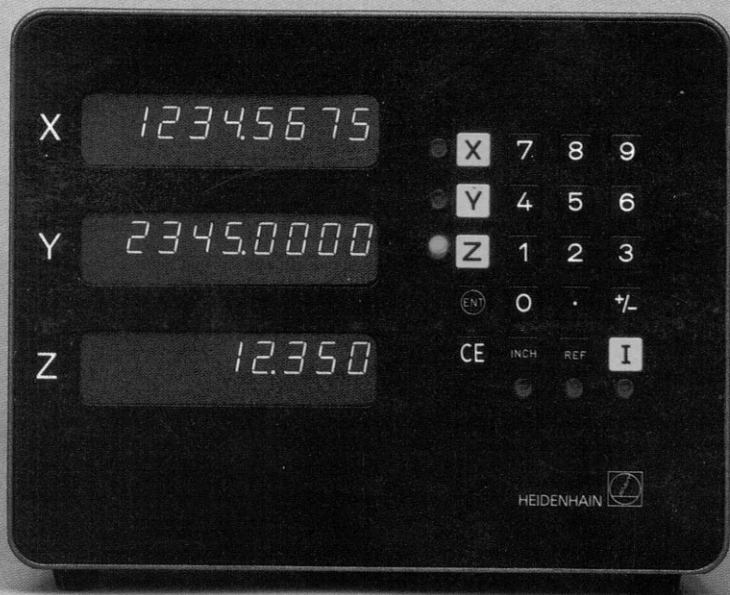




# HEIDENHAIN

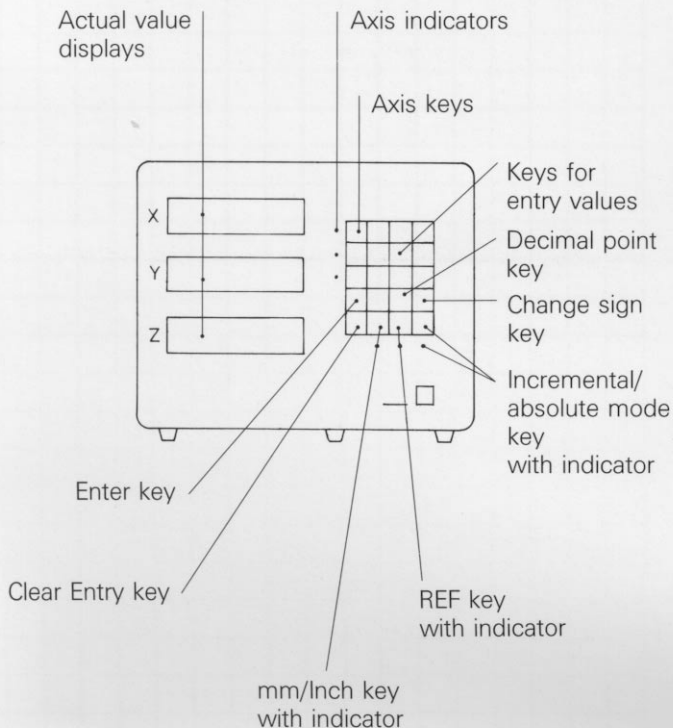
## Operator's Guide

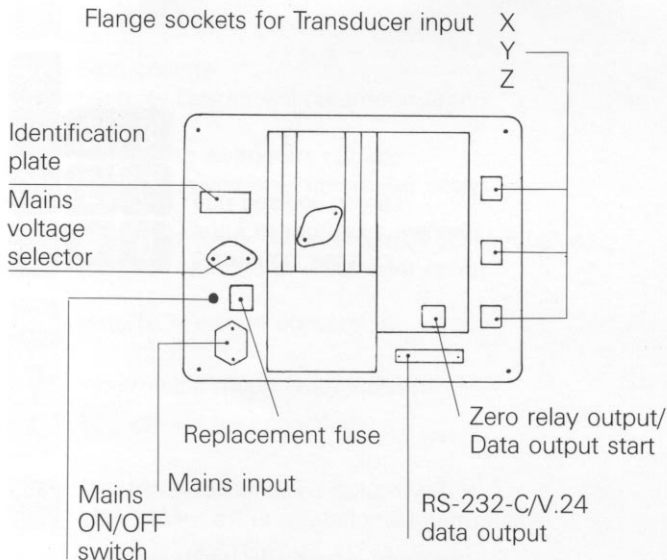


Counters

# VRZ 735/775

**Operating panel VRZ 735 (2 Axes)**  
**VRZ 775 (3 Axes)**





## Operating panel

### Operating keys

### Functional test

### Operational parameters (Grating pitch/Radius or $\phi$ -display)

### Operational parameters (Counting direction/Resolution)

### Zero reset of axes

### Axis preset

### Correction of an entry

### Maximum entry values

### REF-reference mark evaluation

### mm-INCH conversion · Zero relay output

### Absolute/Incremental positioning

### Absolute/Incremental positioning

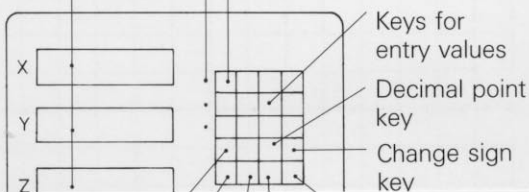
### Data output RS-232-C · Linear compensation

### Measuring machine operation

Actual value displays

Axis indicators

Axis keys



### Operating keys

**X** Axis keys (with indicators)

**Y**

**Z**

**7 8 9** Numerical keys for entry of reference values and position values  
**4 5 6**  
**1 2 3**  
**0**

**.** Decimal point

**+/-** Sign change (also for operational parameter entry)

**CE** for erasing erroneous entries (also for operational parameter entry)

**ENT** transfer of entry value as actual position value (also for operational parameter entry)

**INCH** mm/INCH instant conversion

**I** Incremental mode (with indicator - **I** off = Absolute values)

**REF** for retrieval of entered datum values after power off or operational interruptions (inactive when **I** -key is pressed)

### Operating keys

#### Functional test

Operational parameters (Grating pitch/Radius or  $\phi$ -display)

Operational parameters (Counting direction/Resolution)

Zero reset of axes

Axis preset

Correction of an entry

Maximum entry values

REF-reference mark evaluation

mm-INCH conversion · Zero relay output

Absolute/Incremental positioning

Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

Measuring machine operation

Actual value displays

