

# IK 5000 QUADRA-CHEK

– the Universal PC Package Solution for Measuring Machines



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IK 5000 QUADRA-CHEK, the universal PC package solution for 2-D and 3-D measuring tasks, is equally suitable for initial equipping on a machine as well as for retrofitting. It is available in versions for three or four axes, and the optional expansion stages make it ready for all coordinate measuring technology applications and for video measuring microscopes. You can use it to measure two- and three-dimensional geometries and their relationships.

### Description

IK 5000 QUADRA-CHEK consists of the IK 5000 slot card for the PC as well as the additional necessary slot covers, and the corresponding PC software. Once installed on your PC you will have a powerful measuring station.

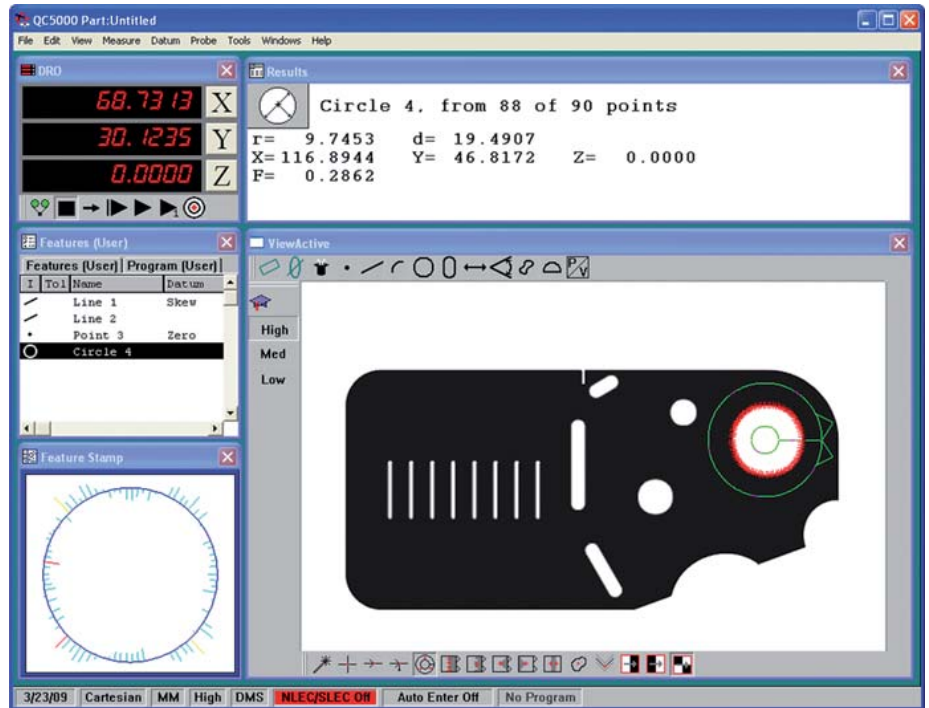
### System requirements

The following is necessary to run QUADRA-CHEK:

- PC: ≥ dual-core Pentium, 2.66 GHz
- Operating system: Windows XP or Vista
- RAM: ≥ 1GB
- Hard disk: At least 500 MB available
- One PCI slot and one or two additional empty slots (depending on the version)
- Screen:  
Resolution at least 1024 x 768 pixels;  
for the *video function*: 22" widescreen,  
resolution at least 1680 x 1050 pixels

### Configuration

Various versions of the IK 5000 are available. Please see the configuration table for the model designations and various functions supported.



### User interface

The IK 5000 QUADRA-CHEK screen shows various configurable windows and tool fields for clear and simple operation.

The **ViewActive** window shows the measured features with the accepted measurement points. You can also define relationships here.

The **Video** window (only in the version with video evaluation) shows the video image in real time.

The **Template** windows list all measured features, relationships and constructed features together with their values and tolerances in tables.

