

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Heidenhain ND221* at our website: ***Click HERE***

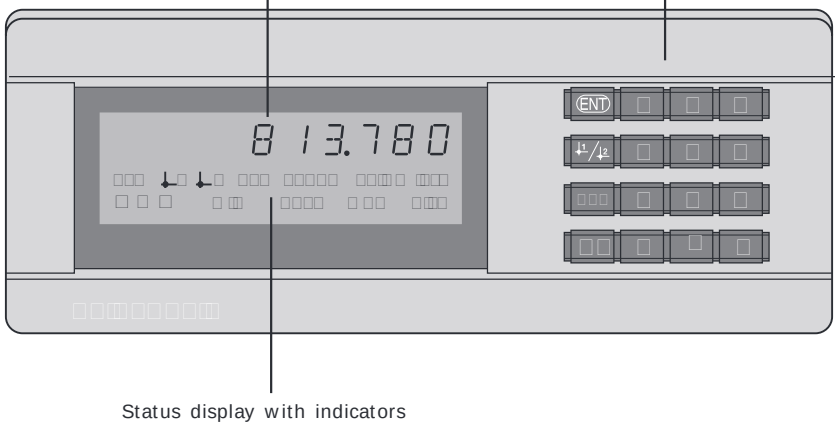
HEIDENHAIN



User's Manual

Measured Value Displays

6/ 2000



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Key	Function
ENT	• Set datum • Transfer input value • Set display to value from P79 (P80!) • Leave parameter list
↓1/↓2	• Select datum • Page backwards in parameter list
MOD	• Select parameter after switch-on • Page forward in parameter list • Start measured value output “PRINT”
CL	• Delete entry • Set display to zero (P80!) • CL plus MOD: select parameter list • CL plus number: select parameter • Delete parameter input and show parameter number
–	• Algebraic sign • Reduce parameter value
.	• Decimal point • Increase parameter value

Indicator	Meaning
REF	If the decimal point is also blinking: Display is waiting for reference mark traversing. If decimal point is not blinking: Reference mark has been traversed— display stores datum points in nonvolatile memory. Blinking: display is waiting for ENT or CL to be depressed.
inch	Position values in inches
↓1 / ↓2	Selected datum point
PRINT	Measured value output with MOD key
SET	Blinking: Display is waiting for input values
< / = / > MIN / MAX / DIFF / ACTL / START	Without function

Items supplied with ND 221 B	
ND 221 B Encoder input 11 μA_{PP}	Measured value display unit, benchtop model Id.-Nr. 344 992-xx
Power cord	3 m (9.9ft)
User's Manual	ND 221 B
Adhesive plug-in feet	For stacking ND 221B units

This manual is for the ND 221 B measured value display with the following software number or higher:

349 797-01

The software number is indicated on a label on the rear panel.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Contents

Working with the ND Display Units

Position Encoders and Reference Marks	6
Switch-On, Traversing Reference Marks	7
Datum Setting	8
Measured Value Output	9
Error Messages	10

Installation and Specifications

Rear Panel, Accessories	11
Mounting	12
Power Connection	13
Operating Parameters	14
List of Operating Parameters	16
Linear Encoders	19
Nonlinear Axis Error Compensation	22
RS-232-C/ V.24 Interface (X31)	26
Locking the Keypad	29
Displaying the Software Version	30
Distance-to-Go Mode	31
Specifications	32
Dimensions	33

Position Encoders and Reference Marks

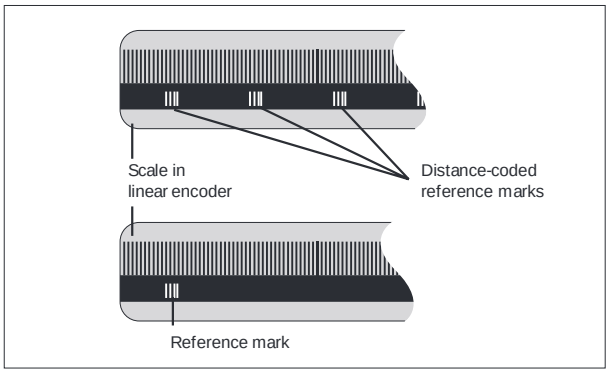
The ND 221 B display unit is designed for use with photoelectrical linear encoders with 11 μA_{pp} sinusoidal signals: primarily for HEIDENHAIN MT length gauges with 11 μA_{pp}.

The MT length gauges have one reference mark. The scales of other photoelectric linear encoders (see "Linear Encoders") can contain one reference mark or many *distance-coded* reference marks.

