



HEIDENHAIN

Pilot



Working with the Display Unit

VRZ 480

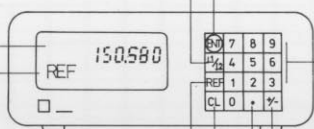
Datum reset key

for selection of appropriate datum

Actual value/
input displays

Operating mode

REF key for
reference mark
evaluation



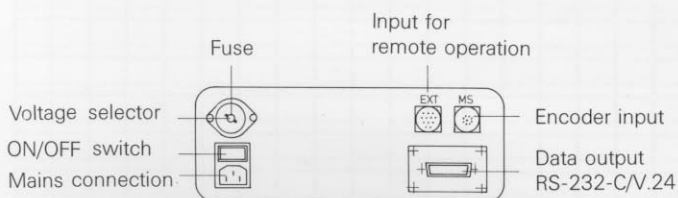
Transfer key for
entry values

Decimal numeric
keyboard

Change sign key

Decimal point key

Clear entry key



Fuse

Input for
remote operation

Voltage selector

ON/OFF switch

Mains connection

Encoder input

Data output
RS-232-C/V.24

Controls and Displays

Switch-on

Working in REF mode

Datum Points

Setting the Datum

Absolute Dimensions/Incremental Dimensions

Positioning in Incremental Dimensions

Parameter Entry

● Function of the CL key

● mm/inch Display

● Tolerance Compliance Operating Mode

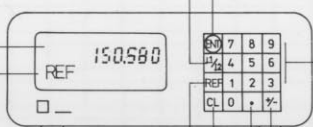
● Maximum/Minimum Evaluation Operating Mode

Error Messages

Datum reset key

for selection of appropriate datum

Actual value/
input displays
Operating mode



Transfer key for
entry values

Decimal numeric
keyboard

Change sign key

Switch-on



Read the information on initial activation before the first switch-on!

The mains switch is located at the rear of the housing.

Switch on measured value display:

0 1

0.000
+1

The display blinks (depending on parameter P1, see operating instructions).

The blinking indicates that a power interruption has occurred.

Press REF key:

REF

REF 46.813
+1

REF blinks.

The display indicates the stored REF value.

See the next page for information on working in REF mode.

Press REF key again:

REF

46.813
+1

REF is cleared from display.

The measured value display is ready for operation. New datum points may be set.

Switch-on

Working in REF mode

Datum Points

Setting the Datum

Absolute Dimensions/Incremental Dimensions

Positioning in Incremental Dimensions

Parameter Entry

● Function of the CL key

● mm/inch Display

● Tolerance Compliance Operating Mode

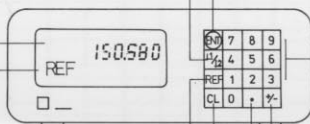
● Maximum/Minimum Evaluation Operating Mode

Error Messages

Datum reset key

for selection of appropriate datum

Actual value/
input displays
Operating mode



Transfer key for entry values

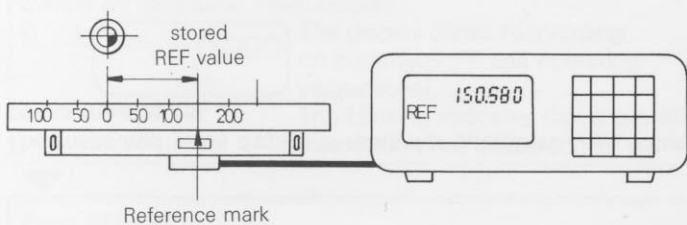
Decimal numeric keyboard

Working in REF mode

(REF Reference mark evaluation)

In REF mode the measured value display keeps the datum points in non-volatile storage. With REF operation switch-on the reference mark of the encoder must be traversed (on encoders with distance-coded reference marks two reference marks must be traversed).

After traversing the reference mark(s) one time all datum points are reproduced.



Switching on REF mode/Reproducing datum points

Switch-on reference mark evaluation:



REF 52.813
REF 1

REF blinks.
Display indicates the stored REF value and remains "frozen".

Traverse encoder reference mark(s):



REF 83.467
REF 1

Display value changes concurrently; display value refers to the current datum.
REF glows continuously.

Switch-off REF mode

Switch-off reference mark evaluation:



REF 31.864
REF 1

REF is cleared from display.
REF mode is no longer active.