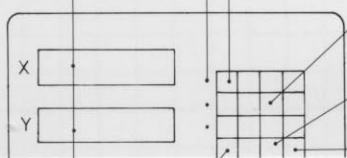
Axis indicators

Axis keys

Keys for entry values

Decimal point key

Change sign



### Functional test



Switch on counter  
(mains switch at rear)

▶ All axes display zero

Traverse each axis to verify counting function

REF

press

Decimal points flash – the position displays indicate the REF-values last entered

X

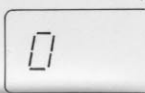
press

▶ X Axis indicator on

0

press

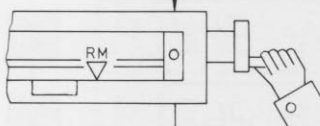
▶ X Axis indicator flashes. Position display indicates zero on left



ENT



Repeat in Y, Z-axes



Traverse each machine axis. Each REF-value is „frozen” until the reference mark is crossed. Decimal points cease to blink.

REF

▶ REF Indicator off

REF

press again and hold depressed

▶ REF Indicator on

Traverse axes back over reference marks

▶ Axis indicators stop at zero  
Decimal points flash

### Functional test

Operational parameters (Grating pitch/Radius or  $\phi$ -display)

Operational parameters (Counting direction/Resolution)

Zero reset of axes

Axis preset

Correction of an entry

Maximum entry values

REF-reference mark evaluation

mm-INCH conversion · Zero relay output

Absolute/Incremental positioning

Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

Measuring machine operation

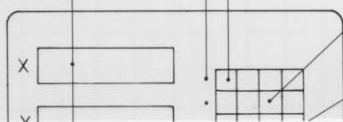
Actual value displays

Axis indicators

Axis keys

Keys for entry values

Decimal point key



## Entry of operational parameters

### Parameter "Grating pitch"

**CE** press and hold depressed

**4** press, now release **CE** and **4**

**X**

P41 - 3

**Y**

P42 - 2

**Z**

P43 - 1

**+/-**

**ENT**

Digit on right (= parameter value) signifies the transducer grating pitch

Nu-meral	Grating pitch/Linear encoder	normal reference marks	distance-coded reference marks
0	10 $\mu$ m		
1	20 $\mu$ m		
2	40 $\mu$ m		
3	100 $\mu$ m		
5	LS 101C		
6	LS 107C LS 403C/404C LS 703C/704C ULS 300C		
7	LID 350C		

By pressing **+/-**, the code number is changed 0...3.

