



**HEIDENHAIN**



**User's Manual**

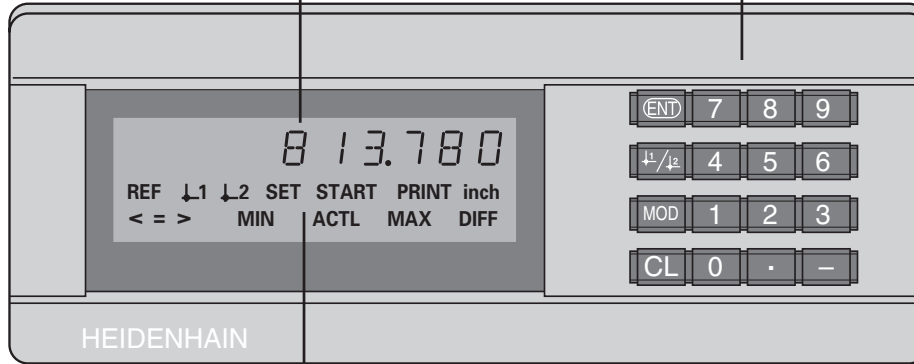
**ND 221 B**

**Measured Value Displays**







6/2000



**Display of actual value and input**  
(9 decades with algebraic sign)

**Numeric keypad with decimal point**



**Status display with indicators**

Key	Function
	<ul style="list-style-type: none"> <li>• Set datum</li> <li>• Transfer input value</li> <li>• Set display to value from P79 (P80!)</li> <li>• Leave parameter list</li> </ul>
	<ul style="list-style-type: none"> <li>• Select datum</li> <li>• Page backwards in parameter list</li> </ul>
	<ul style="list-style-type: none"> <li>• Select parameter after switch-on</li> <li>• Page forward in parameter list</li> <li>• Start measured value output "PRINT"</li> </ul>
	<ul style="list-style-type: none"> <li>• Delete entry</li> <li>• Set display to zero (P80!)</li> <li>• CL plus MOD: select parameter list</li> <li>• CL plus number: select parameter</li> <li>• Delete parameter input and show parameter number</li> </ul>
	<ul style="list-style-type: none"> <li>• Algebraic sign</li> <li>• Reduce parameter value</li> </ul>
	<ul style="list-style-type: none"> <li>• Decimal point</li> <li>• Increase parameter value</li> </ul>

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

**Items supplied with ND 221 B**

<b>ND 221 B</b> Encoder input 11 $\mu\text{A}_{\text{PP}}$	Measured value display unit, benchtop model Id.-Nr. 344 992-xx
<b>Power cord</b>	3 m (9.9ft)
<b>User's Manual</b>	ND 221 B
<b>Adhesive plug-in feet</b>	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.

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## Position Encoders and Reference Marks

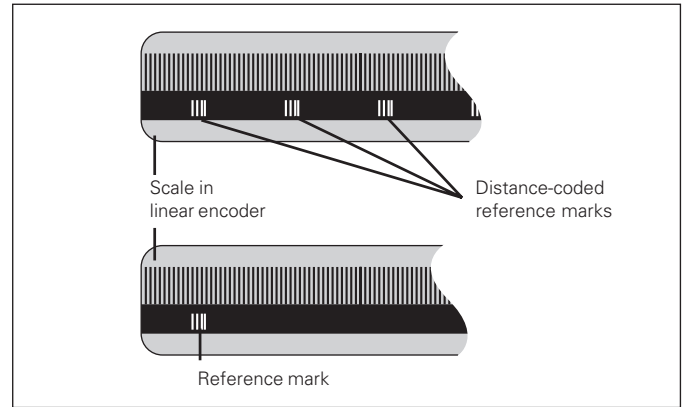
The ND 221 B display unit is designed for use with photoelectrical linear encoders with  $11 \mu\text{A}_{\text{pp}}$  sinusoidal signals: primarily for HEIDENHAIN **MT length gauges** with  $11 \mu\text{A}_{\text{pp}}$ .

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  $\mu\text{m}$ ).