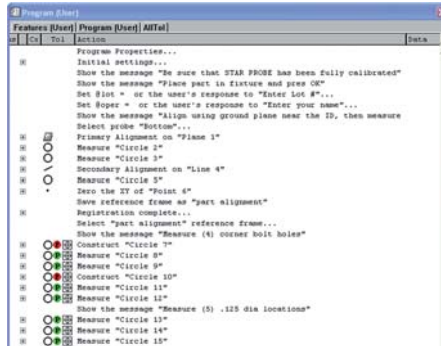
The element currently being measured is shown in the **Feature Stamp** window. The **Results** window contains all corresponding information.

The current measurement position is shown in the **DRO** window.

	IK 5294	IK 5293	IK 5394-EG	IK 5394-2D	IK 5493	IK 5494-2D	IK 5494-3D	IK 5594
<b>Axes</b>	4 XYZQ	3 XYZ	4 XYZQ	4 XYZQ	3 XYQ	4 XYZQ	4 XYZQ	4 XYZQ
<b>2-D geometries</b>	●	●	●	●	●	●	●	●
<b>3-D geometries</b>	–	●	–	–	–	–	●	●
<b>Optical edge detector</b>	–	–	●	–	●	–	–	–
<b>Video evaluation</b>	–	–	–	●	–	●	●	●
<b>Light/zoom control</b>	–	–	–	●	–	●	●	●
<b>Autofocus</b>	–	–	–	–	–	●	●	●
<b>Touch probe</b>	–	●	–	–	–	–	●	TP200
<b>CNC function</b>	–	–	–	–	●	●	●	●

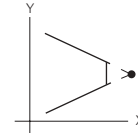
### Programming of parts

Difficult and repetitive measuring tasks can be simplified with the aid of a program that you either create yourself or record automatically during measurement of the first part. QUADRA-CHEK learns the reference points, the sequence of measurements, tolerances and data-output commands. QUADRA-CHEK visually leads you to the features to be probed when the program is run. The program view also provides you with an optimum overview of the process.

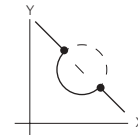


### Excerpt from the possibilities for the construction of features:

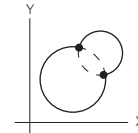
#### 2-D possibilities



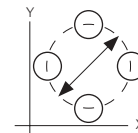
Intersection of two lines



Intersection of line and circle



Intersection of two circles



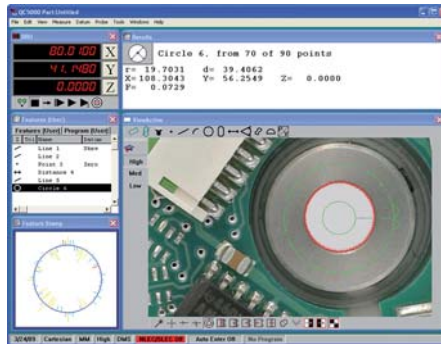
Hole circle formed from three or more circles



Bisector of two lines

### Integrated image processing

The integrated image processing function included with the video-function versions provides a special benefit: the video image is shown on the screen in real time and can be saved. QUADRA-CHEK can even assume complete control of the illumination and the motor zoom. A digital USB camera can be connected.



In order to quickly and directly compare the actual status and nominal status, import the parts drawing in DXF or IGS format, and place it over the video image.

### Axis positioning

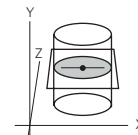
The CNC versions of the IK 5000 QUADRA-CHEK work as full-fledged controls, directly controlling the positioning of the X, Y, Z and Q axes. Servo and stepper motors can be connected. The necessary servo amplifiers for two or three axes are available as accessories.

### Automating

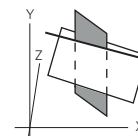
Programs running in combination with the CNC function of IK 5000 QUADRA-CHEK run automatically. This minimizes the effects of subjective assessments, and increases data throughput noticeably. By automating series of measurements and complex procedures, you spare yourself the strain of performing repetitive measuring tasks.



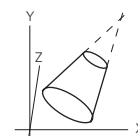
#### 3-D possibilities



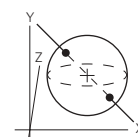
Intersection of cylinder and surface



Plane from plane and 3-D line



Taper angle



Intersection of sphere and line

# IK 5000 QUADRA-CHEK

## – Functions

The innovative operator guidance provides self-explanatory information about the various functions. It already supports you while setting up the coordinate system (aligning the part and specifying the datum).

