
An 'Advanced Settings' button is located at the bottom of the main content area. At the very bottom of the dialog are 'Print', 'Save', 'Save As', and 'Close' buttons. A status bar at the bottom shows 'OK', 'XO', 'HomePos', '0.17 °', '80.09 ° Degree', 'BK', 'PC', and a refresh icon.

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Programming Mode

Attribute „Setup“:

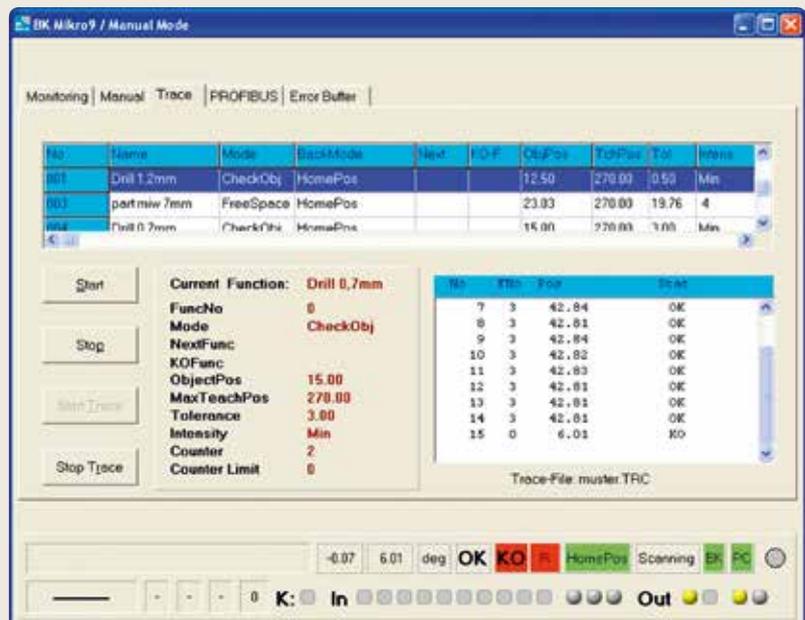
To determine the parameters for conversion from angular measuring system to linear measuring system (via three learned scanning angles in a tool axis)



Manual Mode

Attribute „Trace“:

To execute, monitor and record scanning processes



The Scanners: Proven under Extreme Conditions.



Designed for toughest applications, equipped with strong scanner shaft and due to double-lipped special seals (as in pumps) impervious to aggressive cooling agents, dust and chips.

Adaptive: Primarily a suitable scanner is selected according to the machining process and the geometry of spindle and magazine. In this way unilateral resp. bilateral scanning (with double spindles), the axially rotating or linear scanning movement and different measuring lengths are ideally achieved.



It simply works! BK Mikro



Universal: BK Mikro is the ideal solution for original equipment manufacturers (machine builders) and for retrofitting (users). The compact scanner dimensions and the wide scanning range as well as the smooth, cylindrical wall allow for easy assembly without additional adjustment aids.

Application-specific: As the drive is controlled by position, rotational speed and torque the object is gently touched by a carefully „dosed“ probing force. This allows for the scanning of smallest rotating drills (axially as small as 0.1 mm!) and the detection of slightest damages.

Scanner and Cycle Data in Comparison

Scanner (Type)*	TK9LIN50	TK9LIN100	TK91A	TK94A/RL	TK8A	TK7A/RL	TK96A/RL
Shaft (ø)	-	-	4 mm	4 mm	3 mm	3 mm	4 mm
Body (ø)	-	-	32 mm	32 mm	20 mm	20 mm	12 mm
Wand length** (max.)	-	-	610 mm	250 mm	380 mm	250 mm	100 mm
Plate	-	-	yes	no	yes	no	no
Time of 180° rotation (ca.)	-	-	1.80 sec	0.25 sec	1.30 sec	0.40 sec	0.85 sec
Repeat accuracy (+/- [°] max.)	-	-	0.05	1.20	0.15	1.20	1.20
Stroke length (max.)	50 mm	100 mm	-	-	-	-	-
Time of one stroke (ca.)	1.40 sec	1.80 sec	-	-	-	-	-
Repeat accuracy (mm)	0.05	0.05	-	-	-	-	-

* Protection class IP67, >5 million scanning cycles | ** Depending on application other lengths can be requested

TK96A / TK96RL: Small and Dynamic

TK96 is the ideal solution for applications in smallest process zones with highest system availability and a sturdy environment.

The two variants have identical system features but differ with respect to the internal stop (in model „A“) and the possibility of bilateral scanning (with designation „RL“). The series TK96 impresses by its particular small dimensions and excellent scanning data.