If there is an interruption of power, the relationship between the position of the length gauge and the displayed position value is lost. The reference marks on the position encoders and the REF reference mark evaluation feature enable the display unit to quickly reestablish this relationship again when the power is restored.

When a reference mark is crossed over, a signal is generated which identifies that position as a reference point. At the same time, the display unit restores the relationship between length gauge position and display values which you last defined by setting the datum.

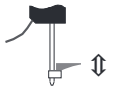
To restore the datum on scales with distance-coded reference marks, you only need to traverse a maximum of 20 mm (signal period: 20 µm).



Reference marks on linear encoders

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Switch-On, Traversing the Reference Marks

0 ➤ 1 ENT...CL	Turn on the power. (Switch located on rear panel.) • ND 221 B appears for two seconds. • ENT...CL [1] appears. • REF indicator is blinking.
ENT 5,697	Switch-on the reference mark evaluation function. • The position value that was last assigned to the reference mark position is displayed. • REF indicator lights up. • Decimal point is blinking.
	Cross over the reference mark. Move the plunger until the display starts counting and the decimal point stops blinking. The display is now ready for operation.

For automation purposes, crossing over the reference marks and the display ENT ... CL can be disabled with parameter P82.

REF Mode

Crossing over the reference marks automatically switches the display to REF mode: The last assignment of display values to length gauge positions is stored in nonvolatile memory.

[1] Press the CL key if you choose not to traverse the reference marks. Note that, in this case, the relationship between length gauge position and display value will be lost if the power is interrupted or if the unit is switched off.

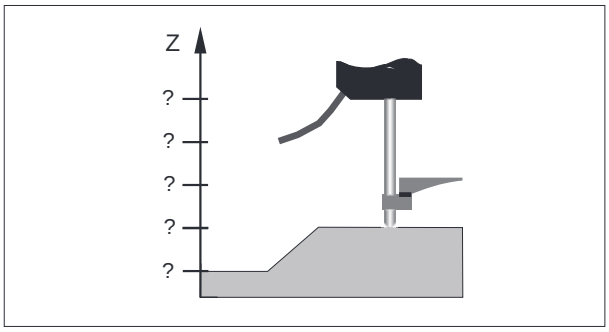
Datum Setting

The datum setting procedure assigns a display value to a known position. With the ND 200 series, you can set two separate datum points.
There are several ways to set the datum:
- Enter a numerical value, or
- Transfer a value from an operating parameter (see P79, P80).

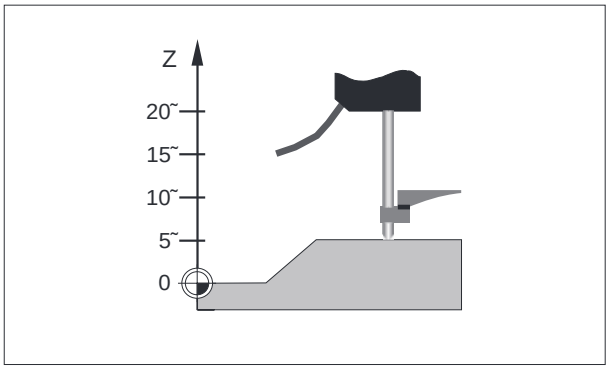
↓1/↓2	Select datum 1 or 2.
5 5	Enter numerical value (here, 5).
ENT	Confirm the entered numerical value.

You can switch between datums 1 and 2 as desired. Datum 2 can be used, for example, for working with incremental dimensions.

When you switch back to datum 1, the display unit resumes display of the encoder's actual position.



Without datum setting: unknown assignment of measured values to positions



After datum setting: assignment of measured values to positions

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

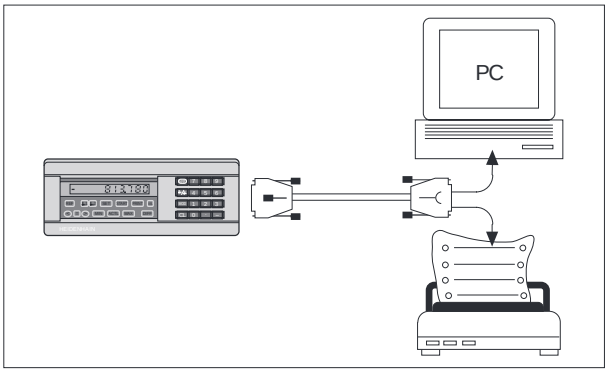
Measured Value Output

For technical information on the RS-232-C/V.24 data interface (X31), information on the data format, etc., see the chapter “ RS-232-C/V.24 Interface (X31).”