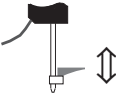


Reference marks on linear encoders

## Switch-On, Traversing the Reference Marks

	<p><b>Turn on the power.</b> (Switch located on rear panel.)</p> <ul style="list-style-type: none"><li>• ND 221 B appears for two seconds.</li><li>• ENT . . . CL <sup>1)</sup> appears.</li><li>• REF indicator is blinking.</li></ul>
ENT . . . CL	

	<p><b>Switch-on the reference mark evaluation function.</b></p> <ul style="list-style-type: none"><li>• The position value that was last assigned to the reference mark position is displayed.</li><li>• REF indicator lights up.</li><li>• Decimal point is blinking.</li></ul>
5,697	

	<p><b>Cross over the reference mark.</b> Move the plunger until the display starts counting and the decimal point stops blinking. The display is now ready for operation.</p>
---	---

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.

<sup>1)</sup> 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.

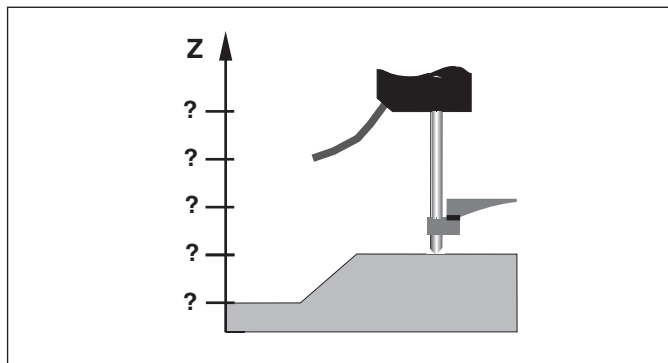
There are several ways to set the datum:

- Enter a numerical value, or
- Transfer a value from an operating parameter (see P79, P80).

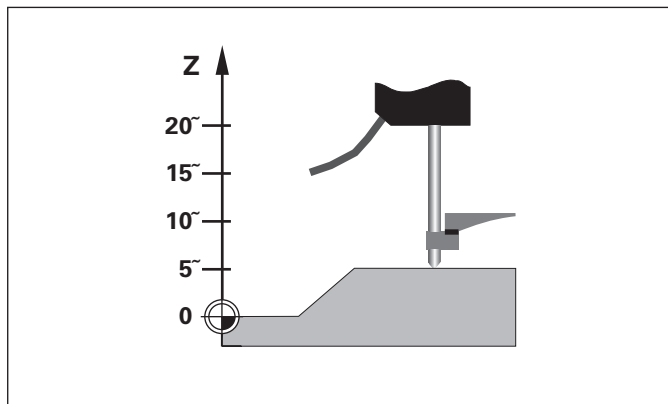
	<b>Select datum</b> 1 or 2.
<b>5</b> 5	<b>Enter numerical value</b> (here, 5).
	<b>Confirm</b> the entered numerical value.

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



## Measured Value Output

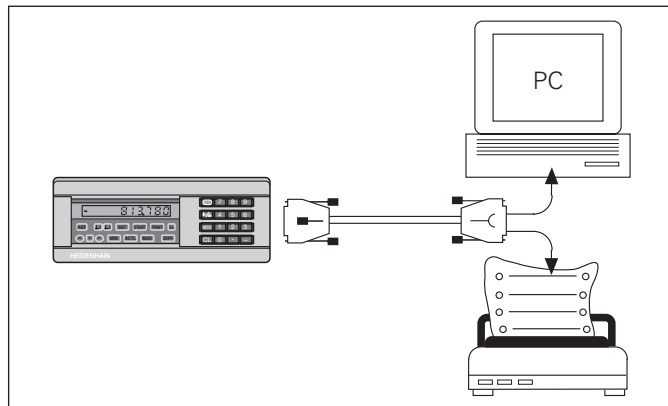


For technical information on the RS-232-C/V.24 data interface (X31), information on the data format, etc., see the chapter "RS-232-C/V.24 Interface (X31)."

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. <sup>1)</sup>
SIGNAL	Encoder signal is too weak. The scale may be contaminated. <sup>1)</sup>
DSR.MISSING	The connected device has not sent a DSR signal. <sup>1)</sup>
REF. ERR.	The spacing of the reference marks as defined in P43 is not the actual spacing. <sup>1)</sup>
FORMAT ERR.	Data format, baud rate, etc. do not match. <sup>1)</sup>
FREQUENCY	Input frequency too high for encoder input. Traversing speed may be too fast. <sup>1)</sup>
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!