Scanning

- TK96A in one direction: right or left
- TK96RL bidirectional: right-left or left-right
- Lateral (orthogonal)

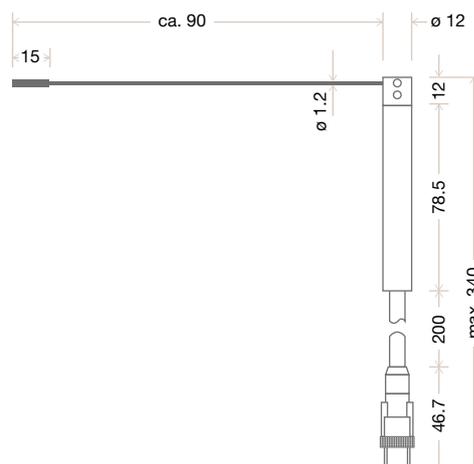
Application

Tool/object monitoring and free-space monitoring

Technical Data

Housing	Stainless steel
Protection Class	IP67
Wand length	100 mm (can be shortened), Ø 1.2 mm Wand exchangeable
Scanning angle	TK96A: max. 270° TK96RL: max. 360°
Control unit connection	Fixed cable (200 mm) Small circular connector M12x1, 8 pin
Ambient temperature	0 °C to +65 °C
Storage temperature	-25 °C to +85 °C
Scanning cycles	> 5 million at minimum scanning intensity

Mechanical Dimensions (mm)



It simply works! BK Mikro

TK7A/TK7RL: Compact and Fast

TK7 is established in the price sensitive segment and is particularly suitable for fast and simple monitoring tasks.

Both scanner variants of this type have identical features. The only difference is that in type „A“ the rotational movement is limited by a mechanical stop whereas type „RL“ (without mechanical stop) can rotate in both directions. Due to the highly dynamic features of the drive the advantage of TK7 lies in the very fast scanning speed rather than in the scanning precision.



Technical Data

Housing	Anodized aluminium
Protection Class	IP67
Wand length	175 mm (standard), Ø 1.2 mm Wand exchangeable
Scanning angle	TK7A: max. 270° TK7RL: max. 360°
Control unit connection	Small circular connector M12x1, 8 pin
Ambient temperature	0 °C to +80 °C
Storage temperature	-25 °C to +85 °C
Scanning cycles	> 5 million at minimum scanning intensity

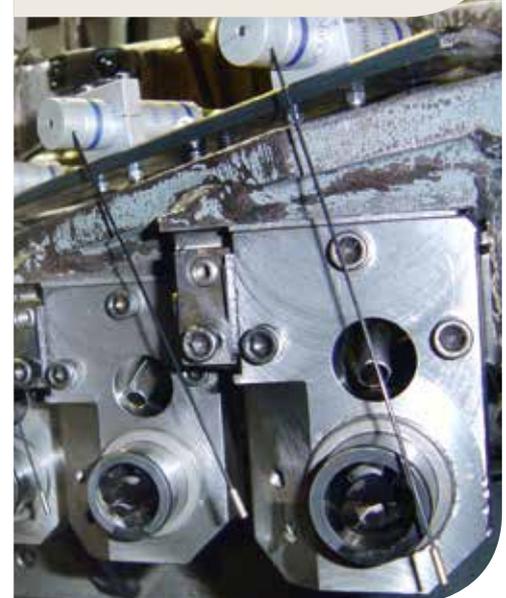
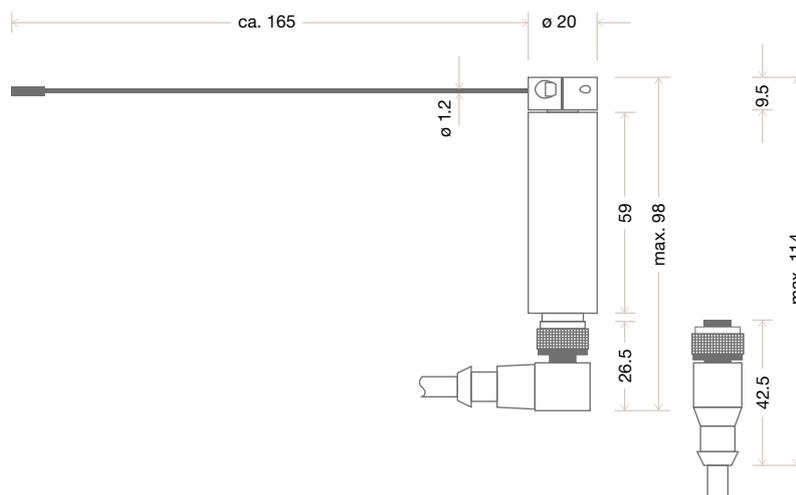
Scanning

- TK7A in one direction:
right or left
- TK7RL bidirectional:
right-left or left-right
- Lateral (orthogonal)

Application

Tool/object monitoring and
free-space monitoring

Mechanical Dimensions (mm)



TK94A / TK94RL: Robust and with High Speed



Scanning

- TK94A in one direction: right or left
- TK94RL bidirectional: right-left or left-right
- Lateral (orthogonal)

Application

Tool/object monitoring and free-space monitoring

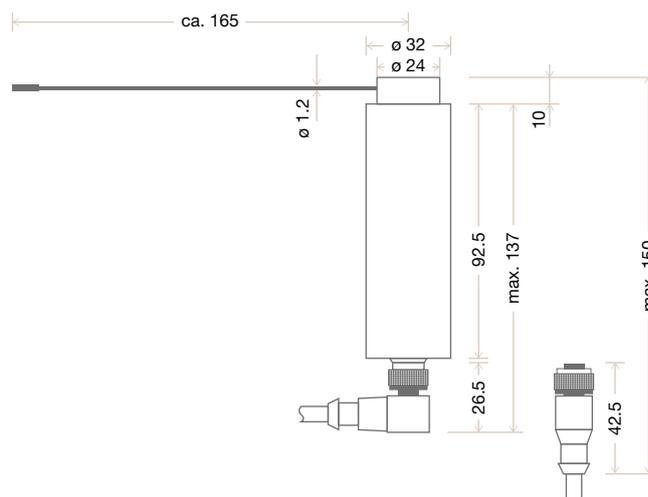
The TK94 components are ideal for monitoring applications which require particularly robust scanners for extremely short scanning cycles.

