



HEIDENHAIN

Pilot



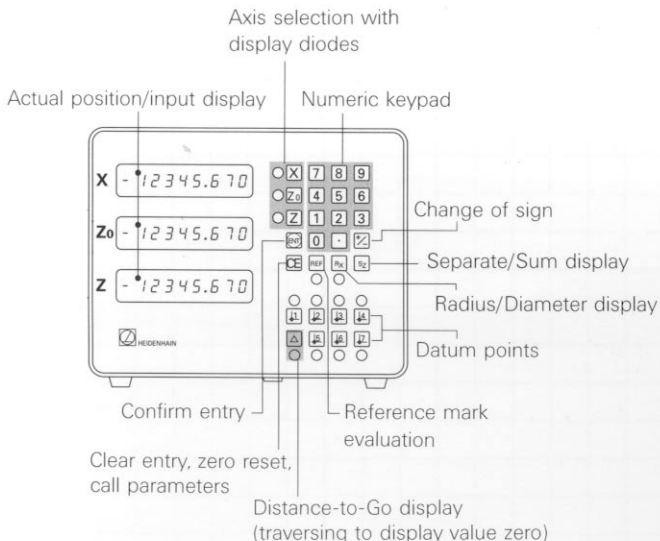
Working with the

VRZ 730/770

Keys, Displays, Connections

VRZ 730 (2 axes)

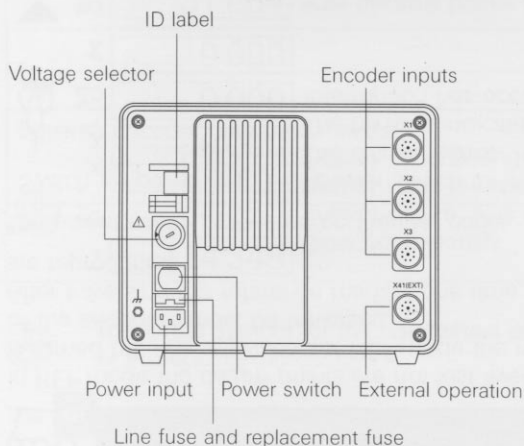
VRZ 770 (3 axes)



	Axis Selection		Distance-to-Go (Countdown Positioning)
	Confirm Entry		Reference Mark Evaluation
	Clear Entry/Zero Reset/ Select Parameter		Radius/Diameter Display
	Datum Points ¹⁾		Separate/Sum Display (Bedway and Top Slide)
	mm/inch Selection (via parameter P10)		Change of Sign

¹⁾ -key as mm/inch conversion key (key activation via Operating Parameter P10 = 2; see Parameter Entry mm/inch)

Rear Panel: Connections



Keys, Displays, Connections

Switch-On · Working in REF Mode

Datum Points

Setting a Datum Point

Radius/Diameter Display

Incremental/Absolute Dimensions

Positioning in Incremental Dimensions

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

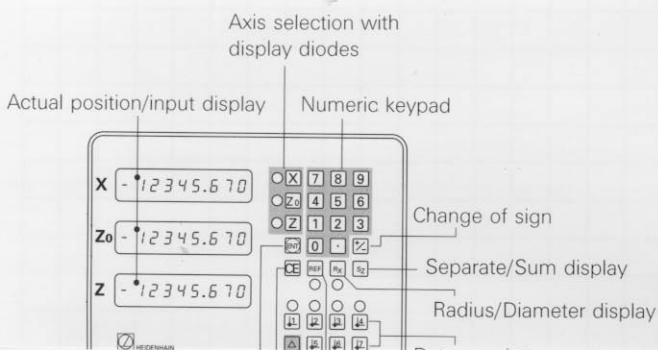
Sum Display (VRZ 770)

Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes



Switch-On



Read the information on commissioning in your **Operating Instructions** before the first switch-on!

In REF mode the datum points are not lost even when the VRZ is turned off. After activation of REF mode the reference marks of the encoders must be traversed. After traversing the reference mark(s) one time all datum points are reproduced.

The power switch is located on the rear panel.

Switch on power (set "0/1" power switch to 1):

 X The display blinks.
Z₀ The blinking indicates that a power interruption has occurred.
Z

Activate Reference Mark Evaluation:

  LED on.

X The displays indicate the stored REF values and remain "frozen".
Z₀ Axis decimal points blink.
Z

Traverse encoder reference mark(s):

 X Display value changes concurrently:
Z₀ display value is based on the
Z current datum. Axis decimal points glow continuously.