Measured values can be output over the RS-232-C/V.24 interface (X31), for example to a printer or PC.

There are several ways to start measured value output:

- ➤ Press the MOD key (check the parameter settings for P86).
  or
- ➤ Input the command STX (Ctrl B) over the RXD input of the RS-232-C/V.24 interface (X31).



The RS-232-C/V.24 interface (X31) enables you to connect a printer or a PC to your display unit

Error Messages

Display	Effect/Cause
RS232 FAST	Command for measured value output followed too quickly by another. 1)
SIGNAL	Encoder signal is too weak. The scale may be contaminated. 1)
DSR.MISSING	The connected device has not sent a DSR signal. 1)
REF. ERR.	The spacing of the reference marks as defined in P43 is not the actual spacing. 1)
FORMAT ERR.	Data format, baud rate, etc. do not match. 1)
FREQUENCY	Input frequency too high for encoder input. Traversing speed may be too fast. 1)
MEMORY ERR.	Checksum error: Check the datum, operating parameters and compensation values for nonlinear axis error compensation. If this error recurs, contact your service agency!

1) These errors are important for the attached device.

Other error displays
If “ OVERFLOW” appears, the measured value is too large or too small:

- ➤ Set a new datum.
  or
- ➤ Traverse back.

To clear error messages:

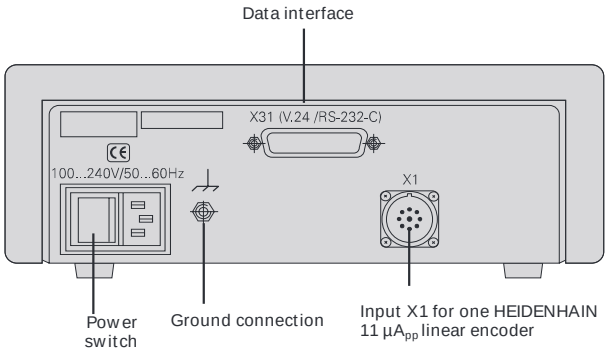
Once you have removed the cause of the error:

- ➤ Clear the error message with the CL key.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Rear Panel

Ports X1 and X31 comply with the recommendations in EN 50 178 for separation from line power.



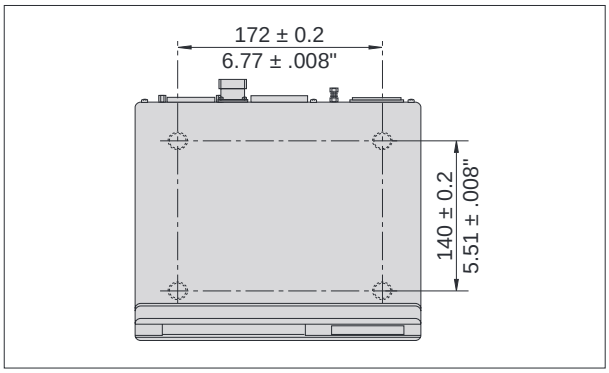
Encoder input X1	
HEIDENHAIN flange socket	9-pin
Input signals	~ 11 µA$_{pp}$
Maximum encoder cable length	30 m (98.5ft)
Maximum input frequency	100 kHz
RS-232-C/ V.24 data interface (X31)	
25-pin D-sub connection (female)	

Accessories

Connecting elements	
Connector (male)	25-pin for D-sub connection X31 Id.-Nr. 245 739-ZY
Data interface cable, complete	3 m (9.9 ft), 25-pin for D-sub connection X31, Id. Nr. 274 545-01

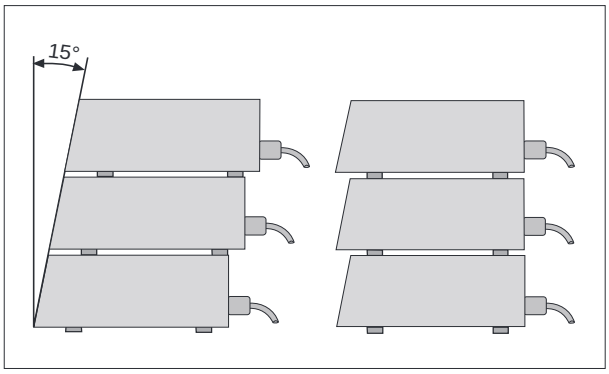
Mounting

You can fasten the ND 221 B from below by using M4 screws (see illustration at right).



Hole positions for mounting the ND display unit

ND 221 B display units are stackable. Adhesive plug-in feet (supplied with your unit) prevent the stacked units from being moved out of place.