Both scanner variants of the TK94 series only differ with respect to the mechanical stop for type „A“. The model „RL“ can rotate in both directions without this stop. The special feature of this series is the drive unit which was designed for highly dynamic and extremely fast reactivity.

Technical Data

Housing	Anodized aluminium
Protection Class	IP67
Wand length	175 mm (standard), Ø 1.2 mm Wand exchangeable
Scanning angle	TK94A: max. 270° TK94RL: max. 360°
Control unit connection	Small circular connector M12x1, 8 pin
Ambient temperature	0 °C to +80 °C
Storage temperature	-25 °C to +85 °C
Scanning cycles	> 5 million at minimum scanning intensity

Mechanical Dimensions (mm)



It simply works! BK Mikro

TK8A: Compact and Precise

TK8 is particularly suitable for precise scanning results with relatively short scanning cycles and a larger distance to the object.

This rotary scanner offers two special features: For one thing, the use of wands with a length of up to 380 mm allows for a larger distance to the object. For another, scanners with plate can be used and allow to monitor the tool tips inside the tool magazine. The high positioning resolution of the drive ensures highest monitoring precision.



Technical Data

Housing	Anodized aluminium
Protection Class	IP67
Wand length	380 mm, with plate 80 x 15 mm, 284 mm, with plate 65 x 15 mm, Wand exchangeable
Scanning angle	Max. 300°
Control unit connection	Small circular connector M12x1, 8 pin
Ambient temperature	0 °C to +80 °C
Storage temperature	-25 °C to +85 °C
Scanning cycles	> 5 million at minimum scanning intensity

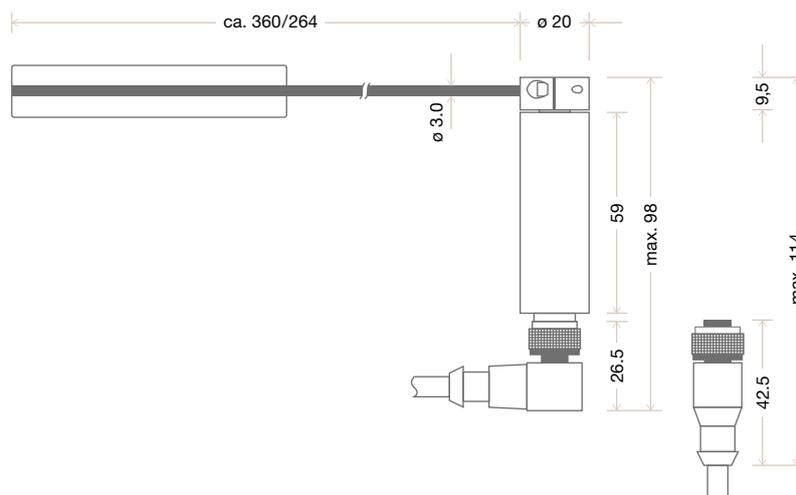
Scanning

- In one direction:
right or left
- Axial (rotational)

Application

Tool/object monitoring

Mechanical Dimensions (mm)





Scanning

- In one direction:
right or left
- Axial (rotational)

Application

Tool/object monitoring and checking shapes



TK91A: Full of Drive and Highly Precise

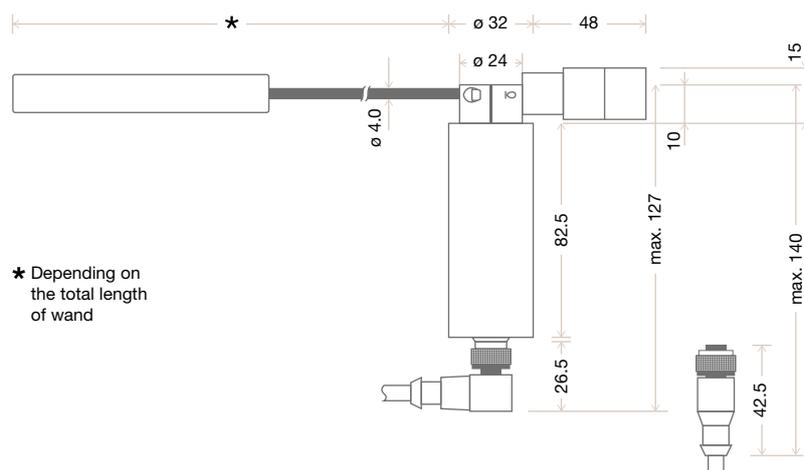
TK91 is ideally suited for scanning long tools and detecting smallest deviations.

This new development can take longer wands (up to 660 mm) with plates to monitor tool tips. Therefore, no space for lateral swivel range is required. The internal mechanical backstop limits the rotary movement of the wand. The powerful gear motor of TK91 – which also excels by the repeat accuracy of its monitoring function – is ideal for a wide scanning range.