Enter the grating pitch for each individual axis corresponding to the linear transducer connected.

**ENT** stores the specified grating pitch

### Parameter "Radius or Diameter display"

**CE**

**3**

**X**

P31 - 1

**Y**

P32 - 1

**Z**

P33 - 0

**+/-**

**ENT**

Digit on right signifies either radius or diameter display

Parameter value	Display
0	Display step = measured value
1	Display step = measured value x 2

**+/-** switches 0 to 1 alternately in display.

Select appropriate display for your machine axis). (Normally diameter display for X-axis)

**ENT** stores the selected display status.

Operational parameters (Grating pitch/Radius or  $\phi$ -display)

Operational parameters (Counting direction/Resolution)

Zero reset of axes

Axis preset

Correction of an entry

Maximum entry values

REF-reference mark evaluation

mm-INCH conversion · Zero relay output

Absolute/Incremental positioning

Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

Measuring machine operation

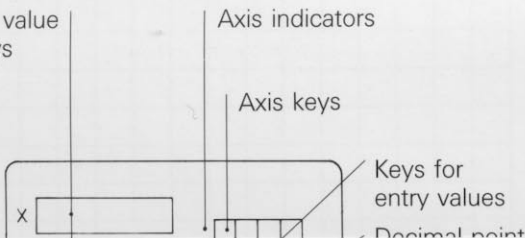
Actual value displays

Axis indicators

Axis keys

Keys for entry values

Decimal point



### Parameter "Counting direction"

**CE**

press and hold depressed

**2**

press, now release **CE** and **2**

**X**

P21 - 0

Digit on right (= parameter value) signifies either normal or reversed counting.

**Y**

P22 - 1

0 = normal  
1 = reverse

**Z**

P23 - 0

**+/-**

**+/-** switches 0 to 1 alternately in display.

Select required counting direction

**ENT**

**ENT** stores the selected counting direction

### Parameter "Resolution"

**CE**

press and hold depressed

**1**

press, now release **CE** and **1**

**X**

P11 - 0

Digit on right signifies a fine or coarse resolution.

**Y**

P12 - 1

**Z**

P13 - 0

Grating pitch	0 = fine		1 = coarse	
	mm	inch	mm	inch
10 μm	0.0005	0.00002	0.001	0.00005
20 μm	0.001	0.00005	0.005	0.0001
40 μm	0.002	0.0001	0.005	0.0005
100 μm	0.005	0.0002	0.01	0.0005

By pressing the axis keys the corresponding parameters are addressed and shown in the X-display

**+/-**

**+/-** switches 0 to 1 alternately in display.

Select required resolution

**ENT**

**ENT** stores the selected resolution

### Operational parameters (Counting direction/Resolution)

Zero reset of axes

Axis preset

Correction of an entry

Maximum entry values

REF-reference mark evaluation

mm-INCH conversion · Zero relay output

Absolute/Incremental positioning

Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

Measuring machine operation

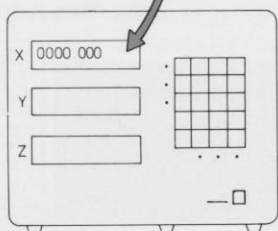
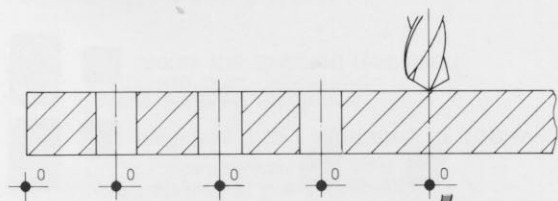
Actual value displays

Axis indicators

Axis keys

Keys for entry values

### Zero reset of axes



Allocation of "zero" to a certain position for datum-set.



Non-volatile storage of the preset datum point is only effected with counter in operating mode "reference mark evaluation REF" (REF light diode illuminated). For this purpose, press REF-key (REF light diode flashes) and traverse reference marks in all axes (REF light diode illuminated).

Press



Axis key X, Y or Z



Axis indicator on



Zero key



Axis indicator flashes,  
Position display indicates zero on left.



Zero is displayed as a position.  
Axis indicator remains on.



If necessary, repeat procedure in the remaining axes.