<sup>1)</sup> 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.

## 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	$\sim$ 11 $\mu\text{A}_{\text{pp}}$
Maximum encoder cable length	30 m (98.5ft)
Maximum input frequency	100 kHz

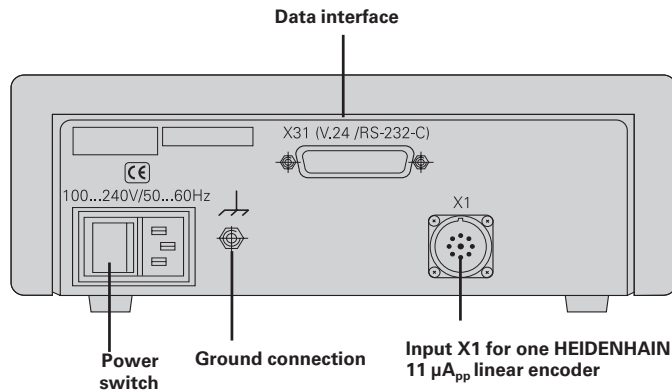
### RS-232-C/V.24 data interface (X31)

25-pin D-sub connection (female)

## Accessories

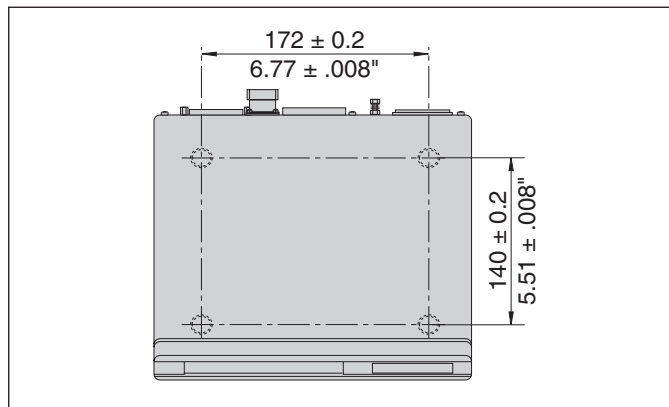
### Connecting elements

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



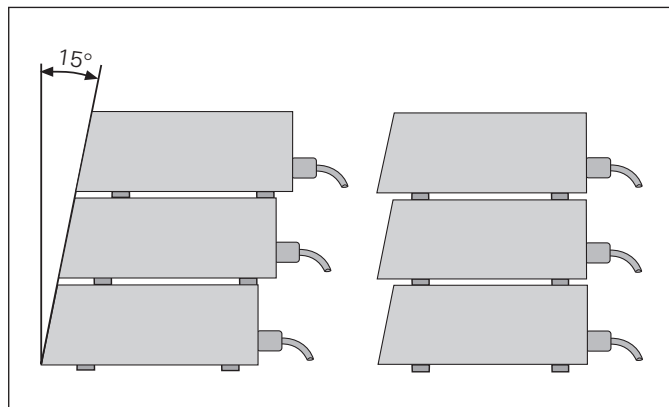
## Mounting

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

## 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 mm<sup>2</sup>

**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 mm<sup>2</sup>)

## 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.
---	---

## 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	
Page backward in the list of operating parameters	
Reduce parameter value	
Increase parameter value	
Correct entry and display parameter designations	
Confirm change or numerical entry, leave list of operating parameters	

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 <b>code number 95 148</b>
P01	<b>Units of measurement</b> Display in millimeters <b>MM</b> Display in inches <b>INCH</b>
P11 SCL	<b>Scaling factor</b> Scaling factor off <b>SCALING OFF</b> Scaling factor on <b>SCALING ON</b>
P12 SCL	<b>Scaling factor</b> Enter a numerical value $0.100000 < P12 < 9.999999$ Default setting: 1.000000
P30 DIR	<b>Counting direction</b> Positive counting direction with positive direction of traverse <b>DIRECT. POS</b> Negative counting direction with positive direction of traverse <b>DIRECT. NEG</b>
P31 S. PER.	<b>Signal period of encoder</b> $0.000\ 000\ 01 < P31 < 99\ 999.9999\ \mu\text{m}$ Default setting: 10 $\mu\text{m}$
P33 COUNT	<b>Counting mode</b> 0-1-2-3-4-5-6-7-8-9 <b>COUNT 0-1</b> 0-2-4-6-8 <b>COUNT 0-2</b> 0-5 <b>COUNT 0-5</b>