Technical Data

Housing	Anodized aluminium
Protection Class	IP67
Wand length	Max. 660 mm, with plate 120 x 15 mm Wand exchangeable
Scanning angle	Max. 300°
Control unit connection	Small circular connector M12x1, 8 pin
Ambient temperature	0 °C to +80 °C
Storage temperature	-25 °C to +85 °C
Scanning cycles	> 5 million at minimum scanning intensity

Mechanical Dimensions (mm)



It simply works! BK Mikro

TK9LIN50 / TK9LIN100: Linear and Precise

With its superb repeat accuracy TK9LIN can be recommended for all uses where high-precision measurements (e.g. of tolerances or depths) are required.

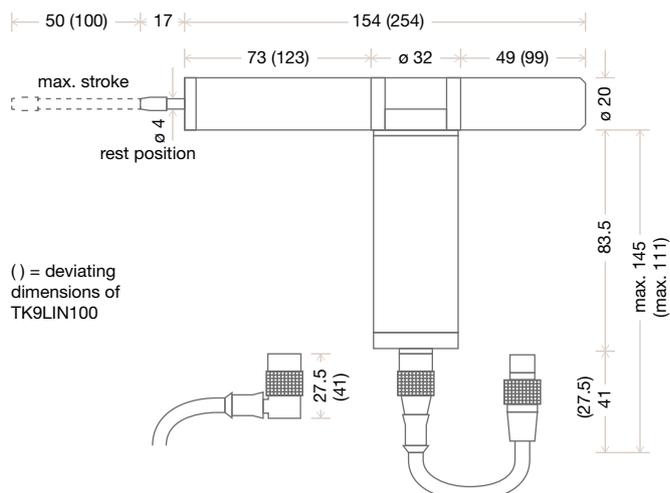
TK9LIN is designed for testing functions in longitudinal direction if rotational scanning is not suitable or possible (as in cavities, bore holes or limited space). Any scanning area between rest position and maximum stroke can be realised. In order to meet a wide range of testing applications specific wand tips (brass, plastics, etc.) are available.



Technical Data

Housing	Anodized aluminium
Protection Class	IP64
Wand tip	Exchangeable, thread M2x6
Control unit connection	Small circular connector M12x1, 6 pin
Ambient temperature	0 °C to +80 °C
Storage temperature	-25 °C to +85 °C
Scanning cycles	> 5 million at minimum scanning intensity
Scanning area	TK9LIN50: 50 mm max. stroke TK9LIN100: 100 mm max. stroke
Wand length	TK9LIN50: ca. 67 mm TK9LIN100: ca. 117 mm

Mechanical Dimensions (mm)

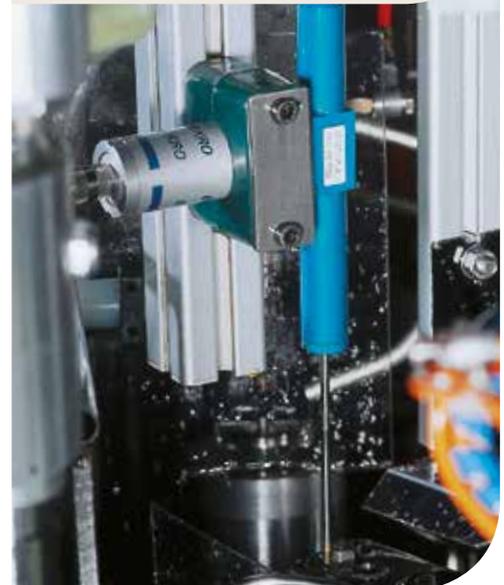


Scanning

- TK9 LIN50 in longitudinal direction: Stroke 50 mm
- TK9 LIN100 in longitudinal direction: Stroke 100 mm
- Lateral (linear)
- Axial (linear)

Application

Position monitoring



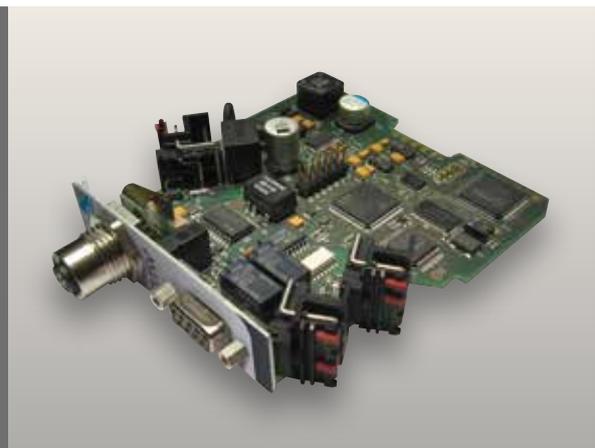
The Control Units: Compact with Great Performance.

The control units of BK Mikro have got the lot: compact design, powerful functionality and the right connections to the system network – not to forget great flexibility in case of subsequent system adaptations.

Functional: The control unit integrates the intelligent, micro-controller based logic, the modern interface technology as well as all control elements for an individual configuration setting.

Innovative: The system is based on an up-to-date ARM9-Risc-CPU with high performance and low power consumption.

Practical: Galvanically isolated inputs and outputs ensure a high degree of operational safety. Furthermore, a cable break detection (IP67) is integrated into the scanner line.



