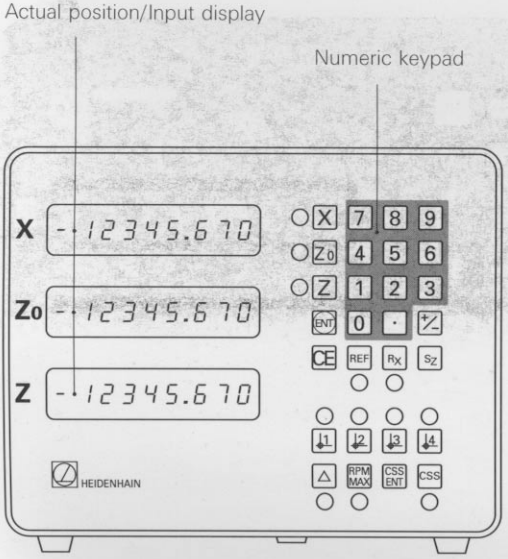
HEIDENHAIN

Pilot

Working with the

VRZ 739/779

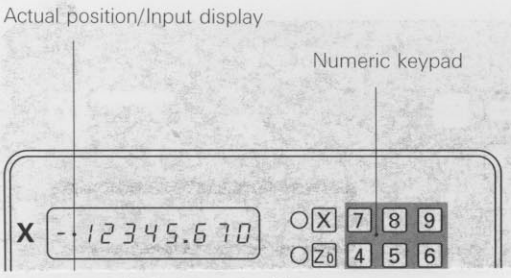
Keys and Displays



X Axis Selection	△ Distance-to-Go (Countdown Positioning)
ENT Confirm Entry	REF Reference Mark Evaluation
CE Clear Entry/Zero Reset/ Select Parameter	R_X Radius/Diameter Display
1 Datum Points	S_Z Separate/Sum Display (Bedway and Top Slide)
4 mm/inch Selection (via parameter P10)	

Constant Surface Speed Functions

Keys and Displays
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 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes



Switch on/Working in REF mode

Read the information on comissioning 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 (with distance-coded reference marks: two reference marks).
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):

I
0

X 0.000
Z 0.000

The display blinks.
The blinking indicates that a power interruption has occured.

▼

Activate Reference Mark Evaluation:

REF REF

LED on.

X – 52.813
Z 16.469

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

▼

Traverse encoder reference mark(s):

X 83.467
Z 114.348

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

The display is ready for operation and is in REF mode.
Afterwards the datums can be reset.

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

Switch REF mode off

REF REF

LED off.
REF mode is switched off.

Switch on/Working in REF mode
Datum Points
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Sum Display (VRZ 779)
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mm/inch · Shrinkage · Set Display to Zero
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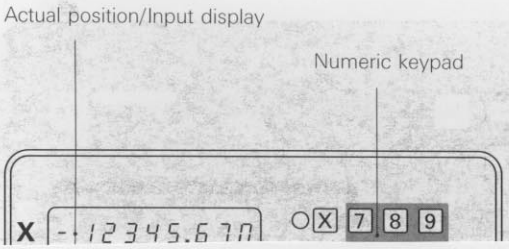


Datum Points

Using datum points you can set a certain correlation between encoder position and the display value.
The VRZ permits the setting of four datum points for each axis.
The datum points are selected with the keys [1] ... [4].

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

e. g. Datum 2

[2] [2]

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

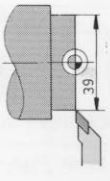
X 84.551

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

Setting the Datum

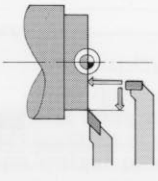
The datum points will remain stored after a power interruption only if they are set in the REF mode.

Example: Presetting lathe tools



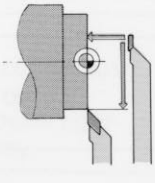
Clamp tool no. 1 in place

[1]



Clamp tool no. 2 in place

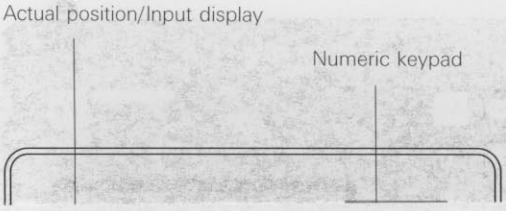
[2]



Clamp tool no. 3 to 4 in place

... [4]

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 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes



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:

[X] ● [X] Axis display diode on.

▼

Addressing the datum e. g. ⊥1 for tool No. 1:

● LED on.