 This is the symbol for the handwheel of your machine or positioning device.

The -key toggles REF mode on and off.

Switch-On · Working in REF Mode

Datum Points

Setting a Datum Point

Radius/Diameter Display

Incremental/Absolute Dimensions

Positioning in Incremental Dimensions

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

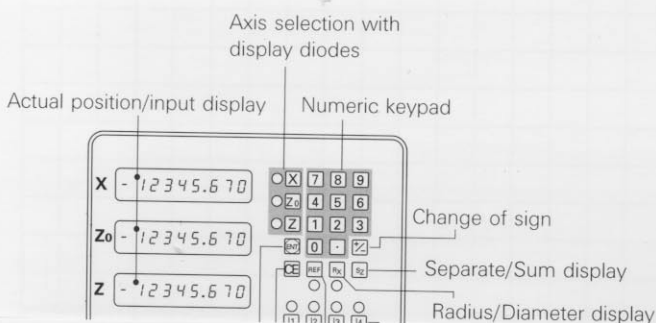
Sum Display (VRZ 770)

Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes

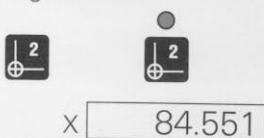


Datum Points

Using datum points you can set a certain correlation between encoder position and the display value. The VRZ permits the setting of seven datum points for each axis. The datum points are selected with the keys

Switching to the Other Datum Points (e.g. in the X axis)

e.g. Datum 2



LED on.
The display jumps to a new value. This value is based on the selected datum.

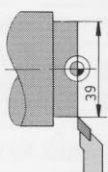
A switch-over to the other datum is possible both in REF mode as well as outside of the REF mode.

Setting the Datum

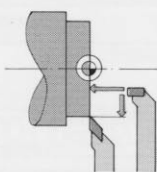


The datum points will remain stored after a power interruption only if they are set in the REF mode.

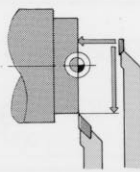
Presetting Lathe Tools with Datum Points



Clamp tool no. 1 in place



Clamp tool no. 2 in place



Clamp tool no. 3 to 7 in place



Datum Points

Setting a Datum Point

Radius/Diameter Display

Incremental/Absolute Dimensions

Positioning in Incremental Dimensions

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

Sum Display (VRZ 770)

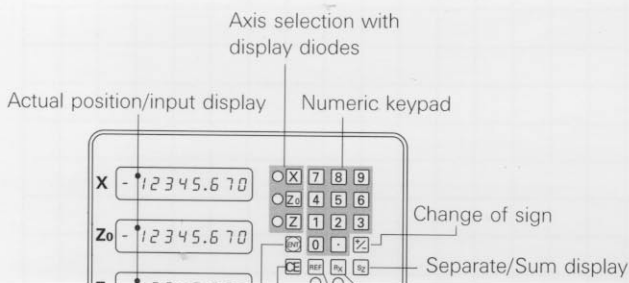
Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes

VRZ 770 (3 axes)



Setting a Datum Point: Presetting Lathe Tools



Before setting the datum in X check whether the radius or diameter display was selected (see next page).

The VRZ is in the diameter display mode.

Axis selection e.g. X axis:

Axis display diode on.

Addressing the datum e.g. $\perp 1$ for tool No. 1:

LED on.

x Display value is based on the current datum.

Move the machine slide or tool to the datum position:

x

Enter the new datum value for the current position, e.g. 39.000 mm:

Axis display diode blinks.

x The entry value appears *left*-justified in the display.

Transfer entry to memory:

Axis display glows continuously.

x The entry value appears *right*-justified in the display.

Falsely entered values can be corrected at any time by re-entering with the correct value.

If the entry value is still left-justified in the display, then must be pressed before entering the correct value.

Setting a Datum Point

Radius/Diameter Display

Incremental/Absolute Dimensions

Positioning in Incremental Dimensions

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

Sum Display (VRZ 770)

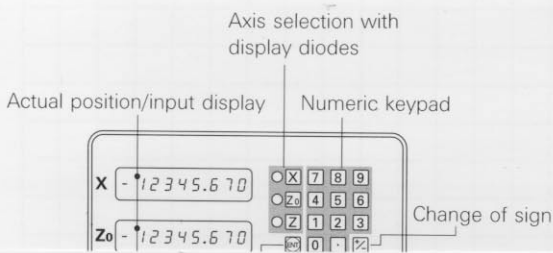
Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes

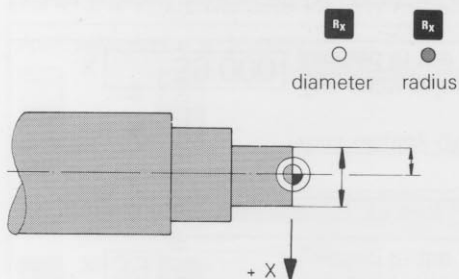
VRZ 770 (3 axes)



Radius/Diameter Display for the Cross Slide X

With the **R_X** key you can select either radius or diameter display for the X axis.