It simply works! **BK Mikro**



Well Equipped at All Events

- Fieldbus interfaces for PLC connection PROFIBUS resp. DeviceNet
- Mini-USB connection for projecting via PC
- Quick identification of monitoring status by LEDs „OK“ resp. „KO“ on the front side
- Clockwise/counter-clockwise rotation of wand programmable
- Scanning intensity adjustable in eight steps (required for drills with small diameter)
- For each tool an individual profile can be stored
- EEPROM as remanent data storage for all parameters transmitted
- One circular connector for all scanners

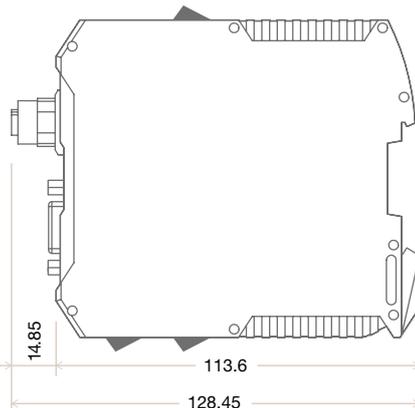
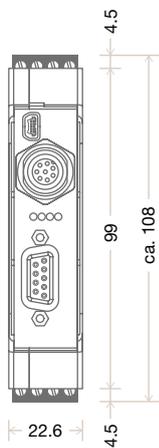


BK Mikro91 Premium



- PROFIBUS interface for direct fieldbus connection to machine control
- Mini-USB for PC-connection
- 3 digital control inputs (positive or negative logic): start and teach signal as well as configurable channel
- 2 relay outputs (as N/C or N/O contact) with „OK“ and „KO“ signal
- Pluggable supply voltage and scanner connection
- Opening for top hat rail plug for optional connection of I/O extension module
- 4 LEDs for current status display

Mechanical Dimensions (mm)



Technical Data

Housing	Insulation material, protection class II, built-in type
Protection class	IP20
Dimensions (W x H x D)	22.6 mm x 99 mm x 113.6 mm
Mounting of housing	Profile rail 35 mm acc. DIN EN 50022
Supply voltage	24 V DC $\pm 20\%$ PELV, $I_{max} = 0.4$ A
Power consumption	10 VA max.
Control voltage	24 V DC $\pm 20\%$ PELV
Inputs	Galvanically isolated Input current ca. 5 mA Pulse duration 30 ms min.
Switch outputs	2 x relay 30 V DC, 2 A max. 10^5 switching cycles min.
Connections	<ul style="list-style-type: none"> · Pluggable screw terminals for voltage supply, relay outputs, control inputs · Circular connector, 8 pin (scanner connection) · Mini-USB · PROFIBUS (Sub-D-bush, 9 pin)
Climate conditions	Acc. class 3K3 acc. EN 50178
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +80 °C

It simply works! BK Mikro

BK Mikro91D Premium

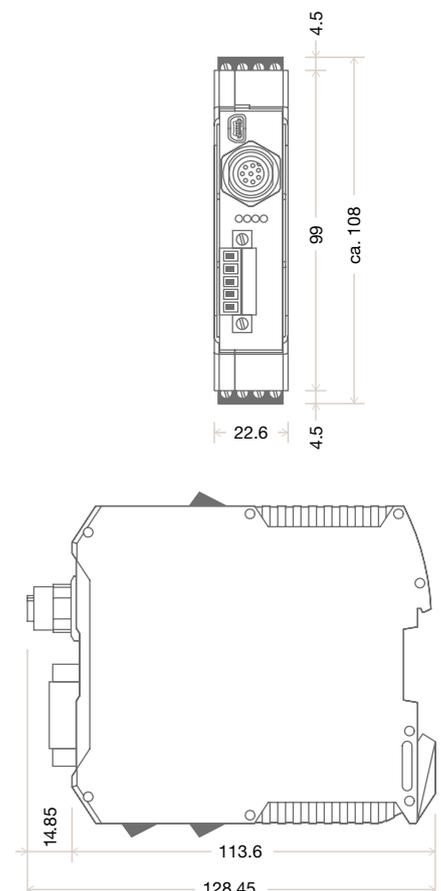
- DeviceNet interface for direct fieldbus connection to machine control
- Mini-USB for PC-connection
- 3 digital control inputs (positive or negative logic): start and teach signal as well as configurable channel
- 2 relay outputs (as N/C or N/O contact) with „OK“ and „KO“ signal
- Pluggable supply voltage and scanner connection
- Opening for top hat rail plug for optional connection of I/O extension module
- 4 LEDs for current status display



Technical Data

Housing	Insulation material, protection class II, built-in type
Protection class	IP20
Dimensions (W x H x D)	22.6 mm x 99 mm x 113.6 mm
Mounting of housing	Profile rail 35 mm acc. DIN EN 50022
Supply voltage	24 V DC $\pm 20\%$ PELV, $I_{max} = 0.4$ A
Power consumption	10 VA max.
Control voltage	24 V DC $\pm 20\%$ PELV
Inputs	Galvanically isolated Input current ca. 5 mA Pulse duration 30 ms min.
Switch outputs	2 x relay 30 V DC, 2 A max. 10^5 switching cycles min.
Connections	· Pluggable screw terminals for voltage supply, relay outputs, control inputs · Circular connector, 8 pin (scanner connection) · Mini-USB · DeviceNet (Open Style Connector), bush 5 pin, for direct cable wiring
Climate conditions	Acc. class 3K3 acc. EN 50178
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +80 °C