### Zero reset of axes

#### Axis preset

#### Correction of an entry

#### Maximum entry values

#### REF-reference mark evaluation

#### mm-INCH conversion · Zero relay output

#### Absolute/Incremental positioning

#### Absolute/Incremental positioning

#### Data output RS-232-C · Linear compensation

#### Measuring machine operation



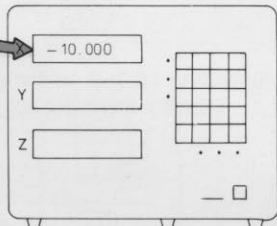
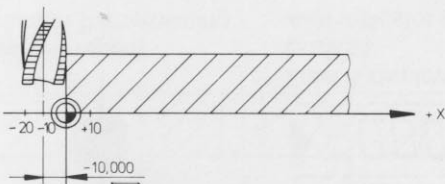
Actual value displays

Axis indicators

Axis keys

Keys for

### Axis preset



For datum set, a certain position may be allocated with a predetermined value.

Non-volatile storage of the preset datum point is only effected with counter in operating mode "reference mark evaluation REF" (REF light diode illuminated). For this purpose, press REF-key (REF light diode flashes) and traverse reference marks in all axes (REF light diode illuminated).



Press



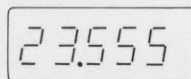
Axis key X, Y or Z



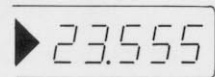
Axis indicator on



Key-in desired position value



Axis indicator flashes  
Position display indicates entry value on left.



Entry value is displayed on right.  
Axis indicator remains on



If necessary, also set datum values in the remaining axes.



### Axis preset

Correction of an entry

Maximum entry values

REF-reference mark evaluation

mm-INCH conversion · Zero relay output

Absolute/Incremental positioning

Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

Measuring machine operation

Actual value displays

Axis indicators

Axis keys

## Correction of an entry

The **CE** -key erases an incorrect or erroneous value which has been keyed-in.



The **CE** -key is also used for operational parameter entry see "Operational parameters"

Procedure

Axis selected and incorrect value keyed-in



20.36

Axis indicator flashes.  
Position display indicates entry value on left

**CE**

press



Axis indicator on.  
Position display indicates previous position value.

Key-in correct value

**Correction of an entry**

**Maximum entry values**

**REF-reference mark evaluation**

**mm-INCH conversion · Zero relay output**

**Absolute/Incremental positioning**

**Absolute/Incremental positioning**

**Data output RS-232-C · Linear compensation**

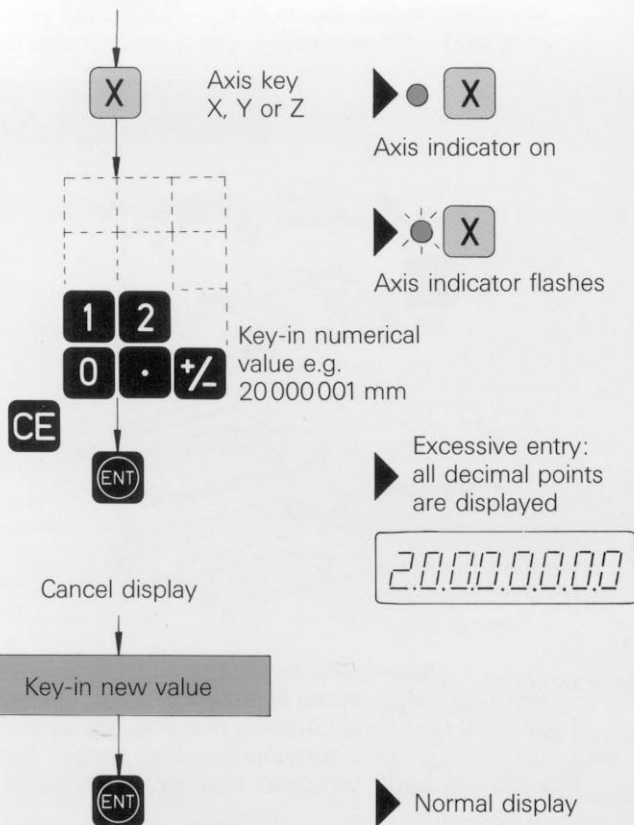
**Measuring machine operation**

**Maximum entry values**

The following maximum entry values may be entered:

Grating pitch	Resolution	max. entry value
10 $\mu\text{m}$	fine	9999.9999 mm/393.70076 inches
10 $\mu\text{m}$	coarse	20000.000 mm/787.40155 inches
20 $\mu\text{m}$	fine	20000.000 mm/787.40155 inches
20 $\mu\text{m}$	coarse	20000.000 mm/ 787.4016 inches
40 $\mu\text{m}$	fine	20000.000 mm/ 787.4016 inches
40 $\mu\text{m}$	coarse	20000.000 mm/ 787.4015 inches
100 $\mu\text{m}$	fine	20000.000 mm/ 787.4016 inches
100 $\mu\text{m}$	coarse	20000.000 mm/ 787.4015 inches

Example:

**Maximum entry values**

REF-reference mark evaluation

mm-INCH conversion · Zero relay output

Absolute/Incremental positioning

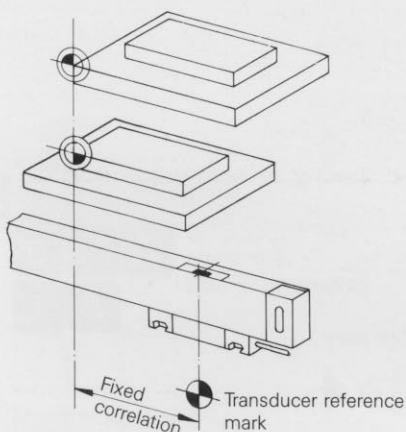
Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

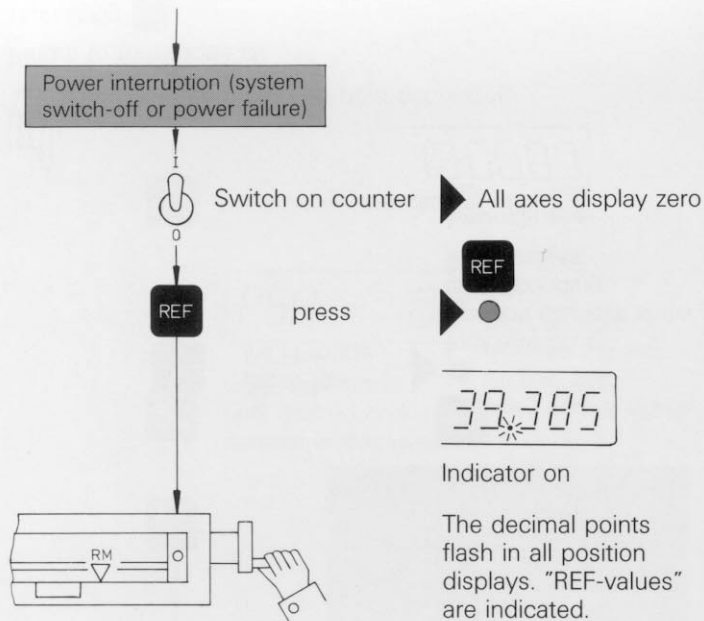
Measuring machine operation

**REF-reference mark evaluation**

For retrieval of datum after switch on, press REF-key and traverse all axes over the reference marks. The displays then commence counting and indicate values with reference to the datum last set in operating mode "reference mark evaluation REF" (REF light diode illuminated).



Datum reproduction is only possible when – prior to setting of the datum – the reference marks have been traversed over with the REF-function switched on.

**Procedure:**

If a new datum-set takes place, these new REF-values are automatically stored.

Traverse each machine axis over reference marks. Each REF-value is "frozen" until the reference mark is crossed-decimal points cease to blink.