[⊕1] [⊕1]

X 25.493 Display value is based on the current datum.

▼

Move the machine slide or tool to the datum position:

X 31.864

▼

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

[3] ☼ [X] Axis display diode blinks.

[9]

X 39 The entry value appears *left*-justified in the display.

▼

Transfer entry to memory:

[ENT] ● [X] Axis display glows continuously.

X 39.000 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 [CE] must pressed before entering the correct value.

Setting a Datum Point
Radius/Diameter Display
Incremental/Absolute Dimensions
Positioning in Incremental Dimensions
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Sum Display (VRZ 779)
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Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
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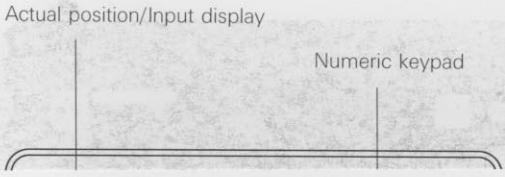
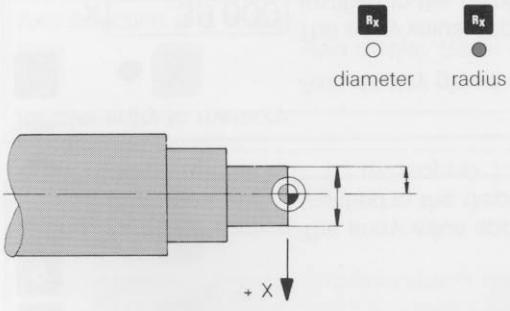


Radius/Diameter Display for the Cross Slide X

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

Example:



The VRZ is in diameter display mode.

Rx

LED is off.

X 10.000 The X display indicates the shaft diameter.

Switching to radius display:

Rx Rx

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 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes

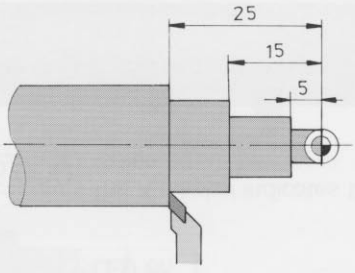
Actual position/Input display

Numeric keypad

Absolute Dimensions/Incremental Dimensions

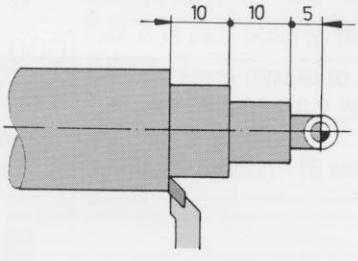
Absolute dimensions

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.**

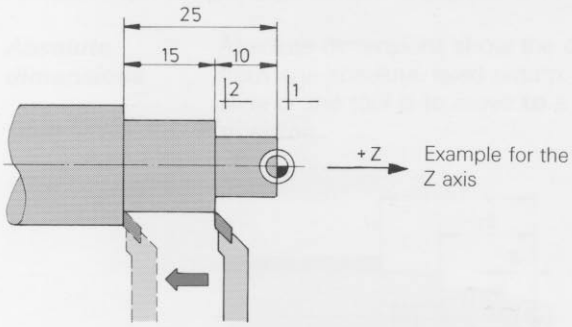


Incremental/Absolute Dimensions
Positioning in Incremental Dimensions
Distance-to-go Display/Traversing to Zero
Traversing to Zero (continued)
Sum Display (VRZ 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes

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.

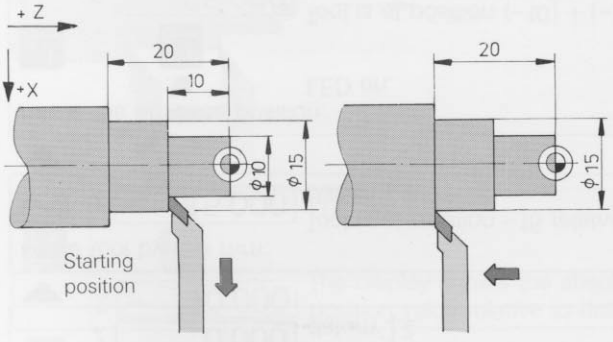
Z – 25.000 Tool is at position (–10) + (–15) = –25 relative to datum ⊥1.

Positioning in Incremental Dimensions
Distance-to-go Display/Traversing to Zero
Traversing to Zero (continued)
Sum Display (VRZ 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes

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 R_X off).