Mechanical Dimensions (mm)

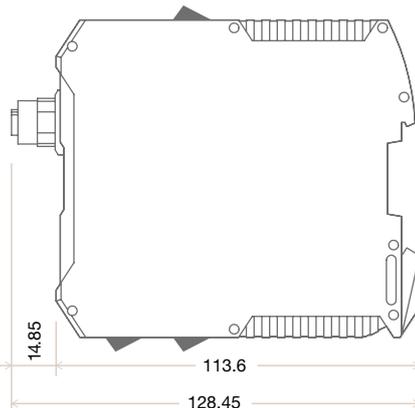
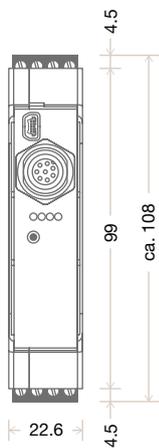


BK Mikro92 Premium



- Mini-USB for PC-connection
- 3 digital control inputs (positive or negative logic): start and teach signal as well as configurable channel
- 2 relay outputs (as N/C or N/O contact) with „OK“ and „KO“ signal
- Pluggable supply voltage and scanner connection
- Opening for top hat rail plug for optional connection of I/O extension module (in case of more than one tool monitoring)
- 4 LEDs for current status display

Mechanical Dimensions (mm)



Technical Data

Housing	Insulation material, protection class II, built-in type
Protection class	IP20
Dimensions (W x H x D)	22.6 mm x 99 mm x 113.6 mm
Mounting of housing	Profile rail 35 mm acc. DIN EN 50022
Supply voltage	24 V DC $\pm 20\%$ PELV, $I_{max} = 0.4$ A
Power consumption	10 VA max.
Control voltage	24 V DC $\pm 20\%$ PELV
Inputs	Galvanically isolated Input current ca. 5 mA Pulse duration 30 ms min.
Switch outputs	2 x relay 30 V DC, max. 2 A 10^5 switching cycles min.
Connections	<ul style="list-style-type: none"> · Pluggable screw terminals for voltage supply, relay outputs, control inputs · Circular connector, 8 pin (scanner connection) · Mini-USB
Climate conditions	Acc. class 3K3 acc. EN 50178
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +80 °C

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BK Mikro92 Kombi I/O

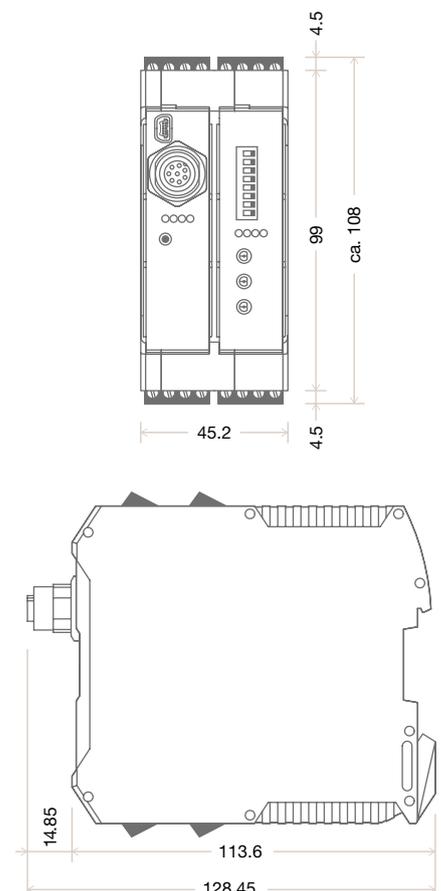
- Connections: mini-USB, supply voltage and scanner
- Digital control inputs (positive or negative logic):
3 x start and teach signal as well as configurable channel,
10 x to select / activate up to 512 different positions
- Digital outputs:
2 x relay with „OK“ and „KO“ signal (as N/C or N/O contact),
2 x for free configuration (active switching function for 24 V signal)
- 3 rotary switches: selection of scanner and feeding in the scanning angles (adjustable in 24°-steps from 0° to 360°)
- 8 toggle switches:
Selection monitoring type (object or free-space monitoring)
Selection rotational direction of wand (right and/or left)
Definition of relay outputs (N/C or N/O)
Setting of scanning intensity (2 steps)
Selection of tolerance range ($\pm 0,1^\circ / \pm 1,0^\circ / \pm 3,0^\circ / \pm 10,0^\circ$)



Technical Data

Housing	Insulation material, protection class II, built-in type
Protection class	IP20
Dimensions (W x H x D)	45.2 mm x 99 mm x 113.6 mm
Mounting of housing	Profile rail 35 mm acc. DIN EN 50022
Supply voltage	24 V DC $\pm 20\%$ PELV, $I_{max} = 0,4$ A
Power consumption	max. 10 VA
Control voltage	24 V DC $\pm 20\%$ PELV
Inputs	Galvanically isolated Input current ca. 5 mA Pulse duration 30 ms min.
Switch outputs	2 x relay 30 V DC, 2 A max., 10^5 switching cycles min. 2 x high side switch, $I_{max} = 0,5$ A
Connections	· Pluggable screw terminals for voltage supply, relay outputs, control inputs · Circular connector, 8 pin (scanner connection) · Mini-USB
Climate conditions	Acc. class 3K3 acc. EN 50178
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +80 °C