Various predefined features are available for measurement, depending on the version:  
*2-D saving:* Point, line, circle, slot, rectangle  
*3-D saving:* Plane, cylinder, cone, sphere  
 The "Measure Magic": it selects that feature which best matches the shape implied by the points probed.

With IK 5000 QUADRA-CHEK you can define features yourself (for example, a circle whose position and dimensions are exactly specified). In addition, you can establish relationships (distances, angles) between features.

Measuring programs that you create yourself or record automatically simplify the efforts necessary for repeated parts. The digital readout graphically takes you to the next measurement position during program run.

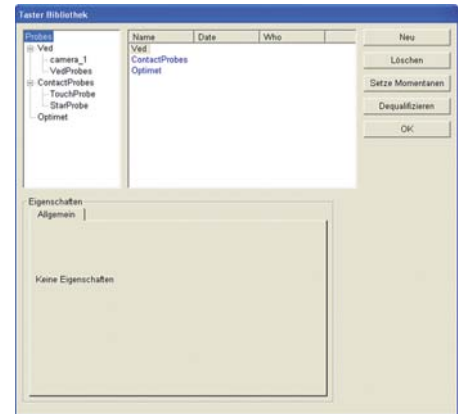
Depending on the version, IK 5000 QUADRA-CHEK saves measurement points of plane (2-D) contours either automatically or manually via crosshairs, via optical edge detection, or via a video camera.

For 3-D contours, such as planes, cylinders, cones and spheres, the measurement points are saved by probing with a touch probe. If a triggering touch probe is used the values are saved automatically. With rigid probing elements a key must be pressed.

The measured features can be clearly displayed either in three dimensions or in one of the three projection planes.

### Multi-sensor scanning

Along with the usual method for saving measurement points, the IK 5494 and IK 5594 versions permit multi-sensor scanning: in addition to the video camera, the measuring machine is also equipped with a touch probe. You can then use the touch probe to measure 3-D features on the object, and enjoy the advantages of video evaluation for 2-D features. The integrated probe library manages the various measurement tools for you, whether they be optical, video, laser or touch-probe systems.

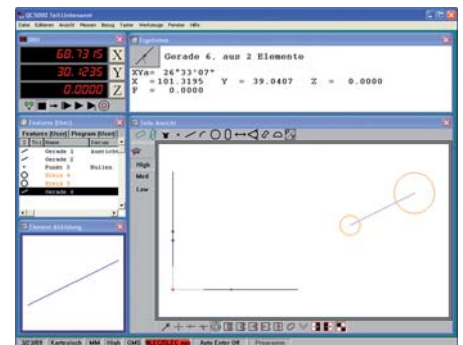


### Constructed features

QUADRA-CHEK gives you several possibilities for determining dimensions:

- Measuring the features
- Calculating the features (e.g. the center point of a measured circle)
- Establishing a relationship between features (e.g. distance between two circle center points, angle between two lines)

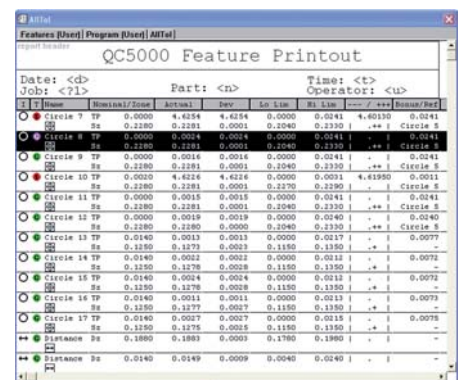
However, you can also construct new features from existing features and from relationships. The properties of these constructed features can then be seen directly in the parts view.