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

Working in REF mode

Datum Points

Setting the Datum

Absolute Dimensions/Incremental Dimensions

Positioning in Incremental Dimensions

Parameter Entry

● Function of the CL key

● mm/inch Display

● Tolerance Compliance Operating Mode

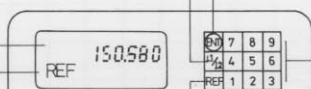
● Maximum/Minimum Evaluation Operating Mode

Error Messages

Datum reset key

for selection of appropriate datum

Actual value/
input displays
Operating mode



Transfer key for entry values

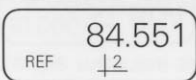
Decimal numeric keyboard

Datum Points

Using datum points you can set a certain correlation between encoder position and the display value.

The VRZ 480 Measured Value Display permits the setting of two datum points which are represented by the $\perp 1$ and $\perp 2$ symbols.

Switching to the Other Reference Point



The display value changes suddenly. The value refers to the current datum indicated with the datum symbol (here $\perp 2$).

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

Datum Points

Setting the Datum

Absolute Dimensions/Incremental Dimensions

Positioning in Incremental Dimensions

Parameter Entry

- Function of the CL key
- mm/inch Display
- Tolerance Compliance Operating Mode
- Maximum/Minimum Evaluation Operating Mode

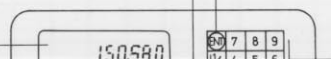
Error Messages

Datum reset key

for selection of appropriate datum

Transfer key for entry values

Actual value/
input displays

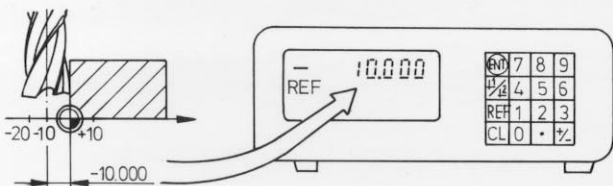


Decimal numeric

Setting the Datum



Non-volatile storage of datum points is only ensured if the datum points are set in the REF mode (see "switch-on REF mode").



Addressing the datum:



REF 25.493
+1

The symbol for datum 1 or 2 appears in the display. Display value refers to the current datum.

Traverse the machine slide or tool to the datum position:



REF 31.864
+1

Enter the new datum value for the current position, e.g. -10.000:

1

0

+/-

REF -10 SET
+1

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

Transfer entry:

ENT

REF 10.000
+1

SET is cleared from display. The entry value appears to the *right* in the display.

Falsely entered values can be corrected at any time. If the entry value is still left-justified in the display, then **CL** must be pressed before entering the correct value.

Setting the Datum

Absolute Dimensions/Incremental Dimensions

Positioning in Incremental Dimensions

Parameter Entry

- Function of the CL key
- mm/inch Display
- Tolerance Compliance Operating Mode
- Maximum/Minimum Evaluation Operating Mode

Error Messages

Datum reset key

for selection of appropriate datum

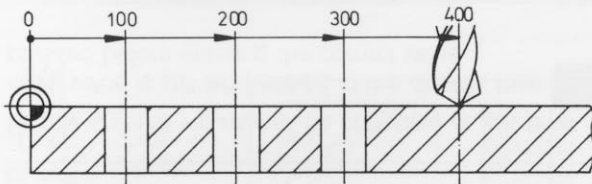
Transfer key for entry values

Actual value/

Absolute Dimensions/Incremental Dimensions

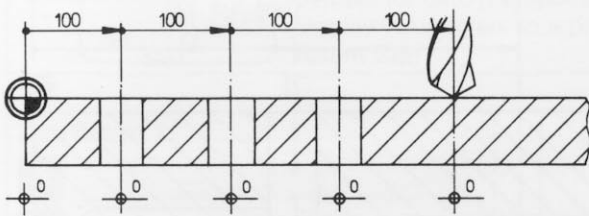
Absolute dimensions

refer to one absolute, fixed datum. The axis slide or the tool is to move **to** a certain **position**.



Incremental dimensions

refer to the previous position of the axis slide or tool. The axis slide or the tool is to move **by** a certain **amount**.



Absolute Dimensions/Incremental Dimensions

Positioning in Incremental Dimensions

Parameter Entry

- Function of the CL key
- mm/inch Display
- Tolerance Compliance Operating Mode
- Maximum/Minimum Evaluation Operating Mode

Error Messages

Datum reset key

for selection of appropriate datum

Transfer key for entry values

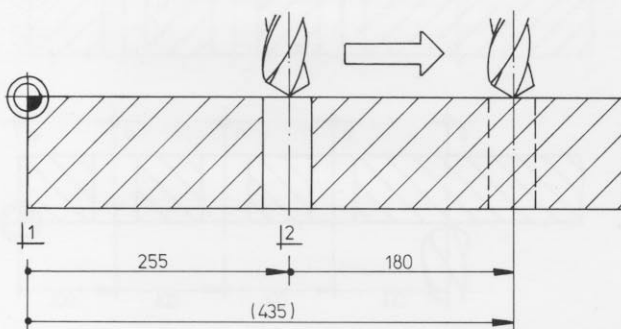
Positioning in Incremental Dimensions

With the datum point 1 the absolute datum is set (here the left edge of the workpiece).

