

ND 1300 QUADRA-CHEK

– the Digital Readouts for Convenient 2-D Measurement



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The ND 1300 QUADRA-CHEK digital readouts can support up to four axes. They function as measuring computers with 2-D acquisition of measurement points, suiting them for measuring microscopes, measuring projectors and profile projectors, as well as for video measuring machines if the video edge detection option is selected.

Description

The digital readouts of the ND 1300 series are characterized by the large, color touchscreen. Their enclosures consist of robust, diecast aluminum.

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).

Predefined features (point, line, circle, slot and rectangle) are available for measurement. The "Measure Magic" function makes measurement especially easy. In addition, you can establish relationships (distances, angles) between features.

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.

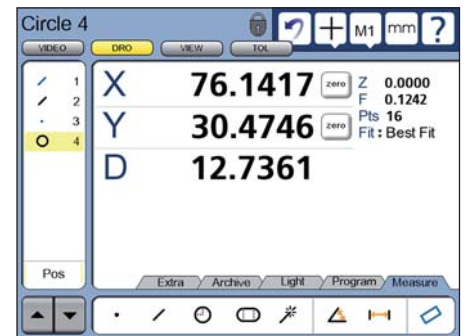
Depending on the option installed, the ND 1300 saves measurement points of plane (2-D) contours either automatically or manually via crosshairs, optical edge detection, or a video camera. The integrated image processing function of the video option provides a special benefit: the video image is shown on the screen in real time, can be saved and output via the data interface. The digital readout even assumes complete control of the illumination and the motor zoom.

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.

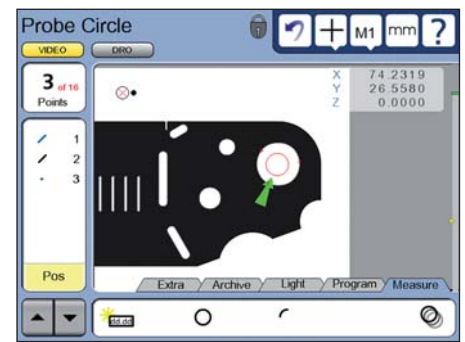
Clearly structured display

The large, color, flat-panel touchscreen enables simple operation with intuitive operator guidance, since in each mode only those functions actually available are offered for selection. The numeric keypad and the few basic function keys are located in ergonomically favorable positions.



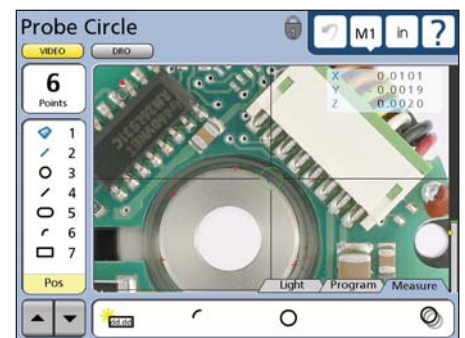
Saving of measurement points

The ND 1300 readouts are designed for 2-D measurements. You are provided with various tools with which you can manually or automatically save measurement points. For automatic saving of measurement points you simply roughly approach the position. The actual edge is automatically detected by the active tool (option). This objective saving of the measurement point permits a high degree of repeatability. This makes it possible for you to work quickly and reliably, without tiring, while at the same time maintaining a low degree of measurement uncertainty.



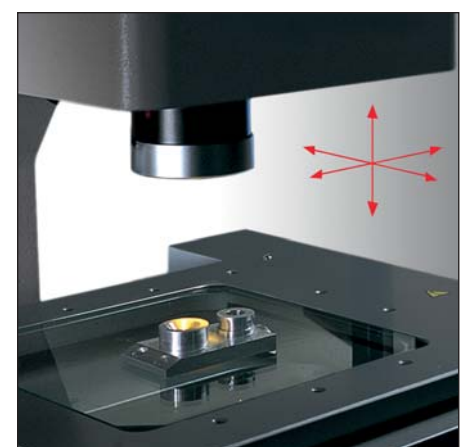
Integrated image processing

The ND 1300 with video option optimally combines in one unit the functions of a position display unit with the capability of displaying the image of the measured object directly on the screen. The separate PC with a frame grabber or monitor with crosshair generator that you would normally need is not necessary. Video cameras with S-Video or composite interfaces can be connected.



Axis positioning

The CNC option lets the ND 1300 work as a full-fledged control, 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.