Example:



The VRZ is in diameter display mode.

R_X
○

LED is off.

X 10.000

The X display indicates the shaft diameter.

Switching to radius display:

R_X **R_X**
●

LED on.

X 5.000

The X display indicates the shaft radius.



The display step is doubled in the diameter display mode.

Radius/Diameter Display

Incremental/Absolute Dimensions

Positioning in Incremental Dimensions

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

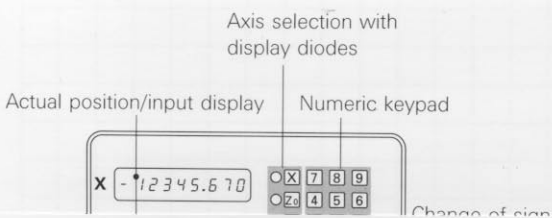
Sum Display (VRZ 770)

Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

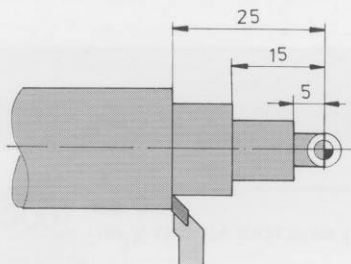
Error Codes



Absolute Dimensions/Incremental Dimensions

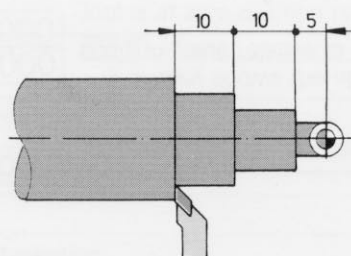
Absolute dimensions

Absolute dimensions show the distance from one absolute, fixed datum. The axis slide or the tool is to move **to** a certain **position**.



Incremental dimensions

Incremental dimensions show the distance from the previous position of the axis slide or tool. The axis slide or the tool is to move **by** a certain **amount**.



Incremental/Absolute Dimensions

Positioning in Incremental Dimensions

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

Sum Display (VRZ 770)

Example of Sum Display (VRZ 770)

Parameter Entry

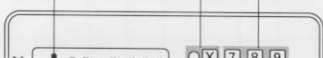
mm/inch · Shrinkage · Set Display to Zero

Error Codes

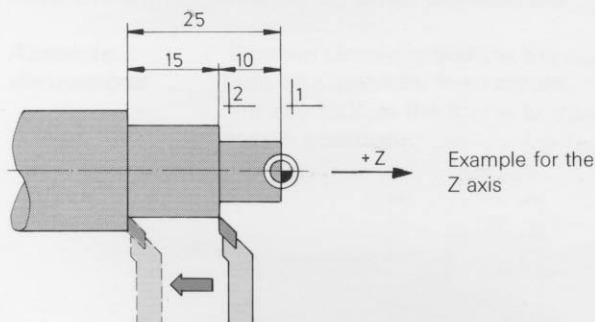
Axis selection with display diodes

Actual position/input display

Numeric keypad



Positioning in Incremental Dimensions



LED on.

z - 10.000

The display shows the absolute position value relative to datum 1.

Switch to datum 2:



LED on.

z - 31.864

Display value is based on a preset datum 2.

Set the datum 2 in the Z axis to zero:



Axis display diode blinks.



Axis display diode glows.

z 0.000

Tool is at zero position relative to datum 2.

Move tool by -15 mm:



z - 15.000

Tool is at position -15 relative to datum 2.

Recall the absolute position:



LED on.

z - 25.000

Tool is at position $(-10) + (-15) = -25$ relative to datum 1.