Datum 2 can be set to "0" after each positioning operation. By switching to datum 1 you can recall the absolute value.

Example

The tool is at the absolute position +255 and is to be moved in incremental dimensions by +180 mm.



255.000
REF \downarrow 1

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

Switch to datum 2:

31.864
REF \downarrow 2

Symbol for datum 2 appears. Display value refers to a preset datum 2.

Zero datum 2:

0

ENT

0.000
REF \downarrow 2

Tool is at zero position relative to datum 2.

Move tool by +180 mm:

180.000
REF \downarrow 2

Tool is at position 180 relative to datum 2.

Recall the absolute position:

435.000
REF \downarrow 1

Tool is at position $(180 + 255 =)$ 435 relative to datum 1.

Positioning in Incremental Dimensions

Parameter Entry

● Function of the CL key

● mm/inch Display

● Tolerance Compliance Operating Mode

● Maximum/Minimum Evaluation Operating Mode

Error Messages

Datum reset key

for selection of

Transfer

Parameters

The measured value display has operating parameters in non-volatile storage which immediately become active upon switch-on. The parameters are identified by the letter P followed by a parameter number. More detailed information regarding parameters can be found in the operating instructions.

The parameters that are important for operation are included in the pages of this operator's guide which are marked with the symbol ●.



Invalid parameter values will not be accepted by the display unit!

Parameter Entry (example parameter P2)

Call parameter (Press and hold CL key.

Enter parameter **number** e.g. 2. Release both keys):

CL **2**

P2 2

The parameter appears with the current parameter value in the display.

Enter parameter **value** (e.g. 3):

3

P2 3

The parameter value appears right-justified in the display.

Clear mistaken entry, if necessary:

CL

P2 2

The parameter appears with the last valid value.

A new value can then be entered:

0

P2 0

The new parameter value appears in the display.

Transfer parameter to memory:

ENT

31.864

The last position value appears in the display.

Parameter Entry



- Function of the CL key
- mm/inch Display
- Tolerance Compliance Operating Mode
- Maximum/Minimum Evaluation Operating Mode

Error Messages

The mm/inch display and the function of the CL key are set with the parameter P2.

The CL key clears a false entry and calls the previous display value back. With parameter P2 you can choose whether the display is set to "0" by pressing the CL key (without entering a numerical value).

Parameter P2: Function of the CL key and mm/inch display

Function of the CL key	Display	Parameter
 Does not set the display to "0" if the CL key is pressed without entering a numerical value.	mm display	P2: 0
	inch display	P2: 1
 Sets the display to "0" if the CL key is pressed without entering a numerical value.	mm display	P2: 2
	inch display	P2: 3

31.0864

INCH

If an inch display was chosen, the reminder INCH appears in the display.



During a datum entry or a parameter entry, display zeroing is not possible with the CL key.

- Function of the CL key
- mm/inch Display
- Tolerance Compliance Operating Mode
- Maximum/Minimum Evaluation Operating Mode

Tolerance Compliance Operating Mode

In the "tolerance compliance" operating mode similar test specimens can be examined for dimensional accuracy and assigned to classes.

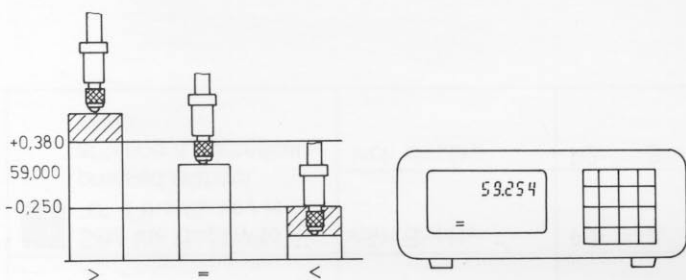
The lower and upper limit values are entered via parameters P8 and P9. P8 and P9 can only be called if beforehand the tolerance compliance operating mode was set with the parameter P7 = 5. In contrast to the previous parameter entry, the parameter number and the upper and lower limit values are displayed alternately in P8 and P9.