Alternatives of stacking the display units

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Power Connection

The rear panel of the ND 221 B contains a connecting jack for a power cord with Euro connector (power cord supplied with the delivery).

Minimum cross section of the power cord: 0.75 mm²

Power supply: 100 Vac to 240 Vac (–15% to +10%)
50 Hz to 60 Hz (± 2 Hz)

A voltage selector is therefore not necessary.



Danger of electrical shock!
Unplug the power cord before opening the housing. Connect the grounding conductor.
Do not interrupt the grounding conductor.



Danger to internal components!
Do not engage or disengage any connections while the unit is under power. Use only original replacement fuses.



To increase noise immunity, connect the ground terminal on the rear panel to the central ground point of the machine.
(Minimum cross-section: 6 mm²)

Operating Parameters

Operating parameters allow you to modify the operating characteristics of your ND display unit and define the evaluation of the encoder signals.

Operating parameters are designated by:

- the letter P,
- a two-digit parameter number, and
- an abbreviation.

Example: `P01 INCH`

The factory settings of the operating parameters are indicated in the parameter list (see “ List of Operating Parameters”) in boldface type.

Parameters consist of “ user parameters” and “ protected operating parameters,” which can only be accessed by entering a code number.

User parameters

User parameters are operating parameters that can be changed without entering the code number:

P00 to P30, P50, P51, P79, P86, P98

The functions of the individual user parameters are detailed in the list of operating parameters (see “ List of Operating Parameters”).

To access a user parameter ...

... after switching on the display:

While ENT ... CL is displayed: 	Display first user parameter.

... during operation:

Together: 	Display first user parameter.

To go directly to a user parameter:

Together: 	Press and hold CL while entering the first digit of the parameter number (here, 1).
	Enter the second digit of the parameter number (here, 2). The display shows the selected user parameter.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Code number for changing protected operating parameters

If you wish to change protected operating parameters, you must first enter the code number 95 148:

➤ Select the user parameter P00 CODE.
➤ Enter the code number 95 148.
➤ Confirm entry with ENT.

Parameter P30 appears on the display. By paging through the list of operating parameters you can display—and, if necessary, change—each protected operating parameter and, of course, each user parameter.

Once you have entered the code number, the protected operating parameters remain accessible until the display unit is switched off.

Functions for changing the operating parameters

Function	Key
Page forward in the list of operating parameters	MOD
Page backward in the list of operating parameters	↓1/↓2
Reduce parameter value	–
Increase parameter value	•
Correct entry and display parameter designations	CL
Confirm change or numerical entry, leave list of operating parameters	ENT

A changed parameter is stored as soon as you

- leave the list of operating parameters
  or
- page forward or backward after the change.

List of Operating Parameters

Parameter	Settings / Function	
P00 CODE	To change the protected operating parameters, enter code number 95 148	
P01	Units of measurement	
	Display in millimeters	MM
	Display in inches	INCH
P11 SCL	Scaling factor	
	Scaling factor off	SCALING OFF
	Scaling factor on	SCALING ON
P12 SCL	Scaling factor Enter a numerical value 0.100000 < P12 < 9.999999 Default setting: 1.000000	
P30 DIR	Counting direction	
	Positive counting direction with positive direction of traverse	DIRECT. POS
	Negative counting direction with positive direction of traverse	DIRECT. NEG
P31 S. PER.	Signal period of encoder 0.000 000 01 < P31 < 99 999.9999 µm Default setting: 10 µm	
P33 COUNT	Counting mode	
	0-1-2-3-4-5-6-7-8-9	COUNT 0-1
	0-2-4-6-8	COUNT 0-2
	0-5	COUNT 0-5

Parameter	Settings/ Function	
P38 DP POS	Decimal places [1] 1 / 2 / 3 / 4 / 5 / 6 (up to 8 for inch display)	
P40 COMP.	Select encoder compensation	
	No compensation	COMP. OFF
	Nonlinear: up to 64 compensation points for linear encoders	NONL. COMP
	Linear compensation	COMP. ON
P41 L.COMP.	Linear error compensation – 99 999.9 < P41 < + 99 999.9 [µm/m] Default setting: 0	

Example: Find input value for P41
Displayed measuring length ..... L_a = 620.000 mm
Actual length (measured, e.g. with the VM 101 comparator system from HEIDENHAIN) ..... L_t = 619.877 mm
Length difference ..... $\Delta L = L_t - L_a = -123$ µm
Compensation factor k (= P41):
$k = \Delta L / L_a = -123$ µm / 0.62 m ..... $k = -198.4$ [µm/m]