Traversing to Zero (Example X axis)

Tool is located at the starting position

Select the X axis:

X ● X — X axis LED on.

X 10.000
Z – 10.000 — The display shows the current position values, here the starting position.

Activate distance-to-go display:

△ △ — Diode on.

X 0.000
Z 0.000 — The display shows the value 0 for each axis.

Distance-to-go Display/Traversing to Zero
Traversing to Zero (continued)
Sum Display (VRZ 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes

Enter 1st desired position: (X = 15.000)

1 ☼ X — Axis display diode blinks.

5 X 15 — The entry value appears *left*-justified in the display.

Transfer entry to memory:

ENT ● X — Axis display diode on.

X – 5.000 — The distance remaining to the desired position appears with reverse sign in the display.

Move machine axis towards zero:

X 0.000 — Tool is located at the 1st desired position.

Select the Z axis:

Z ● Z — Axis display diode on.

X 0.000

Z 0.000 — The axis shows a remaining distance 0 for each axis.

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

2 ☼ Z — Axis diode blinks.

0

+/– Z – 20 — The entered value appears *left*-justified in the display.

Transfer entry value to memory:

ENT ● Z — Axis display diode on.

Z 10.000 — The distance-to-go appears with reverse sign.

Move machine axis towards zero:

Z 0.000 — Tool is located at the 2nd desired position.

Switch to absolute value display:

△ △ ○ — Diode goes out.

X 15.000

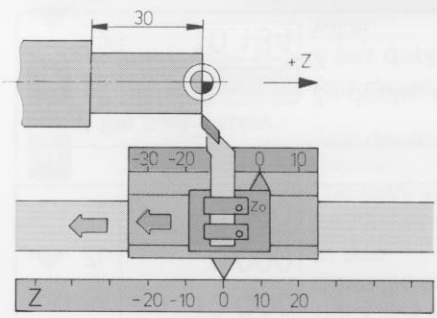
Z – 20.000 — The displays indicate the actual positions relative to the selected datum points.

Traversing to Zero (continued)
Sum Display (VRZ 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes

Sum Display
for saddle (Z) and top slide (Zo)

The VRZ 779 lathe display unit can display the position values for saddle and top slide either singly or as a sum of both values, depending on the S_Z key setting.

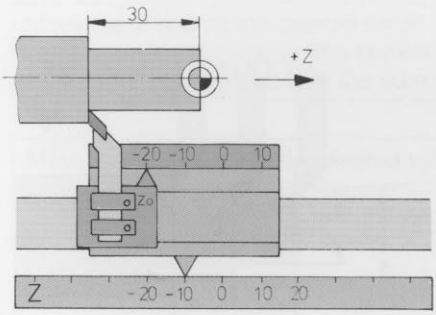
In **single display** the position values are based on any desired datum set for Z and Zo.
In **sum display** the display unit adds the position values for saddle and top slide taking the respective signs into account, so that the absolute position value of the tool relative to the workpiece is always available.
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).
The sum is displayed in the Z axis display, the Zo axis display is dark.



Zo 0.000
Z 0.000

S_Z

Zo
Z 0.000



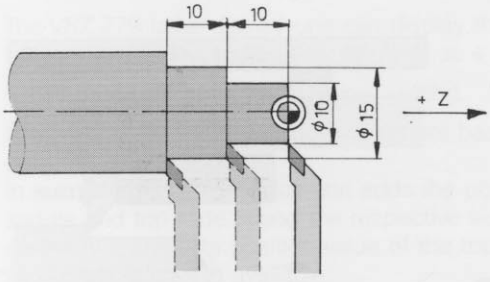
Zo – 20.000
Z – 10.000

S_Z

Zo
Z – 30.000

Sum Display (VRZ 779)
Example of Sum Display (VRZ 779)
Constant Surface Speed
Parameter Entry
mm/inch · Shrinkage · Set Display to Zero
Error Codes

Example of Sum Display



	Rx	LED dark.
	○	
X	10.000	The X axis display shows the shaft diameter, the other displays are set to zero.
Zo	0.000	
Z	0.000	

▼

Select the sum display:

Sz	Zo	Zo display dark.
Z	10.134	Z axis display shows an old sum value.

▼

Set the sum display to zero:

Z	● Z	Axis display diode on.
0	☼ Z	Axis display diode blinks.
Z	0.	The entry value appears *left*-justified in the display.

▼

Transfer entry to memory:

ENT	● Z	Axis display diode on.
Z	0.000	The entry value appears *right*-justified in the display.