Mechanical Dimensions (mm)

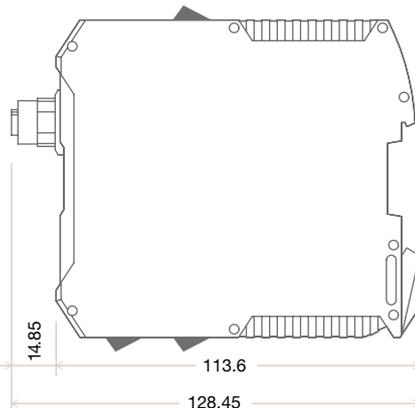
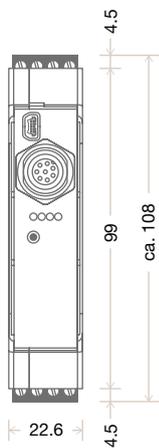


BK Mikro93 Basic



- Mini-USB for PC-connection
- 3 digital control inputs (positive or negative logic): start and teach signal as well as configurable channel
- 2 relay outputs (as N/C or N/O contact) with „OK“ and „KO“ signal
- Pluggable supply voltage and scanner connection
- Opening for top hat rail plug for optional connection of I/O extension module (in case of more than one tool monitoring)
- 4 LEDs for current status display

Mechanical Dimensions (mm)



Technical Data

Housing	Insulation material, protection class II, built-in type
Protection class	IP20
Dimensions (W x H x D)	22.6 mm x 99 mm x 113.6 mm
Mounting of housing	Profile rail 35 mm acc. DIN EN 50022
Supply voltage	24 V DC $\pm 20\%$ PELV, $I_{max} = 0,4$ A
Power consumption	10 VA max.
Control voltage	24 V DC $\pm 20\%$ PELV
Inputs	Galvanically isolated Input current ca. 5 mA Pulse duration 30 ms min.
Switch outputs	2 x relay 30 V DC, 2 A max. 10^5 switching cycles min.
Connections	<ul style="list-style-type: none"> · Pluggable screw terminals for voltage supply, relay outputs, control inputs · Circular connector, 8 pin (scanner connection) · Mini-USB
Climate conditions	Acc. class 3K3 acc. EN 50178
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +80 °C

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BK Mikro9 I/O Extension Module

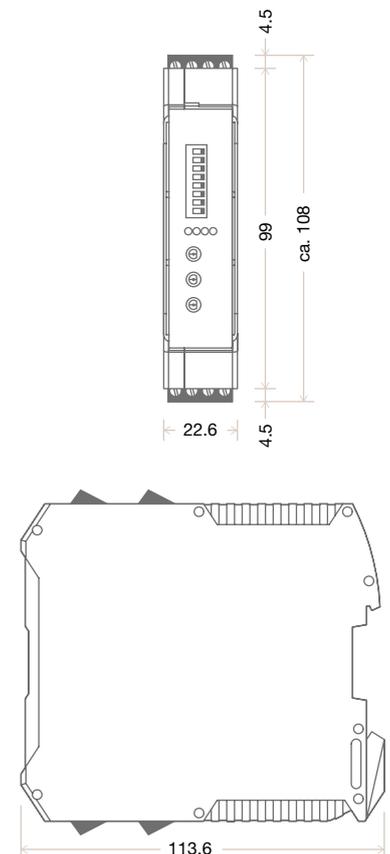
- 10 digital inputs to select/activate up to 512 different tool positions (positive or negative logic)
- 2 digital outputs for free configuration (active switching function for 24 V signal)
- 3 rotary switches for selecting the scanner and for feeding in the scanning angle (adjustable in 24°-steps from 0° to 360°)
- 8 toggle switches:
 - Selection monitoring type (object or free-space monitoring),
 - Selection rotational direction of wand (right and/or left),
 - Definition of relay outputs (N/C or N/O),
 - Setting of scanning intensity (2 steps),
 - Selection of tolerance range ($\pm 0,1^\circ / \pm 1,0^\circ / \pm 3,0^\circ / \pm 10,0^\circ$)
- 4 LEDs for current status display