[1] Depends on signal period (P31) and measuring unit (P01)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Parameter	Settings/ Function	
P43 REF	Reference marks	
	One reference mark	SINGLE REF.
	Distance-coded with 500 • SP (SP: signal period)	500 SP
	Distance-coded with 1000 • SP (e.g. for HEIDENHAIN LS ...C)	1000 SP
	Distance-coded with 2000 • SP	2000 SP
	Distance-coded with 5000 • SP	5000 SP
P44 REF	Reference mark evaluation	
	Evaluate the reference mark	REF. ON
	Do not evaluate the reference mark	REF. OFF
P45 ALARM	Encoder monitoring	
	No monitoring	ALARM OFF
	Monitor the frequency	FREQUENCY
	Monitor contamination	CONTAMINAT.
	Contamination + frequency	FRQ. + CONT.
P50 RS232	Baud rate 110 / 150 / 300 / 600 / 1200 / 2 400 / 4 800 / 9 600 / 19 200 / 38 400 baud	

Parameter	Settings / Function	
P51 RS232	Additional blank lines during data output 0 ≤ P51 ≤ 99 Default setting: 1	BK LINE 1
P79 PRESET	Value for datum point Enter numerical value for datum setting with ENT key	
80 ENT-CL	Set display No set/Set with CL/ENT	CL-ENT OFF
	Zero reset with CL Setting disabled with ENT	CL.....ON
	Zero reset with CL and set with ENT to value selected in P79	CL-ENT ON
P82 DISPL.ON	Message after switch-on ENT...CL message	MESSAGE ON
	No message	MESSG. OFF
P86 MOD	PRINT via MOD disabled	PRINT OFF
	PRINT via MOD enabled	PRINT ON

Parameter	Settings / Function
P98 LANGUA.	Conversational language
German	LANGUAGE D
English	LANGUAGE GB
French	LANGUAGE F
Italian	LANGUAGE I
Dutch	LANGUAGE NL
Spanish	LANGUAGE E
Danish	LANGUAGE DK
Swedish	LANGUAGE S
Finnish	LANGUAGE FI
Czech	LANGUAGE CZ
Polish	LANGUAGE PL
Hungarian	LANGUAGE H
Portuguese	LANGUAGE P

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Linear Encoders

The ND 221 B display unit is designed for use together with photoelectrical encoders with sinusoidal signals—11 μA_{PP}.

Display step with linear encoders

You can select a specific display step by adapting the following operating parameters:

- Subdivision (P31)
- Counting mode (P33)
- Decimal places (P38)

Example
Linear encoder with a signal period of 10 µm

Desired display step ..... 0.000 5 mm
Subdivision (P31)..... 10
Counting mode (P33) 5
Decimal places (P38)..... 4

The tables on the following pages will help you to select the appropriate parameter settings.

Recommended parameter settings for HEIDENHAIN linear encoders with 11 μA_{PP} signals

Model	Signal periods in µm P31	Reference marks P 43	Millimeters: Display step in mm	Count mode P 33	Decimal places P 38	Inches: Display step in inches	Count mode P 33	Decimal places P 38
CT MT xx01	2	Single	0.0005 0.0002	5 2	4 4	0.00002 0.00001	2 1	5 5
LIP 401A/401R		Single	0.0001 0.00005	1 5	4 5	0.000005 0.000002	5 2	6 6
			Recommd. only for LIP 401					
			0.00002 0.00001 0.000005	2 1 5	5 5 6	0.000001 0.0000005 0.0000002	1 5 2	6 7 7
LF 103/103C LF 401/401C LIF 101/101C LIP 501/501C	4	Single/5000	0.001 0.0005 0.0002 0.0001	1 5 2 1	3 4 4 4	0.00005 0.00002 0.00001 0.000005	5 2 1 5	5 5 5 6
LIP 101		Single	0.00005	5	5	0.000002	2	6
			Recommd. only for LIP 101					
			0.00002 0.00001	2 1	5 5	0.000001 0.0000005	1 5	6 7
MT xx	10	Single	0.0005 0.0002 0.0001	5 2 1	4 4 4	0.00002 0.00001 0.000005	2 1 5	5 5 6
LS 303/303C LS 603/603C	20	Single/1000	0.01 0.005	1 5	2 3	0.0005 0.0002	5 2	4 4

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Recommd. parameter settings for HEIDENHAIN linear encoders with 11 μA_{PP} signals (continued)