The tolerance status is output with the symbols:

> measured value is greater than the upper limit value

= measured value is within tolerance

< measured value is less than the lower limit value



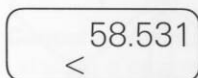
The measured value display can output the tolerance status through two lines for external subsequent processing (see "remote operation" in the operating instructions).

Parameters for the Tolerance Compliance Operating Mode

Tolerance Compliance Operating Mode	Parameter No.	Parameter Value
Switch to tolerance compliance mode	P7:	5
Set lower limit value	P8:	lower limit value with sign
Set upper limit value	P9:	upper limit value with sign



The lower limit value must always be less than the upper limit value filed under parameter P9. In case of false entry, all three tolerance status symbols light up!



With the transfer of the parameters one of the symbols for the tolerance status appears, depending on the current measured value.

● Tolerance Compliance Operating Mode

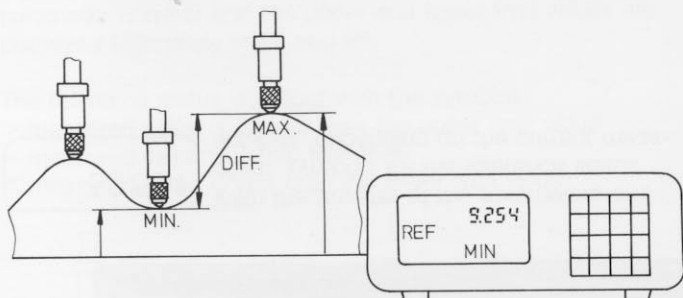
● Maximum/Minimum Evaluation Operating Mode

Error Messages

Maximum/Minimum Evaluation Operating Mode

The measured value display can acquire the maximum and minimum from any number of measured values and form the difference between the two extreme values.

Depending on the setting of the parameter P7 (see table below) or the triggering of the flange socket for remote operation (see "Remote Operation" in the operating instructions) the extreme value MAX or MIN or the difference DIFF of the the two values can be displayed.



The maximum/minimum acquisition occurs every 0.55 ms. Maxima and minima occurring between these acquisitions are not detected. Therefore the test specimen must be moved in such a way that the change in measured values within 0.55 ms is less than the desired accuracy.


For example:

For a required accuracy of $\pm 0.5 \mu\text{m}$ ($\pm 0.00002 \text{ in.}$) the maximum traversing speed of the linear encoder must not exceed 0.9 mm/s or 0.035 ips.

Parameters for Maximum/Minimum Evaluation

Display	Meaning	Parameter Value
-	Display of instantaneous value	P7: 0
MIN	Minimum value from a series of measurements	P7: 1
MAX	Maximum value from a series of measurements	P7: 2
DIFF	Difference (MAX - MIN)	P7: 3

Starting a Measuring Cycle

A measuring cycle is initiated with the  key or a remote start command.

Cancel a Measuring Cycle by

- starting a new measuring cycle
- entering a datum
- switching to another operating mode
- power interruption, e.g. mains OFF/ON
- switching INT/EXT (see "Remote Operation" in the operating instructions)
- pressing the REF key
- changing parameter P1, P4 or P5

Error 01

- A storage command followed another before the data output over the V.24 data interface was concluded.

▶ Acknowledge this error message with **CL**.

Error 02

- A storage command was given although the external unit was not ready or connected (e.g. in the display stop operating mode, see operating instructions).

▶ Acknowledge this error message with **CL**.

A subsequent error of this type will no longer be indicated. An interruption in power activates this error message again.

Error 05

- The encoder output signals are too large and the display unit may no longer be able to interpolate correctly.

▶ Acknowledge this error message with **CL**.

A subsequent error of this type will no longer be indicated. An interruption in power activates this error message again.

Error 06

- The distance-code reference marks were traversed too quickly.
- The value given in parameter 5 for the distance coding of the reference marks does not correspond to the actual coding of the connected encoder.

▶ Acknowledge this error message with **CL**.

Error 99

- After switch-on errors were found during read-out of the parameters from the EEPROM. All parameters were set to "0".

▶ Acknowledge this error message with **CL**.

In case of recurrence please contact the HEIDENHAIN service department.

999.9.9.9.9

- All decimal points light up. The maximum display value was exceeded.
 - All decimal points blink during an internal character overflow.
-

Display blinks

- A power interruption has occurred.
- The output signals of the encoder are too weak, e.g. because of scale fouling.
- Encoder is defective or not connected.
- The encoder was traversed too quickly, the permissible input frequency was exceeded.

▶ The blinking can be cleared with **REF**.

In order to work in REF mode the reference marks of the encoder must then be traversed.