**REF-reference mark evaluation**

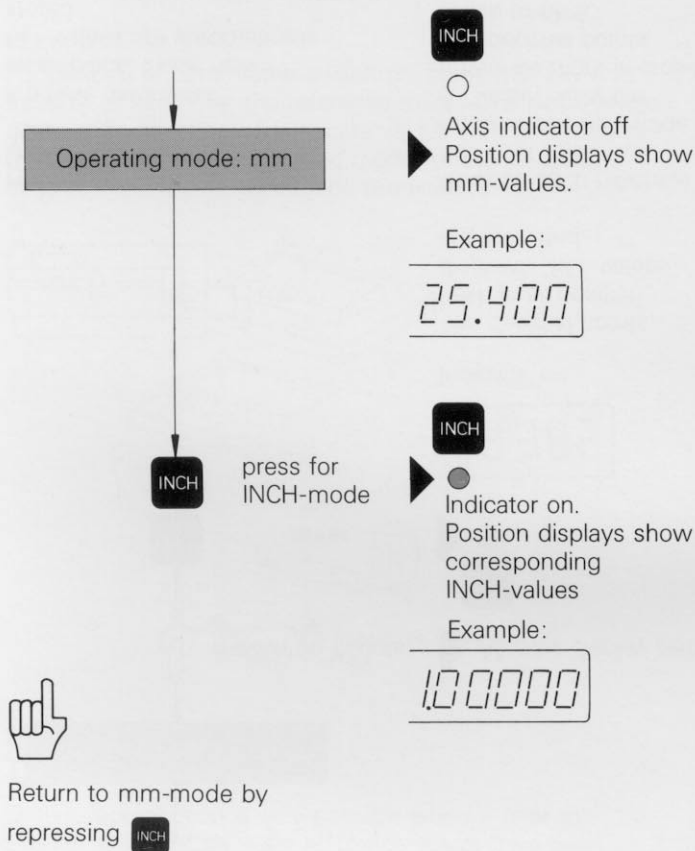
mm-INCH conversion · Zero relay output

Absolute/Incremental positioning

Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

Measuring machine operation

**mm/INCH conversion****Zero relay output**

## Procedure

**CE** press and hold depressed

**5** press, now release **CE** and **5**

PS0 - 0

Digit on right signifies the axis for the "zero" relay output signal

**+/-** press repeatedly until desired code number is displayed

**+/-**

Parameter value	Zero relay signal in axis
0	no axis
1	X
2	Y
3	Z

By pressing **+/-**, the code number is changed 0...3

Select required axis

**ENT** **ENT** stores the specified zero relay axis

**mm-INCH conversion · Zero relay output**

**Absolute/Incremental positioning**

**Absolute/Incremental positioning**

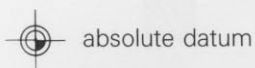
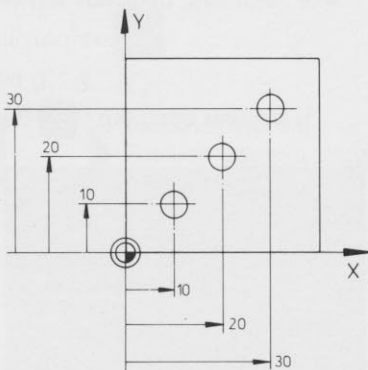
**Data output RS-232-C · Linear compensation**

**Measuring machine operation**

## Absolute/Incremental positioning

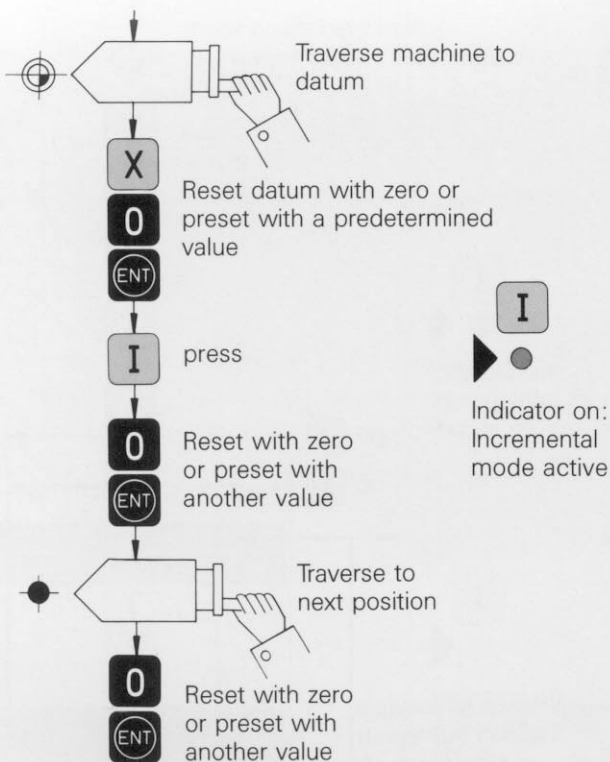
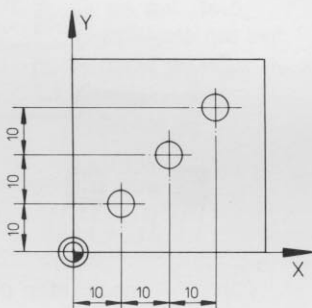
**Absolute dimensions** are referenced to the "absolute" datum.