### Data management

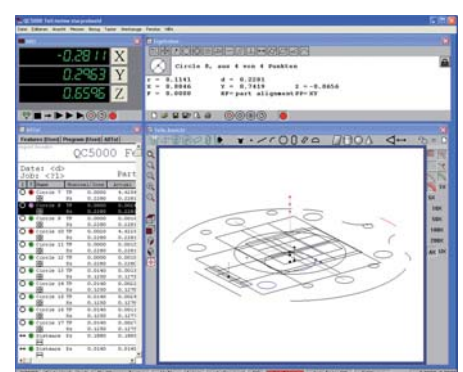
The integrated data-report generator for customized forms, databases and tolerance checks is used to archive, export and import data in numerous formats. Use the integrated spreadsheets for complex and non-standard calculations.

Simply send your customized reports to a printer, or make the data available to other users in a database.



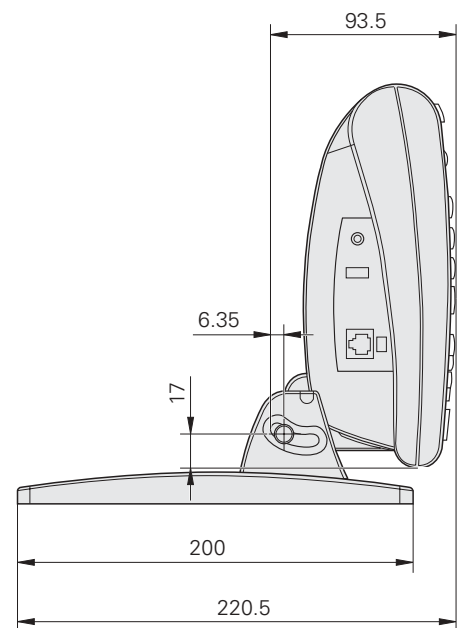
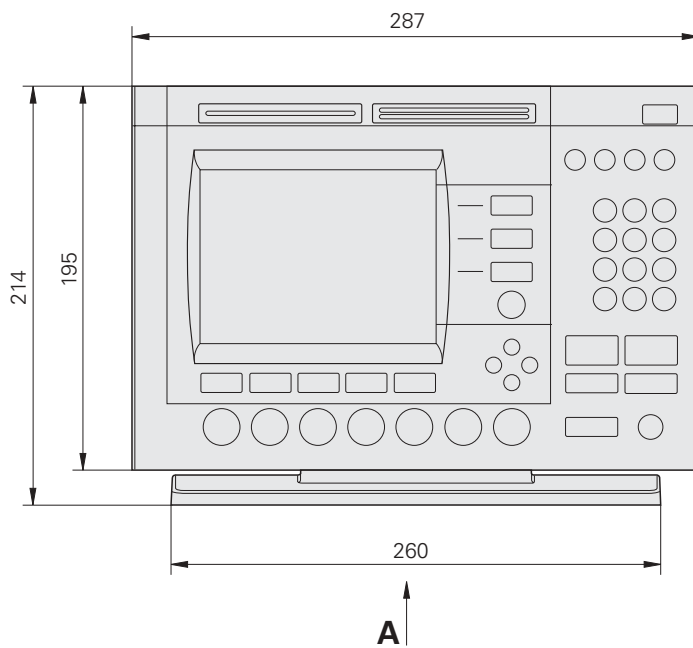
### Functional ViewActive window

QUADRA-CHEK provides you with a comprehensive, graphical ViewActive window. You can choose between a 3-D view, or a projection in the XY, YZ or ZX planes. Additionally, you can magnify, reduce, zoom, shift or rotate the views. You can define tolerances and constructed features in any view. The "pass/fail" color coding makes it easy to determine whether the part matches the specifications.



# Mounting

## Dimensions of ND 1000/ND 2000



Dimensions in mm



Tolerancing ISO 8015

ISO 2768 - m H

< 6 mm:  $\pm 0.2$  mm

# Mounting and Protection

## Mounting

The ND 1000 and ND 2000 display units were conceived as upright units. There are several possible mounting configurations:

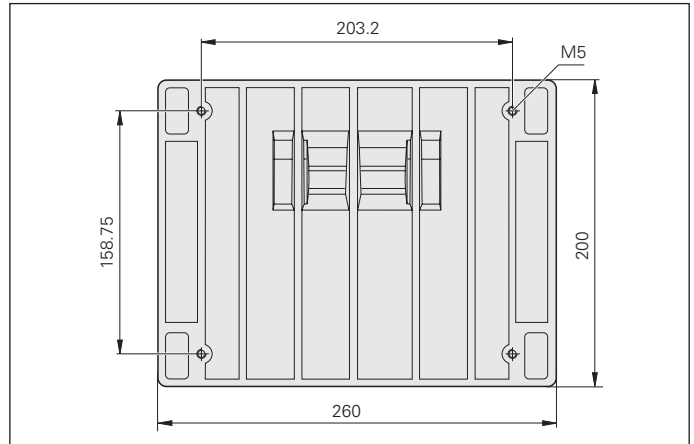
- Tilting base
- Mounting base

## Tilting base

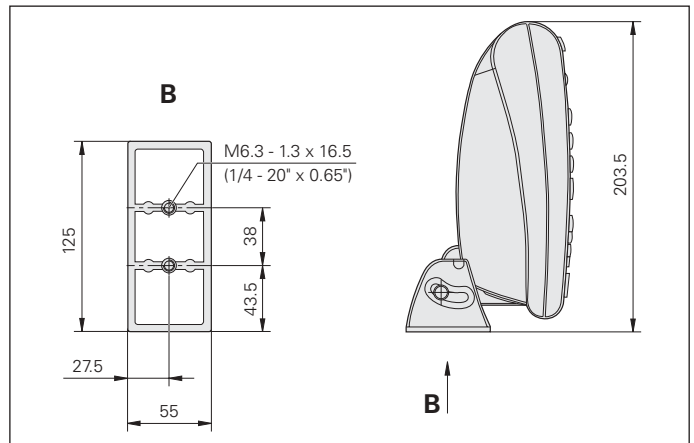
The tilting base is included in delivery. It can be used to tilt the display forward and backward by up to 20°. It can be attached with M5 screws.

## Mounting base (accessory)

With the aid of a mounting base you can set up the ND 1000 and ND 2000 either on the machine or on a mounting arm.



ID 682419-01



## Protective cover (accessory)

Protective covers are available accessories in order to protect the keyboard and screen of the ND 1000/ND 2000 from becoming soiled. The display can still be easily read through the transparent protective covers. They fit themselves optimally to the front of the unit, without impairing the ease of operation.

ND 11xx; 1/2 axes	ID 681051-02
ND 11xx; 3/4 axes	ID 681051-03
ND 12xx	ID 681051-01
ND 21xx	ID 681051-04



# Interfaces

## Digital Readouts

The digital readouts feature interfaces for encoders, for communication and for external components.



	ND 1102 ND 1103 ND 1104	ND 1202	ND 1203 ND 1204	ND 1302 ND 1303 ND 1304		ND 1404	ND 1202 T	ND 2104 G ND 2108 G
<b>Encoders</b>	1 V <sub>PP</sub> or TTL							
<b>Touch probe</b>	● <sup>1)</sup>	–	–	–	–	● <sup>1)</sup>	–	● <sup>2)</sup>
<b>Video</b>	–	–	–	● <sup>3)</sup>	–	–	–	–
<b>Fiber-optic cable</b> Optical edge detector	–	Option	Upon request	–	●	–	–	–
<b>Data</b>	RS-232-C/V.24 and USB type A							
<b>Light control</b>	–	–	–	Option	–	–	–	–
<b>Zoom</b>	–	–	–	Option	–	–	–	–
<b>CNC outputs</b>	–	–	–	Option	Option	–	–	–
<b>Foot switch</b>	●	●	●	●	●	●	●	●
<b>Remote keypad</b>	●	●	●	●	●	–	●	●
<b>Switching outputs</b>	–	–	–	–	–	–	–	12 TTL
<b>Switching inputs</b>	–	–	–	–	–	–	–	5 TTL

● = Available

– = Not available

<sup>1)</sup> HEIDENHAIN touch probe or Renishaw touch probe

<sup>2)</sup> Connection for two relay outputs or HEIDENHAIN touch probe or Renishaw touch probe

<sup>3)</sup> S-Video and composite

# IK 5000



Connections to the IK 5000 are made via its D-sub connectors. Depending on the version, further connections are made through one or two additional slot covers.