Model	Signal period in µm P31	Reference marks P 43	Millimeters: Display step in mm	Millimeters: Count mode P 33	Millimeters: Decimal places P 38	Inches: Display step in inches	Inches: Count mode P 33	Inches: Decimal places P 38
LS 106/106C LS 406/406C LS 706/706C	20	Single/1000	0.001 0.0005	1 5	3 4	0.00005 0.00002	5 2	5 5
ST 1201		-						
LB 302/302C LIDA 10x/10xC	40	Single/2000	0.005 0.002 0.001 0.0005	5 2 1 5	3 3 3 4	0.0002 0.0001 0.00005 0.00002	2 1 5 2	4 4 5 5
			Recommd. only for LB 302					
			0.0002 0.0001	2 1	4 4	0.000001 0.0000005	1 5	5 6
LB 301/301C	100	Single/1000	0.005 0.002 0.001	5 2 1	3 3 3	0.0002 0.0001 0.00005	2 1 5	4 4 5
LIM 102	12800	Single	0.1 0.05	1 5	1 2	0.005 0.002	5 2	3 3

Example
Your encoder: MT 101
Desired display step: 0.0005 mm (0,5 µm)
Parameter settings: P01 = mm, P43 = single, P31 = 10, P33 = 5, P38 = 4

Nonlinear Axis Error Compensation

If you want to use the nonlinear axis error compensation feature, you must:
- Activate the feature with operating parameter 40 (see "Operating Parameters").
- Traverse the reference marks after switching on the display unit.
- Enter a compensation value table.

Your machine may have a nonlinear axis error due to factors such as axis sag or leadscrew errors. Such deviations are usually measured with a comparator measuring system (such as the HEIDENHAIN VM 101).

You select the compensation table through `P00 CODE` and by entering the code number 10 52 96 (see Operating Parameters).

Ascertaining the compensation values

To ascertain the compensation values (e.g. with a VM 101) you must select the compensation table and then press the "–" key to select the REF display.

The letter "R" at the left of the display indicates that the displayed position value is given with respect to the reference mark. If "R" blinks, you must traverse the reference mark.

Entries in the compensation value table

- Datum:
  Here you enter the point at which the compensation is to begin. This point indicates the absolute distance to the reference point.

  Do not change the datum after measuring the axis error and before entering the axis error into the compensation table.

- Spacing of the compensation points:
  The spacing of the compensation points is expressed as:
  Spacing = 2^x [µm].
  Enter the value of the exponent *x* in into the compensation value table.
  Minimum input value: 6 (= 0.064 mm)
  Maximum input value: 20 (= 1048.576 mm)
  Example: 900 mm traverse with 15 compensation points ==> 60.000 mm spacing between points.
  Nearest power of two: 2^{16} = 65.536 mm (see "Table for determining the point spacing")
  Input value in the table: 16

- Compensation value:
  You enter the measured compensation value (in millimeters) for the displayed compensation point. Compensation point 0 always has the value 0 and cannot be changed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table for determining the point spacing

Exponent	Point spacing in mm	Point spacing in inches
6	.064	.0023“
7	.128	.0050“
8	.256	.0100“
9	.512	.0200“
10	1.024	.0403“
11	2.048	.0806“
12	4.016	.1581“
13	8.192	.3225“
14	16.384	.6450“
15	32.768	1.290“
16	65.536	2.580“
17	131.072	5.160“
18	262.144	10.32“
19	524.288	20.64“
20	1048.576	41.25“

Selecting the compensation table, entering an axis correction

CL together with MOD — Select the operating parameters.

↓1/↓2 — Select P00 CODE.

P00 CODE

1 0 5 2, 9 6 ENT — Enter the code number 10 52 96, confirm with ENT.

DATUM (shown for approx. two seconds)

2 7 MOD — Enter the active datum for the error on the axis to be confirmed, e.g. 27 mm. Press MOD to select the next input box.

SPACING

1 0, 4 x MOD — Enter the spacing of the compensation points on the axis to be corrected, for example 2^{10} µm (equals 1.024 mm). Press MOD four times to select COMP. NR. 01. (You cannot enter values in the POS. NR. 00, COMP. NR. 00 and POS. NR. 01 boxes.)

COMP. NR. 01

0 • 0 1, 2 x MOD — Enter the associated compensation value, e.g. 0.01 mm. Press MOD twice to select COMP. NR. 02. (You cannot enter any values in the POS. NR. 02 box).

COMP. NR. 02

0 • 0 2, 2 x MOD — Enter all further compensation points. If you want so select a compensation point directly, press CL and simultaneously enter the desired compensation point number.