for operation:  
the machine is traversed **to** a certain dimension



**Incremental dimensions**

are referenced to each previous datum for operation:  
the machine is traversed **by** a certain dimension



**Absolute/Incremental positioning**

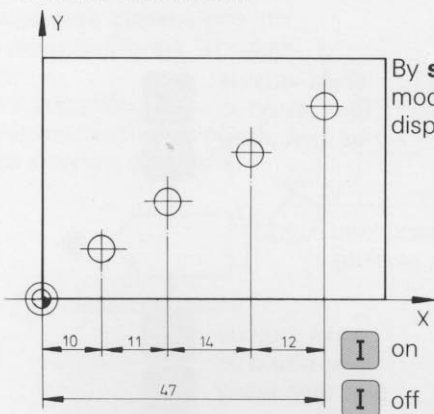
**Absolute/Incremental positioning**

**Data output RS-232-C · Linear compensation**

**Measuring machine operation**

## Absolute/Incremental positioning

### Absolute value recall



By **switching off** the **I** - mode, the counter displays absolute dimensions



After positioning to the workpiece datum, reset datum to "zero".



Indicator on:  
Incremental mode active



Indicator off:  
Absolute mode active

Series of incremental traverses with position zeroing



Absolute dimensions are displayed

## Absolute/Incremental positioning

Data output RS-232-C · Linear compensation

Measuring machine operation

## Data output RS-232-C

### Procedure

**CE** press and hold depressed

**6** press, now release **CE** and **6**

P60 - 4

Digit on right (status code) signifies Baud rate for data transmission:

**+/-** press repeatedly until required code number is displayed

**ENT**

Parameter value	Baud rate
0	110 Baud
1	150 Baud
2	300 Baud
3	600 Baud
4	1200 Baud
5	2400 Baud
6	4800 Baud
7	9600 Baud

By pressing **+/-** the code number is changed 0...7

Select required Baud rate

**ENT** stores the specified Baud rate (data transmission rate)

For details of data output function, connection and format, refer to the manual "V.24 Data interface".

## Linear compensation (for machine errors)

### Procedure:

**CE** press and hold depressed

**7** press, now release **CE** and **7**

X 7 8 9  
Y 4 5 6  
Z 1 2 3  
0 . +/-

Selection of appropriate axis by pressing the axis keys

**ENT**

P71-999

P72- 0

P73-123

Digit on right indicates the correction factor last entered. The factor is entered in  $\pm 0...999$  ppm (parts per million) with sign. e.g. +1  $\mu\text{m}$  per 1000000  $\mu\text{m}$

After setting the correction factor in all axes, the values are stored by pressing **ENT**

Correction range:  
 $\pm 0...999$  ppm

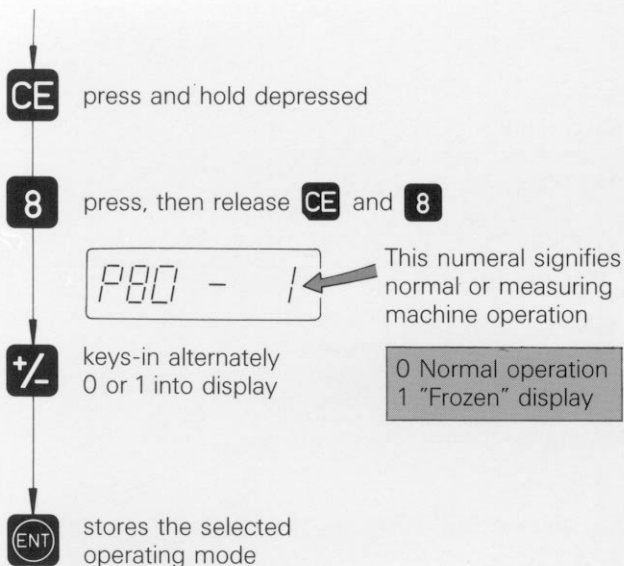
### Note:

A positive (+)-value corresponds to a length extension; a negative (-)-value corresponds to a length reduction of the scale



## Measuring machine operation

Procedure:



With measuring machine operation, the "frozen" display only jumps to the updated counter value after a „Start data transfer" signal.

Display remains unchanged until a further start signal is given.