Parameter	Settings/ Function
P38 DP POS	<b>Decimal places <sup>1)</sup></b> 1 / 2 / 3 / <b>4</b> / 5 / 6 (up to 8 for inch display)
P40 COMP.	Select <b>encoder compensation</b> No compensation <b>COMP. OFF</b> Nonlinear: up to 64 compensation points for linear encoders <b>NONL. COMP</b> Linear compensation <b>COMP. ON</b>
P41 L.COMP.	<b>Linear error compensation</b> $-99\ 999.9 < P41 < +99\ 999.9\ [\mu\text{m}/\text{m}]$ Default setting: <b>0</b>
<b>Example: Find input value for P41</b> Displayed measuring length ..... $L_a = 620.000\ \text{mm}$ Actual length (measured, e.g. with the VM 101 comparator system from HEIDENHAIN) ..... $L_t = 619.877\ \text{mm}$ Length difference ..... $\Delta L = L_t - L_a = -123\ \mu\text{m}$ Compensation factor k (= P41): $k = \Delta L / L_a = -123\ \mu\text{m} / 0.62\ \text{m} \dots\dots\dots k = -198.4\ [\mu\text{m}/\text{m}]$	

<sup>1)</sup> Depends on signal period (P31) and measuring unit (P01)



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

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

Parameter	Settings / Function
P98 LANGUA.	<b>Conversational language</b>
German	<b>LANGUAGE D</b>
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

## Linear Encoders

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

### 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  $10 \mu m$

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  $\mu\text{A}_{\text{pp}}$  signals**

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

**Recommd. parameter settings for HEIDENHAIN linear encoders with 11  $\mu\text{A}_{\text{pp}}$  signals (continued)**

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

**Example**

Your encoder: MT 101

 Desired display step: 0.0005 mm (0,5  $\mu\text{m}$ )

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.



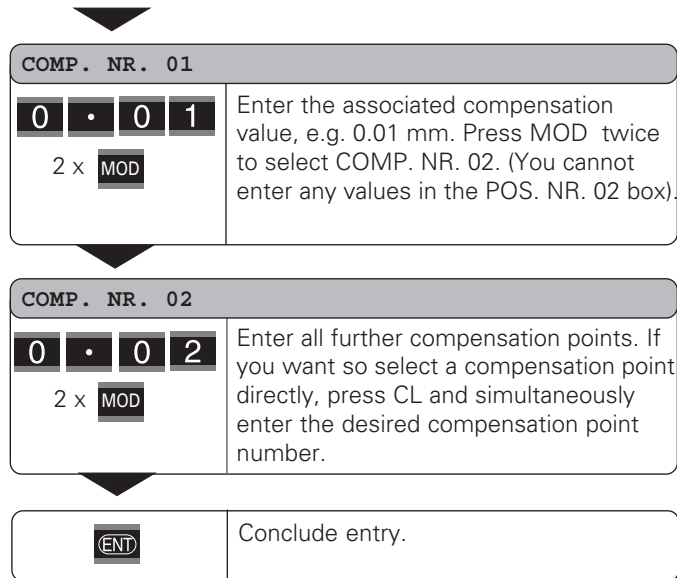
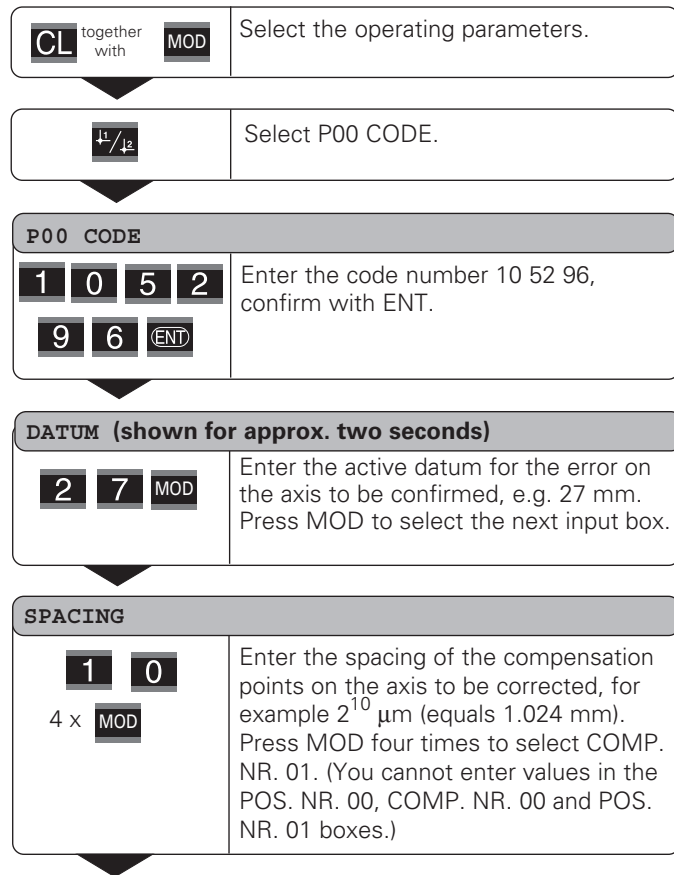
Do not change the datum after measuring the axis error and before entering the axis error into the compensation table.