Positioning in Incremental Dimensions

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

Sum Display (VRZ 770)

Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes

Axis selection with
display diodes

Actual position/input display

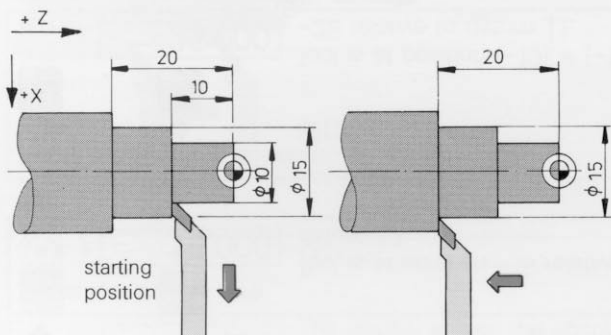
Numeric keypad



Distance-to-go Display

In  mode you enter absolute dimensions, but you position by "traversing to zero" i.e. the display always shows the distance remaining to the previously entered absolute position.

Example:



X axis is in diameter display mode.

(LED under  off).

Traversing to Zero (Example X axis)

Tool is located at the starting position

Select the X axis:



X axis LED on.

X

Z

The display shows the current position values, here the starting position.

Activate distance-to-go display:



Diode on.

X

Z

The display shows the value 0 for each axis.

Distance-to-go Display/Traversing to Zero

Traversing to Zero (continued)

Sum Display (VRZ 770)

Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes

VRZ 770 (3 axes)

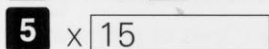
Axis selection with
display diodes

Actual position/input display | Numeric keypad

Enter 1st desired position: (X = 15.000)



Axis display diode blinks.

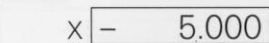


The entry value appears *left-justified* in the display.

Transfer entry to memory:

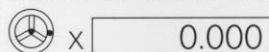


Axis display diode on.



The distance remaining to the desired position appears with reverse sign in the display.

Move machine axis towards zero:

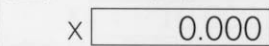


Tool is located at the 1st desired position.

Select the Z axis:



Axis display diode on.



The axis shows a remaining distance 0 for each axis.



Enter 2nd desired position:
(Z = -20.000)



Axis diode blinks.

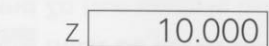


The entered value appears *left-justified* in the display.

Transfer entry value to memory:

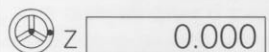


Axis display diode on.



The distance-to-go appears with reverse sign.

Move machine axis towards zero:

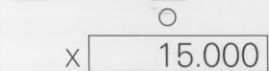


Tool is located at the 2nd desired position.

Switch to absolute value display:



Diode goes out.



The displays indicate the actual positions relative to the selected datum points.



Traversing to Zero (continued)

Sum Display (VRZ 770)

Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes

Sum Display

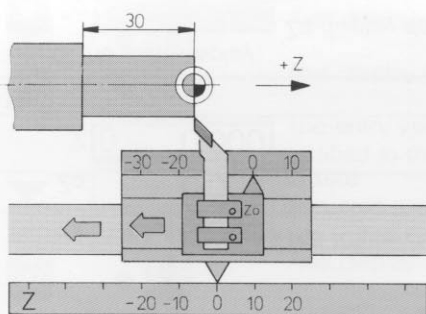
for bedway (Z) and top slide (Zo)

The VRZ 770 lathe display unit can display the position values for bedway and top slide either singly or as a sum of both values, depending on the **S_Z** key setting.

In **single display** the position values are based on any desired datum set for Z and Zo.

In **sum display** the display unit adds the position values for bedway and top slide taking the respective signs into account, so that the absolute position value of the tool relative to the workpiece is always available. The sum is displayed in the Z axis display, the Zo axis display is dark.

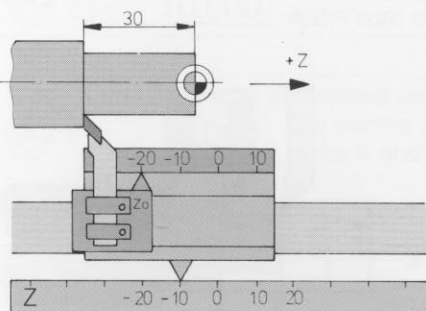
In order to receive the correct sum display **S_Z**, the datum for **S_Z** must be set at the sum of the single displays for Z and Zo (see example below).