ENT — Conclude entry.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Deleting a compensation value table

CL together with MOD	Select the operating parameters.
↓1/↓2	Select P00 CODE.
P00 CODE	
1 0 5 2 9 6 ENT	Enter the code number 10 52 96, confirm with ENT.
DATUM	
↓1/↓2	Select the “delete” function.
DELETE	
ENT	Confirm with ENT or cancel with CL.
ENT	Exit the compensation table mode.

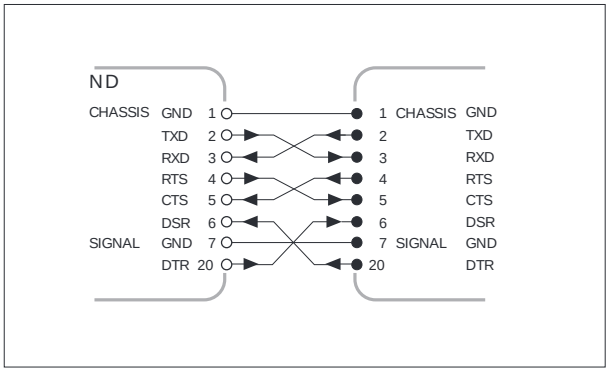
RS-232-C/V.24 Data Interface (X31)

The RS-232-C/V.24 interface (X31) of your display unit enables you to output measured data in ASCII format, for example to a printer or PC.

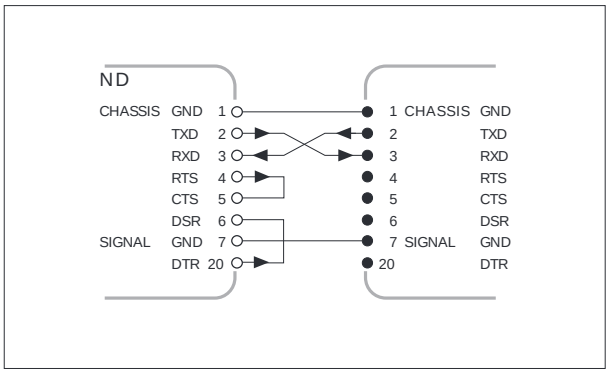
Connecting cable

You can use a connecting cable with full wiring (figure at upper right) or simplified wiring (below right). A cable with full wiring is available from HEIDENHAIN (Id. Nr. 274 545-...). On this type of cable, pin 6 and pin 8 are additionally connected over a jumper.

Maximum cable length: 20 m (66 ft)



Full wiring



Simplified wiring

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Pin layout RS-232-C/V.24 (X31)

Pin	Signal	Assignment
1	CHASSIS GND	Chassis ground
2	TXD	Transmitted data
3	RXD	Received data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	SIGN. GND	Signal ground
8 to 19	–	*Not assigned*
20	DTR	Data terminal ready
21 to 25	–	*Not assigned*

Levels for TXD and RXD

Logic level	Voltage level
Active	– 3 V to – 15 V
Not active	+ 3 V to +15 V

Levels for RTS, CTS, DSR and DTR

Logic level	Voltage level
Active	+ 3 V to + 15 V
Not active	– 3 V to – 15 V

Data format and control characters

Data format	1 start bit 7 data bits Even parity bit 2 stop bits
Control characters	Call measured value: STX (Ctrl B) Interrupt DC3 (Ctrl S) Continue DC1 (Ctrl Q) Interrogate error message: ENQ (Ctrl E)

Example: Data sequence during measured value output
Measured value = – 5.23 mm

Measured value output

–	5 . 2 3					< C R >	< L F >
①	②	③	④	⑤	⑥	⑦	⑧

① Algebraic sign
② Numerical value with decimal point (10 characters on the whole, leading zeros are output as blank spaces.)
③ Blank space
④ Unit:
Blank space = mm; " = inch; ? = fault
⑤ Blank space
⑥ Blank space
⑦ CR (*carriage return*)
⑧ LF (*line feed*)

Operating parameters for measured value output

Parameter	Function
P50 RS232	Baud rate
P51 RS232	Number of additional blank lines for measured value output

Duration of measured value transfer

$$t_D = \frac{187 + (11 \cdot \text{number of blank lines})}{\text{baud rate}} \text{ [s]}$$

Duration of storage and measured value transfer
The time required for data transfer depends on the selected baud rate and the number of additional blank lines.

Latch signal	Storage after	Data transfer after
STX (CTRL B)	† 1 ms	† 37 ms
PRINT (MOD key)	† 18 ms	† 36 ms

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Locking the Keypad

You can disable or re-enable the keypad by entering the code number 24 65 84:

➤ Select the user parameter `P00 CODE` (see “ Operating Parameters”).

➤ Enter the code number 24 65 84.

➤ Confirm the entry with ENT.