- Spacing of the compensation points:  
The spacing of the compensation points is expressed as:  
$$\text{Spacing} = 2^x [\mu\text{m}].$$
  
Enter the value of the exponent  $x$  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.

## Table for determining the point spacing

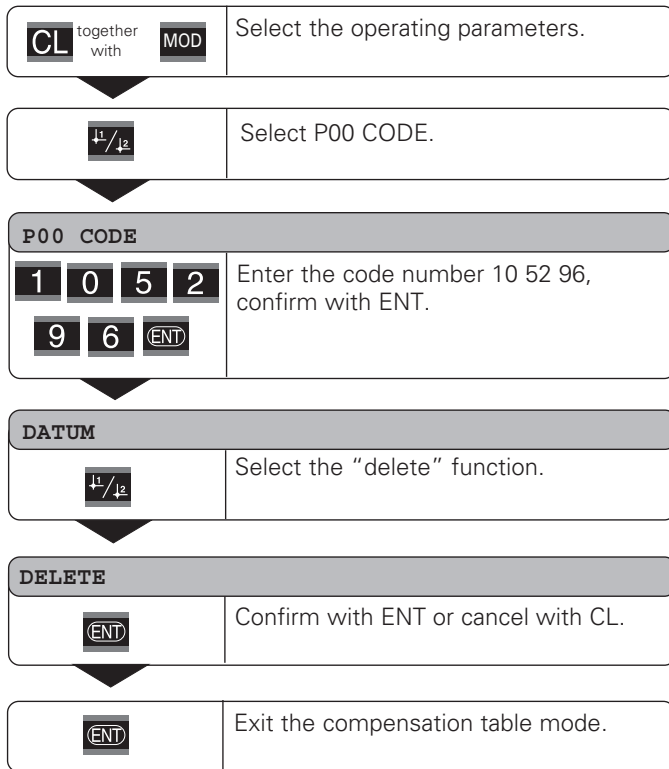
Exponent	Point spacing	
	in mm	in inches
6	.064	.0023"
7	.128	.0050"
8	.256	.0100"
9	.512	.0200"
10	1.024	.0403"
11	2.048	.0806"
12	4.016	.1581"
13	8.192	.3225"
14	16.384	.6450"
15	32.768	1.290"
16	65.536	2.580"
17	131.072	5.160"
18	262.144	10.32"
19	524.288	20.64"
20	1048.576	41.25"