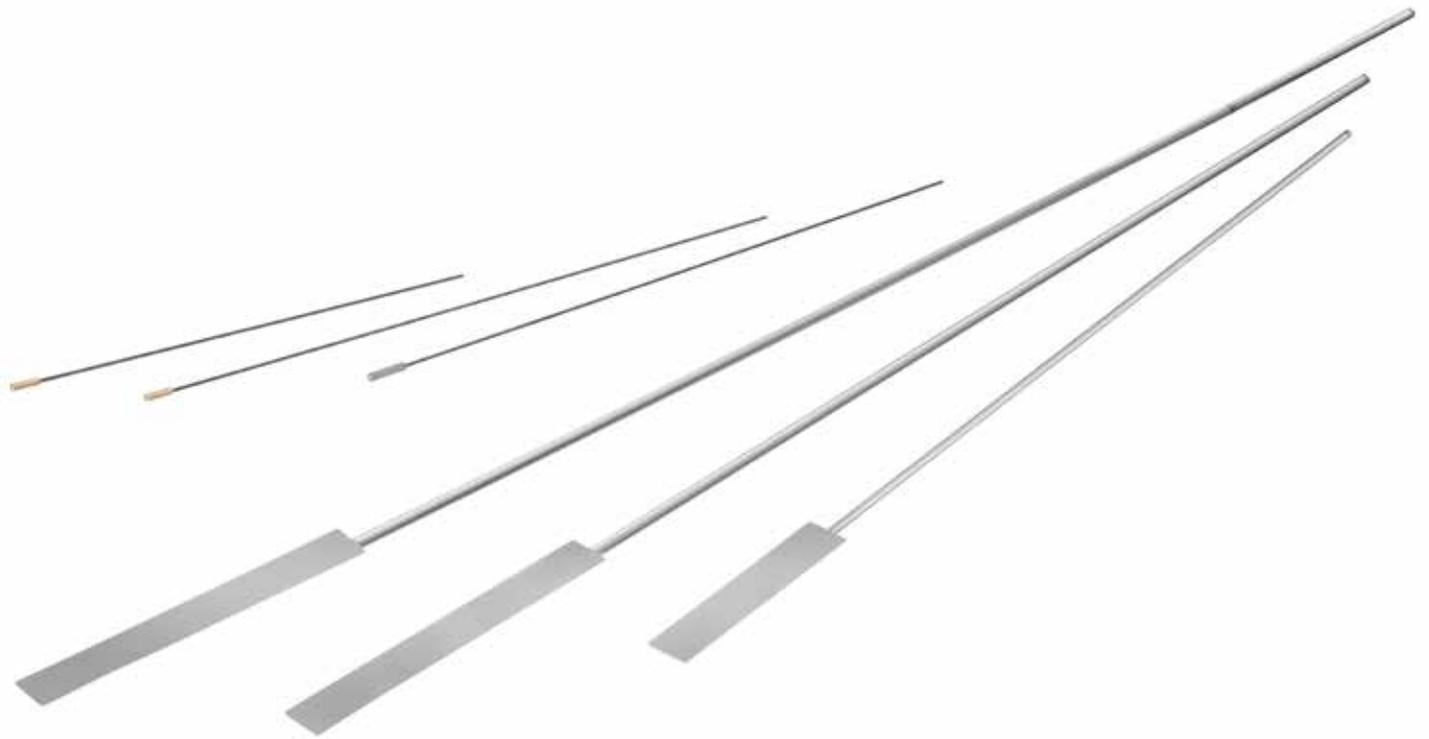
Technical Data

Housing	Insulation material, protection class II, built-in type
Protection class	IP20
Dimensions (W x H x D)	22.6 mm x 99 mm x 113.6 mm
Control voltage for outputs	24 V DC $\pm 20\%$ PELV
Inputs	Galvanically isolated Input current ca. 5 mA Pulse duration 30 ms min.
Switch outputs	2 x high side switch, $I_{max} = 0.5$ A
Connections	Pluggable screw terminals for 10 inputs, 2 outputs (with voltage supply)
Climate conditions	Acc. class 3K3 acc. EN 50178
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +80 °C

Mechanical Dimensions (mm)



Accessories: One Assortment for All Purposes.



Wands

- Wands in different lengths and designs (e.g. HSS-tips)
- Wands for lateral resp. axial scanning (with plate for axial applications only)
- Wands solid resp. hollow for individual shortening
- Easy replacement

It simply works! BK Mikro

In order to perfectly meet the requirements of monitoring tasks BK Mikro offers a comprehensive assortment of accessories and spare parts. Therefore, the system can be attuned to a variety of tasks and most difficult operational environments.

Wand Holders

- Different designs
- Easy replacement
- Protection against fine to large chips
- Protection against clumped cooling liquid
- Pre-configured wand holders with wands also available



Counter Weights

- For balancing of longer wands which do not scan in horizontal direction
- For wands with a thickness of 4 mm
- The better the balancing, the better the scanning results
- Available as set (one small + two big weights) or single weight adapted to wand



Wand tips for TK9LIN

- Set especially designed for linear scanning
- Wand tips made of brass resp. plastics
- Tips with predetermined breaking points (prevents damaging of scanner in error condition)
- Easy replacement



Mounting Brackets

- Different designs available for the respective scanner variants in $\varnothing 12$ mm, $\varnothing 20$ mm, $\varnothing 32$ mm
- Universal fixing options
- Perfect fixation of the scanner: safe reception, highly flexible orientation
- Bracket with adjustment aid
- Self-locking screw connection
- Anodized aluminium resp. stainless steel model



Cables

- To connect control unit and scanner
- Lengths: 0.3 m / 5 m / 7 m / 10 m / 15 m
- Also usable as extension cable
- 8 core PUR-cable with extruded plugs and small circular connectors (suitable for drag chains)
- Available with straight or angular plug (for scanner connection)



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Air Barrier Adapter

- Use with aggressive composition of coolants or emulsions
- Keeps dust, liquids and chips away from seals and increases scanner lifetime
- Consists of air barrier ring and air barrier wand holder
- For scanner axes with a diameter of 20 mm or 32 mm
- For wands with a thickness of 1.2 mm, 3 mm, 4 mm
- With air connection 90° or 180°
- Recommended pressure: 0.5 bar
- Quick and easy assembly



The accessories and spare parts presented here only show a part of the assortment available. Please find the total overview on:

www.bkmikro.com

Example: Scanner, equipped with different components.

It simply works!



You would like to find out more about BK Mikro?

The fastest way:

www.bkmikro.com

On the phone:

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