

	ND 1202	ND 1203	ND 1204
<b>Axes*</b>	2 (XY)	3 (XYQ) or 3 (XYZ)	4 (XYZQ)
<b>Encoder inputs*</b>	~ 1 V <sub>PP</sub> or □□TTL (other interfaces upon request)		
<b>Subdivision factor</b>	10-fold (only for 1 V <sub>PP</sub> )		
<b>Display step<sup>1)</sup></b>	Adjustable, max. 7 digits Linear axes XYZ: 1 mm to 0.0001 mm Angular axis Q: 1° to 0.0001° (00° 00' 01")		
<b>Display</b>	5.7" monochrome flat-panel display for position values, dialogs and inputs, graphics functions and soft keys		
<b>Functions</b>	<ul style="list-style-type: none"> <li>• Measurement of two-dimensional features (2-D)</li> <li>• Point measurement with crosshairs</li> <li>• Programming of features and parts</li> <li>• Measure Magic: automatic recognition of geometries</li> <li>• Graphic display of measurement results</li> <li>• Entry of tolerances</li> <li>• Measurement series with MIN/MAX display</li> </ul>		
<b>Edge detector*</b>	Automatic capture of measurement points via optical edge detector (option)	Upon request	
<b>Error compensation</b>	<ul style="list-style-type: none"> <li>• Linear, and segmented over up to 150 points</li> <li>• Squareness calibration</li> <li>• Matrix compensation over up to 30 x 30 points</li> </ul>		
<b>Data interface</b>	<ul style="list-style-type: none"> <li>• RS-232-C/V.24</li> <li>• USB (type A)</li> </ul>		
<b>Other connections</b>	<ul style="list-style-type: none"> <li>• Foot switch for two functions, or remote keypad</li> <li>• Optical edge detector (only if the option is selected)</li> </ul>		
<b>Accessories</b>	Mounting base, foot switch, remote keypad, fiber-optic cables holder, demo part, protective cover		
<b>Main power input</b>	100 V~ to 240 V~ (-15 % to +10 %), 43 Hz to 63 Hz		
<b>Operating temperature</b>	0 °C to 45 °C		
<b>Protection EN 60529</b>	IP 00, front panel IP 40		
<b>Weight</b>	ND: 1.6 kg; Tilting base: 3.2 kg		

\* Please select when ordering

<sup>1)</sup> Depends on the signal period of the connected encoders as well as the subdivision factor

# ND 1200 QUADRA-CHEK

– the Digital Readouts for 2-D Geometries



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(978)887-3389 gevanwert.com

The ND 1200 digital readouts can support up to four axes, and function as measuring computers for 2-D geometries. They are mainly suited to optical comparators, measuring microscopes and 2-D measuring machines.

## Description

The ND 1200 QUADRA-CHEK digital readouts have a monochrome flat-panel screen for displayed values, dialogs and inputs, graphics functions and soft keys. The robust, diecast aluminum enclosure meets the demands of metrology and production control.

## Functions

The appropriate combination of defined function keys and context-dependent soft keys always provides you with a clear overview. 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).

Predefined features (point, line, circle) are available for measurement. The "Measure Magic" function makes measurement especially easy: it selects that feature which best matches the shape implied by the points probed. In addition, you can establish relationships (distances, angles) between features.

You can also apply tolerance values to features and relationships. Only those tolerances actually possible are offered for the selected feature. You can create or automatically record measuring programs for repeated parts. The digital readout graphically takes you to the next measurement position during program run.

The ND 1200 captures measurement points of plane contours (2-D) either manually via crosshairs or, as an option, automatically via the optical edge detector.

## Data interfaces

You use the data interfaces to output measurement points as well as to load and save settings, compensation values and programs. The RS-232-C/V.24 serial interface enables communication with a PC. You can connect printers or memory media to the USB port.

## Graphic display

In addition to the position values, the ND 1200 also displays the features graphically. Along with the individual measurement points, the geometrical and arithmetical deviations are also shown. Furthermore, for circles the maximum inscribed circles and minimum circumscribed circles are shown.

## Tolerances

You can also apply tolerance values to any feature. Only those tolerances actually possible are offered for the selected feature. This means that a point can only be assigned a tolerance check for its position, whereas a circle can be assigned position, shape and size tolerances.

## Defining features

You can use the QUADRA-CHEK digital readouts to define features yourself. For example, this could be a circle whose position and dimensions are exactly defined, or an alignment line that is at a specified angle to a measurable line.

## Measure Magic

The Measure Magic function recognizes the geometric pattern based on the distribution of the measurement points, and automatically calculates which feature it is, such as a point, line or circle. If the measurement points are poorly chosen, then it may not be possible to determine the feature unambiguously. Measure Magic then chooses the more common version. You can have the feature displayed graphically, and then select from the possibilities.