## Selecting the compensation table, entering an axis correction





## Deleting a compensation value table



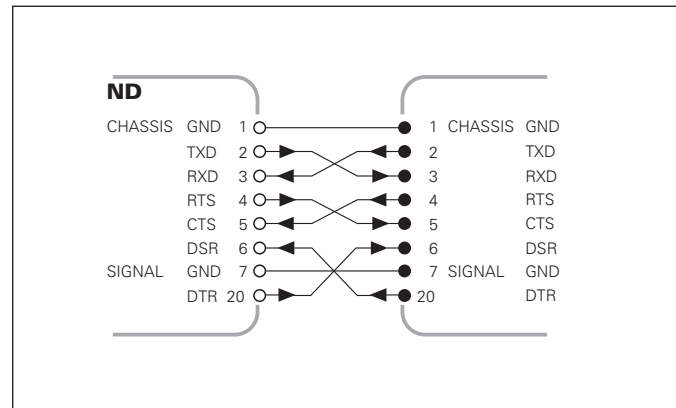
### RS-232-C/V.24 Data Interface (X31)

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.

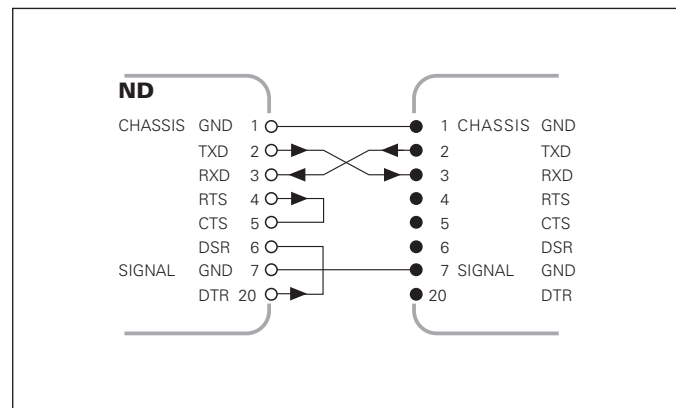
#### Connecting cable

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

## 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	–	<i>Not assigned</i>
20	DTR	Data terminal ready
21 to 25	–	<i>Not assigned</i>

## 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 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

## 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.

## 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.

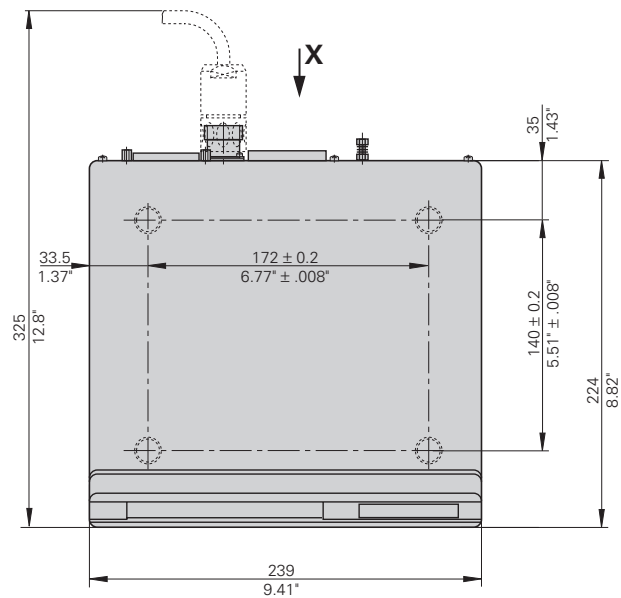
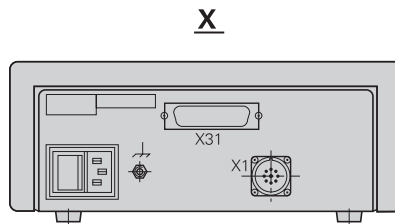
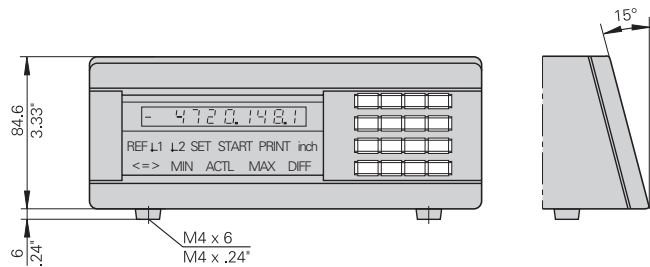
## Specifications

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

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



## ND 221 B: Dimensions in mm/inches



# HEIDENHAIN

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