▼

Move the Z axis to the desired value:

	Z – 10.000	The current position value appears in the sum displays.

▼

Move X and Zo axis to the desired value:

	X 15.000	The current position values appear in the X and sum display.
	Zo	
	Z – 20.000	

Constant Surface Speed

At a constant spindle speed, the cutting speed on the surface of a turned workpiece varies according to its diameter. In Constant Surface Speed mode (CSS), the rotational speed of the spindle is controlled to change with the movement of the X axis so that the cutting speed on the workpiece surface remains constant.
The function is activated with the CSS key. The spindle potentiometer must be switched on.

To set the maximum spindle speed

Activate CSS mode:

CSS

Adjust the maximum rpm with the spindle potentiometer:

RPM MAX · CSS ENT · CSS

The red LED under RPM MAX blinks until the spindle speed has stabilized, then it glows continuously.
The green LED under CSS blinks.

Store the maximum spindle speed:

RPM MAX

RPM MAX · CSS ENT · CSS

The red LED is off.

The green LED blinks.

To set the machining speed:

Move to the X position:
e.g.

X + 20.123 The X position must be positive.

Set the machining spindle speed for this X position.

Activate CSS mode:

CSS ENT

RPM MAX · CSS ENT · CSS

The green LED is on.

The rotational speed of the spindle is controlled to change with the X position.
Maximum rpm = The value stored with RPM MAX
Minimum rpm = Parameter P21.0 to P23.0.
The spindle potentiometer is disabled during CSS operation. The rpm monitor is active. An EMERGENCY STOP results if you exceed the rpm limit value or if you shift gears. The spindle can then be disengaged. The rpm monitor remains inactive as long the spindle is disengaged.

To leave CSS mode:

Set the spindle potentiometer to zero

CSS

RPM MAX · CSS ENT · CSS

The red and green LEDs are off.

Parameters

The display unit features operating parameters in non-volatile storage that become effective immediately upon switch-on.

The parameters are designated by the letter P and a two-digit number. For the parameters 0 to 9, the leading zero is always included, e. g. P05. To call a parameter, press and hold down the CE key, then press the first digit of the parameter number, either 0 or 1.

With the exception of the parameters P00, P1x and P10.0 the parameter values can be changed only after entering the code number **95148** in P00

Example of parameter entry (VRZ 739)
Parameter P10: mm/inch selection

Call parameter (Press and hold CE key. Enter 1.):
Activation of parameter operation.

CE 1

X P1_

▼

Complete the parameter number:

0

X P10.0 — The parameter number appears in the X display.

Z 0 — The parameter value appears right-justified in the Z display.

▼

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

+/−

X P10.0

Z 1

▼

Transfer parameter to memory:

ENT

X 30.4397 — The last position values appear in the display.

Z – 20.5613

Parameter P10: mm/inch selection

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

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

Parameter P13: Shrinkage Compensation

Entry range from ± 0 ... 99999 µm/m
(≙ ± 0 ... 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.

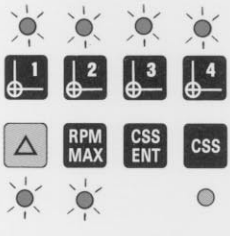
Parameter P20: zero reset of display via CE-key

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).

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** key and pass over reference marks.
E E E E E E E E	● Erroneous entry. The value entered was too large. ● An non-existent 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 machine axes.
0.0.0.1.2.3.4.5	● Gate array overflow; all decimal points blink. ► Switch counter off, then on again.
E r r o r 6 1 E r r o r 6 2 E r r o r 6 3	● The distance-coded reference marks were passed over too quickly. ● The value entered for parameter P09 (reference mark evaluation) does not correspond to the reference marks of the connected encoder. ► Acknowledge the error message with **CE** and correct the error.
E r r o r 5 1 E r r o r 5 2 E r r o r 5 3	● Encoder signal amplitudes too large for X axis. ● Encoder signal amplitudes too large for Zo axis. ● Encoder signal amplitudes too large for Z axis. ► Acknowledge the error message with **CE**.
E r r o r 8 0 E r r o r 8 1 E r r o r 8 2 E r r o r 8 3 E r r o r 8 4 E r r o r 9 8 E r r o r 9 9	● Should any of these error messages appear in the position display during operation, please contact your HEIDENHAIN service agency.

LEDs blink



Cause:

- EMERGENCY STOP
- Error 80 to 85
- During CSS mode, the rpm limit was exceeded or the gears were shifted.