		IK 5293	IK 5294	IK 5394-EG	IK 5394-2D	IK 5493	IK 5494-2D	IK 5494-3D	IK 5594
	Slots <sup>1)</sup>	2	2	2	3	3	3	3	3
	Location								
<b>Encoders for X, Y, Z</b>	IK	1 V <sub>PP</sub> or TTL							
<b>CNC outputs</b>	IK	–	–	–	–	●	●	●	●
<b>Foot switch</b>	IK	●	●	●	●	●	●	●	●
<b>Fiber-optic cable</b>	Slot L	–	–	● <sup>2)</sup>	–	● <sup>2)</sup>	–	–	–
<b>Touch probe</b>	Slot 1	● <sup>3)</sup>	–	–	–	–	–	● <sup>3)</sup>	TP 200
<b>Light control</b>	Slot 1	–	–	–	●	–	●	●	●
<b>Zoom</b>	Slot 2	–	–	–	●	–	●	●	●
<b>Encoder for Q axis</b>	Slot 2	–	1 V <sub>PP</sub> or TTL						
<b>Video</b>	PC	–	–	–	USB camera <sup>4)</sup>	–	USB camera <sup>4)</sup>	USB camera <sup>4)</sup>	USB camera <sup>4)</sup>

● = Available

– = Not available

<sup>1)</sup> Including IK

<sup>2)</sup> Connected directly to the IK PCB, special slot cover with cable guide included in delivery

<sup>3)</sup> HEIDENHAIN touch probe or Renishaw touch probe

<sup>4)</sup> Connected to the USB port of the PC

Please order the adapter cables necessary between the individual components separately.

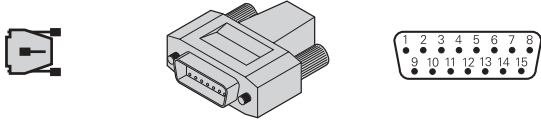
# Interfaces


## Encoders

Depending on the versions, the digital readouts and the PC board are designed for encoders with 1 V<sub>PP</sub> or TTL interface. Other interfaces are available upon request. A distribution cable is necessary in order to attach the encoders to the IK 5000.

### Pin layout $\sim 1 V_{PP}$

Mating connector:  
**15-pin D-sub connector (male)**



	Power supply				Incremental signals						Others
	<b>4</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>1</b>	<b>9</b>	<b>3</b>	<b>11</b>	<b>14</b>	<b>7</b>	<b>5/6/8/ 13/15</b>
$\sim 1 V_{PP}$	<b>U<sub>P</sub></b>	<b>Sensor U<sub>P</sub></b>	<b>0V</b>	<b>Sensor 0V</b>	<b>A+</b>	<b>A-</b>	<b>B+</b>	<b>B-</b>	<b>R+</b>	<b>R-</b>	<b>/</b>

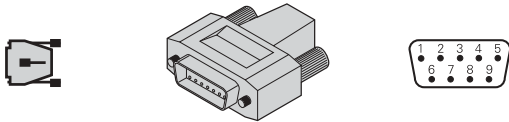
**Shield** on housing; **U<sub>P</sub>** = Power supply voltage


**Sensor:** The sensor line is connected in the encoder with the corresponding power line.

Vacant pins or wires must not be used!

### Pin layout $\square$ TTL

Mating connector:  
**9-pin D-sub connector (male)**



	Power supply			Incremental signals					
	<b>7</b>	<b>6</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>8</b>	<b>9</b>
$\square$ TTL	<b>U<sub>P</sub></b>	<b>0V</b>	<b>0V</b>	<b>U<sub>a1</sub></b>	<b><math>\overline{U}_{a1}</math></b>	<b>U<sub>a2</sub></b>	<b><math>\overline{U}_{a2}</math></b>	<b>U<sub>a0</sub></b>	<b><math>\overline{U}_{a0}</math></b>

**Shield** on housing; **U<sub>P</sub>** = Power supply voltage

Vacant pins or wires must not be used!