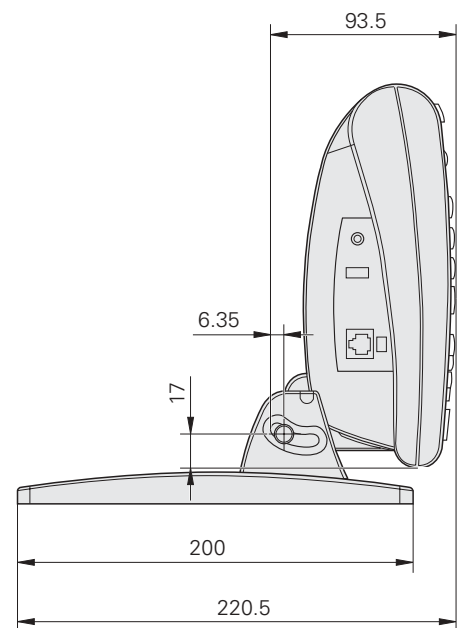
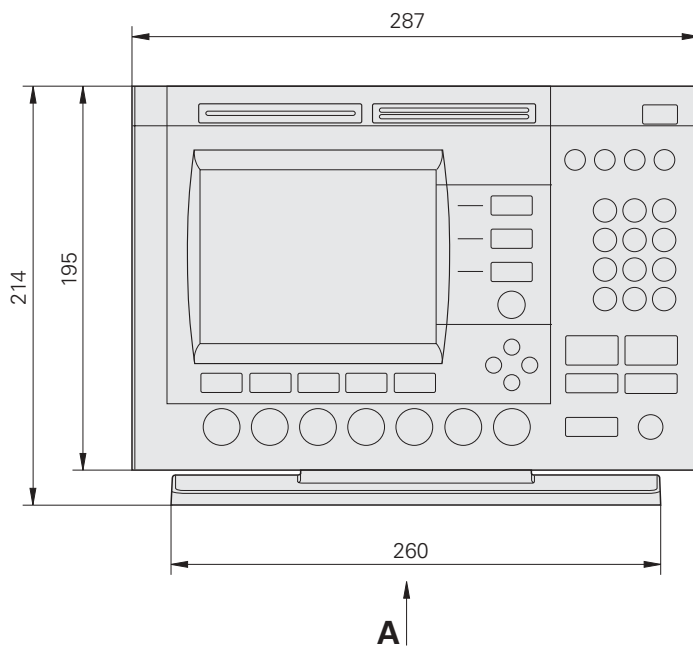


	ND 1302	ND 1303	ND 1304
Axes*	2 (XY)	3 (XYQ) or 3 (XYZ)	4 (XYZQ)
Encoder inputs*	~ 1 V _{PP} or □□TTL (other interfaces upon request)		
Subdivision factor	10-fold (only for 1 V _{PP})		
Display step¹⁾	Adjustable, max. 7 digits Linear axes XYZ: 1 mm to 0.0001 mm Angular axis Q: 1° to 0.0001° (00° 00' 01")		
Display	8.4" color flat-panel display (touchscreen); resolution: SVGA 800 x 600 pixels, for position values, dialogs and inputs, graphics functions, soft keys, and display of video images with the <i>Video</i> option		
Functions	<ul style="list-style-type: none"> • Measurement of two-dimensional features (2-D) • Point measurement with crosshairs • Programming of features and parts • Measure Magic: automatic recognition of geometries • Graphic display of measurement results • Entry of tolerances 		
Edge detector* (option)	<ul style="list-style-type: none"> • Automatic saving of measurement points via optical edge detector 		
Video* (Option)	<ul style="list-style-type: none"> • Automatic saving of measurement points via video edge detection • Manual autofocus (only for Z axis) • Show live images • Archive and output live images (<i>Archive</i> option, only with the <i>Video</i> and <i>Zoom</i> options) • Zoom and light control, programmable (<i>Zoom</i> option, only with the <i>Video</i> option) 		
CNC* (Option)	<ul style="list-style-type: none"> • Automation of measurement tasks • Axis control (for XYZQ) for servo and stepper motors • Autofocus via step-motor control 		
Error compensation	<ul style="list-style-type: none"> • Linear, and segmented over up to 1000 points • Squareness calibration • Matrix compensation over up to 30 x 30 points 		
Data interface	<ul style="list-style-type: none"> • RS-232-C/V.24 • USB (type A) 		
Other connections	<ul style="list-style-type: none"> • Foot switch for two functions, or remote keypad • Video connection for S-Video and composite (<i>Video</i> option) • Light control over six light sources and zoom control (for <i>Video</i> and <i>Zoom</i> options) • CNC outputs and inputs for joystick (for <i>CNC</i> option) 		
Accessories	Mounting base, foot switch, fiber-optic cables holder, servo amplifier, calibration standard, demo parts, protective cover		
Main power input	100 V~ to 240 V~ (-15 % to +10 %), 43 Hz to 63 Hz		
Operating temperature	0 °C to 45 °C		
Protection EN 60529	IP 00, front panel IP 40		
Weight	ND: 1.6 kg; Tilting base: 3.2 kg		

* Please select when ordering; the options *Edge detector* and *Video* cannot be combined
¹⁾ Depends on the signal period of the connected encoders as well as the subdivision factor

Mounting

Dimensions of ND 1000/ND 2000



Dimensions in mm



Tolerancing ISO 8015

ISO 2768 - m H

< 6 mm: ± 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:

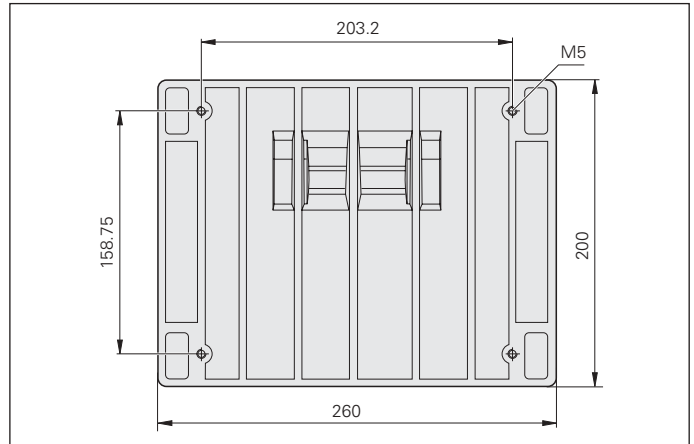
- Tilting base
- Mounting base

Tilting base

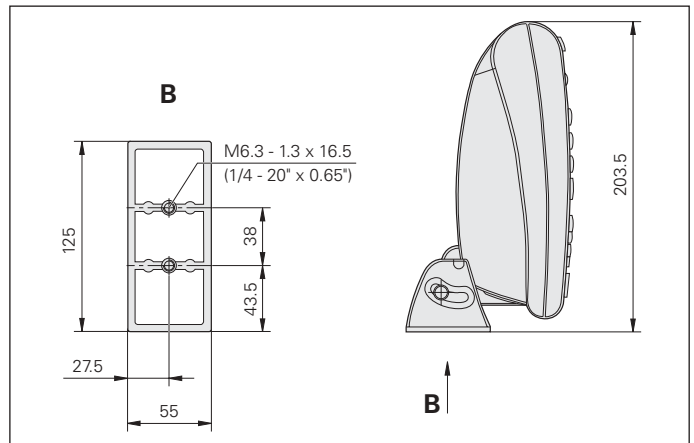
The tilting base is included in delivery. It can be used to tilt the display forward and backward by up to 20°. It can be attached with M5 screws.

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
Encoders	1 V _{PP} or TTL							
Touch probe	● ¹⁾	–	–	–	–	● ¹⁾	–	● ²⁾
Video	–	–	–	● ³⁾	–	–	–	–
Fiber-optic cable Optical edge detector	–	Option	Upon request	–	●	–	–	–
Data	RS-232-C/V.24 and USB type A							
Light control	–	–	–	Option	–	–	–	–
Zoom	–	–	–	Option	–	–	–	–
CNC outputs	–	–	–	Option	Option	–	–	–
Foot switch	●	●	●	●	●	●	●	●
Remote keypad	●	●	●	●	●	–	●	●
Switching outputs	–	–	–	–	–	–	–	12 TTL
Switching inputs	–	–	–	–	–	–	–	5 TTL

● = Available

– = Not available

¹⁾ HEIDENHAIN touch probe or Renishaw touch probe

²⁾ Connection for two relay outputs or HEIDENHAIN touch probe or Renishaw touch probe

³⁾ 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 ¹⁾	2	2	2	3	3	3	3	3
	Location								
Encoders for X, Y, Z	IK	1 V _{PP} or TTL							
CNC outputs	IK	–	–	–	–	●	●	●	●
Foot switch	IK	●	●	●	●	●	●	●	●
Fiber-optic cable	Slot L	–	–	● ²⁾	–	● ²⁾	–	–	–
Touch probe	Slot 1	● ³⁾	–	–	–	–	–	● ³⁾	TP 200
Light control	Slot 1	–	–	–	●	–	●	●	●
Zoom	Slot 2	–	–	–	●	–	●	●	●
Encoder for Q axis	Slot 2	–	1 V _{PP} or TTL						
Video	PC	–	–	–	USB camera ⁴⁾	–	USB camera ⁴⁾	USB camera ⁴⁾	USB camera ⁴⁾

● = Available

– = Not available

¹⁾ Including IK

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

³⁾ HEIDENHAIN touch probe or Renishaw touch probe

⁴⁾ Connected to the USB port of the PC

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

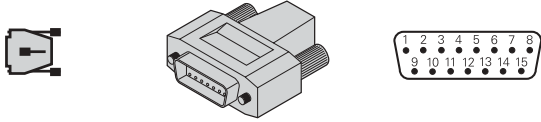
Interfaces


Encoders

Depending on the versions, the digital readouts and the PC board are designed for encoders with 1 V_{PP} 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
	4	12	2	10	1	9	3	11	14	7	5/6/8/ 13/15
$\sim 1 V_{PP}$	U_P	Sensor U_P	0V	Sensor 0V	A+	A-	B+	B-	R+	R-	/

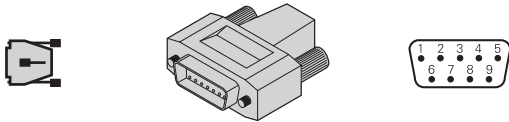
Shield on housing; **U_P** = Power supply voltage


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					
	7	6	1	2	3	4	5	8	9
\square TTL	U_P	0V	0V	U_{a1}	\overline{U}_{a1}	U_{a2}	\overline{U}_{a2}	U_{a0}	\overline{U}_{a0}

Shield on housing; **U_P** = Power supply voltage

Vacant pins or wires must not be used!