Zo	0.000
Z	0.000

S_Z

Zo	
Z	0.000



Zo	- 20.000
Z	- 10.000

S_Z

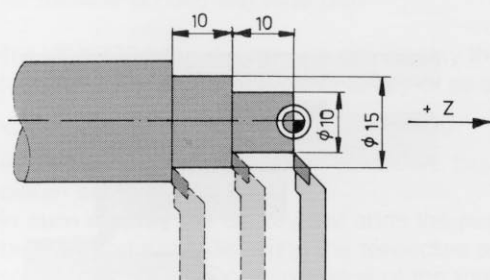
Zo	
Z	- 30.000

Sum Display (VRZ 770)**Example of Sum Display (VRZ 770)****Parameter Entry**

mm/inch · Shrinkage · Set Display to Zero

Error Codes

Example of Sum Display



R_x LED dark.

X The X axis display shows the shaft diameter, the other displays are set to zero.

Zo

Z

Select the sum display:

S_Z Zo Zo display dark.

Z Z axis display shows an old sum value.

Set the sum display to zero:

Z Axis display diode on.

0 Axis display diode blinks.

Z The entry value appears *left*-justified in the display.

Transfer entry to memory:

ENT Axis display diode on.

Z The entry value appears *right*-justified in the display.

Move the Z axis to the desired value:

Z The current position value appears in the sum displays.

Move X and Zo axis to the desired value:

X The current position values appear in the X and sum display.

Zo

Z

Example of Sum Display (VRZ 770)

Parameter Entry

mm/inch · Shrinkage · Set Display to Zero

Error Codes

Parameters

Parameters serve to adapt the VRZ to the machine.

Designation

Parameters are identified with the letter **P** and **two numbers**.
 Examples: P07, P20.

Parameters which refer to individual machine axes have a third digit to identify the axis:

- 1** for the **X** axis (**1st** axis)
- 2** for the **Zo*** axis (**2nd** axis)
- 3** for the **Z** axis (**3rd** axis)

The axis designation is separated from the parameter number by a point.

Example:

P02.1 = parameter P02 for the X axis.

* VRZ 730: Z axis

Example of parameter entry

Parameter **P02.1** is to be assigned the value **1**.

Activate parameter entry: press and hold down CE, and press the first digit of the parameter number.

Call parameter (Press and hold CE key. Enter zero.):

Activation of parameter operation.

X

Complete the parameter number:



X

Zo

The parameter number appears in the X display.

The parameter value appears right-justified in the Zo display.

Status change: Sets alternately the parameter value 0, 1 or 2 in the Zo display.



X

Zo

Transfer parameter to memory:



X

Zo

The last position values appear in the display.

Parameter P10: mm/inch selection

0 = mm display
1 = inch display
2 = mm/inch selection via key 

P10. = 2

○



LED off: mm display

●



LED on: inch display



With P10 = 2, key  cannot be used as datum point key.

Parameter P13: Shrinkage Compensation

Entry range from $\pm 0 \dots 99999 \mu\text{m/m}$
($\cong \pm 0 \dots 9.999\%$)



A positive entry value acts as a workpiece reduction.

A negative entry value acts as a workpiece enlargement.

For jobs without material shrinkage or expansion enter the shrinkage factor 0.

Parameter P20: zero reset of display via CE-key

0 = zero reset of display via CE-key not possible
1 = zero reset of display via CE-key possible

The CE-key deletes an incorrect entry and recalls the previous display value via parameter P20 it can be additionally selected whether display is reset to "0" by pressing the CE-key (without entry of a numerical value).

Error Codes

Display Blinks

- A power interruption has occurred.
- The scale was moved too quickly; the permissible input frequency was exceeded.
- The encoder signal was interrupted.
- ▶ Press **REF** to acknowledge the error message, and cross over the reference marks.

E E E E E E E E

- Input error. The input range was exceeded.
- A non-permissible parameter number was selected.
- ▶ Acknowledge the error message with **CE**.

0.0.0.0.0.3.7.5

- Overflow display. All decimal points light up.
- ▶ Retract the machine axes.

0.0.0.1.2.3.4.5

- Gate array overflow. All decimal points blink.
- ▶ Turn the encoder off and then on again.

Error 61

Error 62

Error 63

- The distance-coded reference marks were crossed over too quickly.
- The value in parameter P09 for reference mark evaluation does not correspond to the reference marks of the connected encoder.
- ▶ Acknowledge the error message with **CE** and correct the error.

Error 51

Error 52

Error 53

- Encoder signal amplitudes too large for the X axis.
- Encoder signal amplitudes too large for the Zo axis.
- Encoder signal amplitudes too large for the Z axis.
- ▶ Acknowledge the error message with **CE**.

Error 80

Error 81

Error 82

Error 83

Error 84

Error 98

Error 99

If any of these error codes appear in the display during operation, contact your HEIDENHAIN Customer Service.