CIRCLE 5		mm	1	+	
	X	-78.9149			
	Y	3.9592			
	D	0.3898			
	Pts=8				
	F LSBF	0.0190			
DRO					
Recall	View	Change	Zoom	Tol	

CIRCLE 2		mm	1	+	
Circle Position and Size Tolerance					
Tol Type: BiDir					
	Actual	Dev			
X	174.9079	0.0079			✓
Y	-20.1577	0.0023			✓
D	58.3624	0.0004			✓
Edit	Nominal	Actual	Dev	Other	

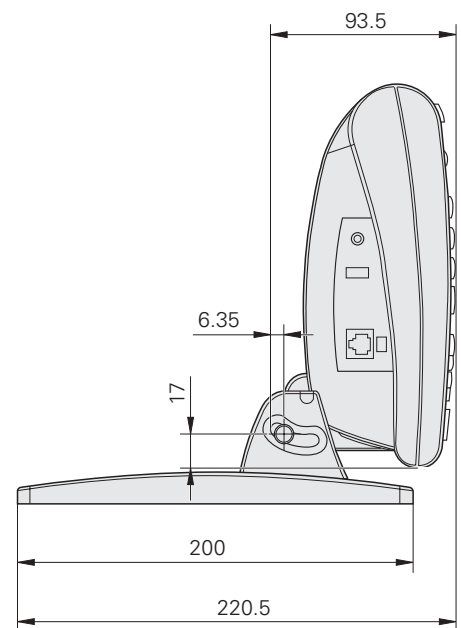
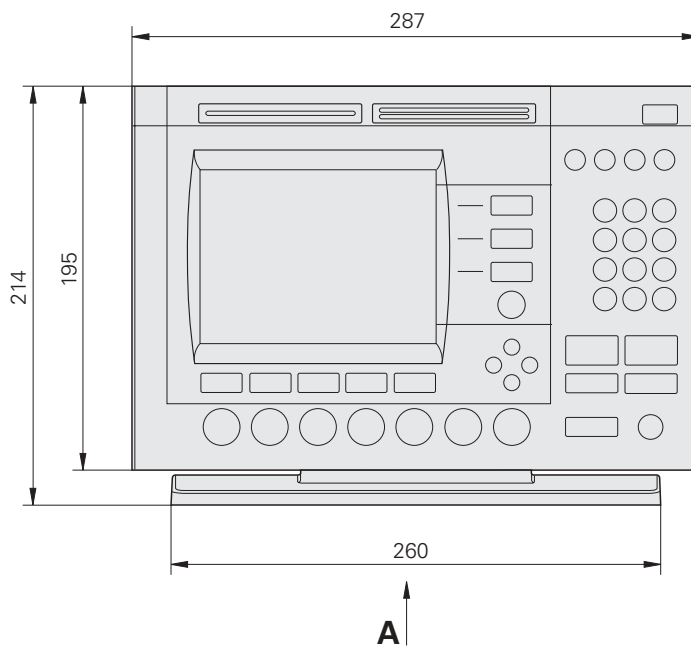
ANGLE 12		mm	1	+	
	X	10.0000			
	Y	20.0000			
	A1	50°00'00"			
	Created				
DRO					
Recall	View			Tol	

CIRCLE 2		mm	1	+	
	X	221.6924			
	Y	9.0327			
	D	8.6658			
	Pts=3				
	F LSBF	0.0000			
DRO					
Recall	View	Change	Zoom	Tol	



# 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:

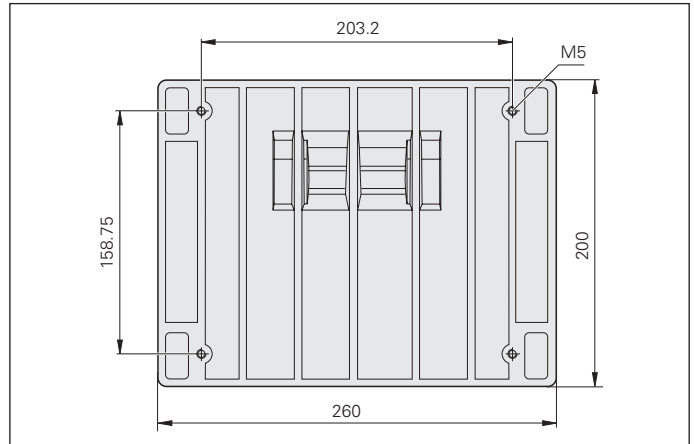
- Tilting base
- Mounting base

## Tilting base

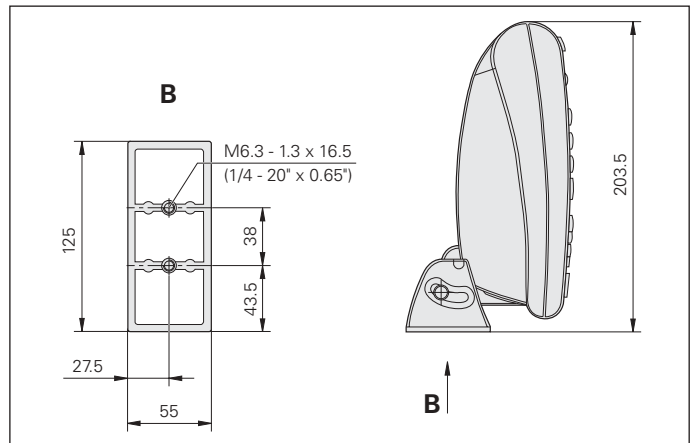
The tilting base is included in delivery. It can be used to tilt the display forward and backward by up to 20°. It can be attached with M5 screws.

## 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.

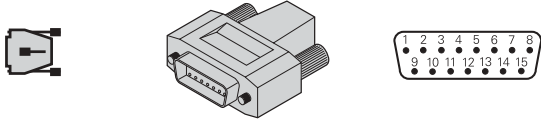
# Interfaces


## 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>

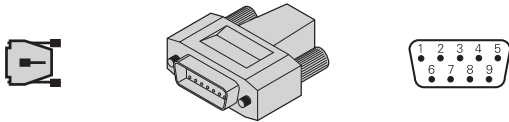
**Shield** on housing; **U<sub>P</sub>** = Power supply voltage


**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!