➤ With the “•” or “–” key, select `KEYS ON` or `KEYS OFF`.

➤ Confirm your selection with ENT.

If the keypad is locked, you can only select the datum or select `P00 CODE` over the MOD key.

Displaying the Software Version

To display the software version of the display unit, enter the code number 66 55 44:

➤ Select the user parameter `P00 CODE`.

➤ Enter the code number 66 55 44.

➤ Confirm your entry with ENT.

➤ The display unit shows the software number.

➤ With the “–” key you can switch the display to the date of issue.

➤ To exit the software version display mode, press ENT.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Distance-to-Go Display Mode

Normally, the display shows the actual position of the encoder. However, it is often more helpful to display the remaining distance to an entered nominal position — especially when you are using the display unit for machine tools and automation purposes. You can then position simply by traversing to display value zero.

You can access the distance-to-go display by entering the code number 246 582.

Display	Meaning
DELTA OFF	Distance-to-go display not active
DELTA ON	Distance-to-go display active

"Traversing to zero" with distance-to-go display

➤ Select datum point 2.
➤ Enter the nominal position.
➤ Move the axis until the display value is zero.

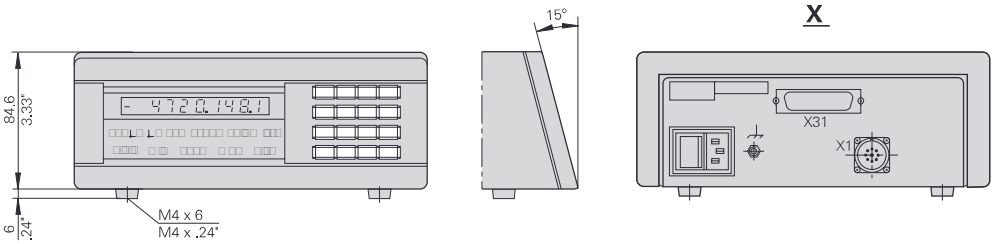
Specifications

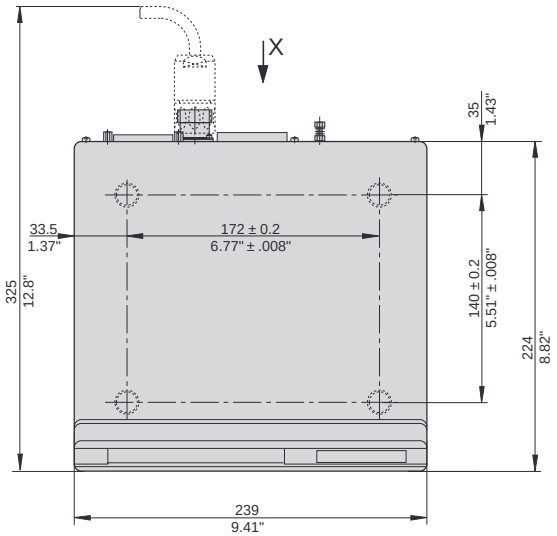
Housing	ND 221 B Benchtop design, cast-metal housing (W • H • D) 239 mm • 84.6 mm • 224 mm
Operating temperature	0° to 45° C (32° to 113° F)
Storage temperature	–20 °C to 70 °C (–4 °F to 158 °F)
Weight	Approx. 1.5 kg
Relative humidity	< 75% annual average < 90% in rare cases
Power supply	Primary-clocked power supply 100 Vac to 240 Vac (–15% to +10%) 50 Hz to 60 Hz (± 2 Hz)
Line fuse	F 1 A inside the housing
Power consumption	8 W (typically)
Electromagnetic compatibility	Class B according to EN 55022

Noise immunity	As per VDE 0843 Parts 2 and 4, severity 4
Protection	IP40 according to IEC 529
Encoder inputs	For encoders with sinusoidal output signals (11 μA_{PP}); reference mark evaluation for distance-coded and single reference marks
Input frequency	ND 221 B 11μA_{pp}: Max. 100 kHz for 30 m cable length
Display step	Adjustable (see "Linear Encoders")
Datum points	Two
RS-232-C/V.24 interface	Baud rates: 110, 150, 300, 600, 1 200, 2 400, 4 800, 9 600, 19 200, 38 400 baud

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ND 221 B: Dimensions in mm/inches





HEIDENHAIN

HEIDENHAIN (G.B.) Limited
200 London Road, Burgess Hill
West Sussex RH15 9RD, Great Britain
{ (01444) 247711
| (01444) 870024

350 273-21 · SW 349 797-01 · 10 · 6/2000 · E · Printed in Germany · Subject to change without notice

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP