NEWALL
NEWALL MEASUREMENT SYSTEMS LTD

C80   Digital Readout Display

CONTENTS

NOTES

SPECIFICATIONS

Electrical

EMC and Low Voltage Compliance
BS EN 55022:1998 Class B

BS EN 55024:1998

Power Supply Unit (supplied)
100 - 240V (47 - 63Hz)
External switch-mode

Conforms to Low Voltage Directive
EN 60 950:1992/
A1:1993/ A2:1994/ A3:1996/ A4:1997

Physical

Height
265mm (10.43")

Width
180mm (7.09")

Depth *(not including connectors)*
50mm (1.97")

Weight
2.9kg (6.38lb)

Environmental

Operating Temperature
0 to 45°C

Storage Temperature
-20 to 70°C

Environmental Conditions
Indoor Use, IP20 (IEC 529)

Relative Humidity
Maximum 80% for temperatures up to 31°C
decreasing linearly to 33% at 45°C

Disposal
At the end of its life, the **C80** system should be
disposed of in a safe manner applicable to
electronic goods.

⚠ **DO NOT BURN**.

The casework is suitable for recycling. Please
consult local regulations on disposal of
electrical equipment.

Input

Three Spherosyn or Microsyn encoders.

Resolutions

Spherosyn or Microsyn 10
(menu selection)

5μm (0.0002")

10μm (0.0005")

20μm (0.001")

50μm (0.002")

Microsyn 5
(menu selection)

1μm (0.00005")

2μm (0.0001")

5μm (0.0002")

10μm (0.0005")

C E

Certificate No FM36096

NOTE: NEWALL MEASUREMENT SYSTEMS LTD
RESERVES THE RIGHT TO CHANGE SPECIFICATIONS WITHOUT NOTICE.

CONNECTIONS

- The **C80** is suitable for use only with Newall Spherosyn and Microsyn analogue encoders.

- Ensure that all cables are secured to prevent the connectors from dropping into hazardous positions when unplugged, for example the floor or coolant tray.

- Ensure that all cables are routed to prevent them from being caught on moving parts.

- Turn off the power before connecting the encoder, by disconnecting the power supply connector

- Ensure that the **C80** is grounded to the machine before turning on the machine supply.

⚠️

DO NOT CONNECT THIS UNIT DIRECTLY TO THE MAINS SUPPLY.

Power Indicator Lamp

2.5mm Power Inlet
19 Vdc ±10% @0.25A

➥

If you have a Newall encoder which is not fitted with D-type connector, an adaptor cable is available.

Part No. 307-80980

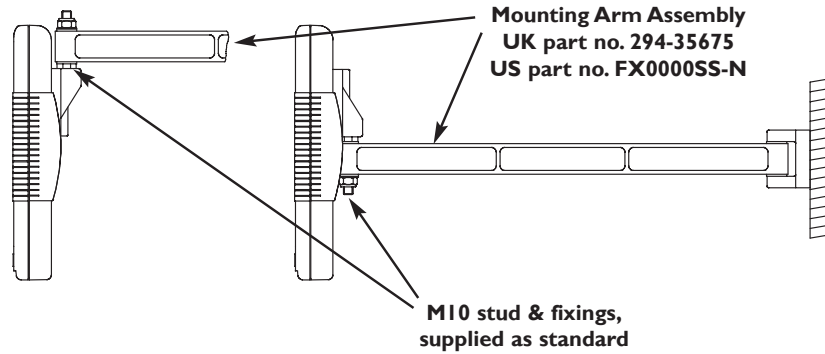Contact your supplier for details.

Equipotential Terminal
(Should be grounded to machine)

Encoder Inputs
9-way 'D'
(All plugs should be screwed finger tight)

RS232 Connection

Cable Anchor
(The power cable should be secured)

Blanking Plug
(Do not remove blanking plugs. These are used to prevent accidental connection of incorrect encoders)
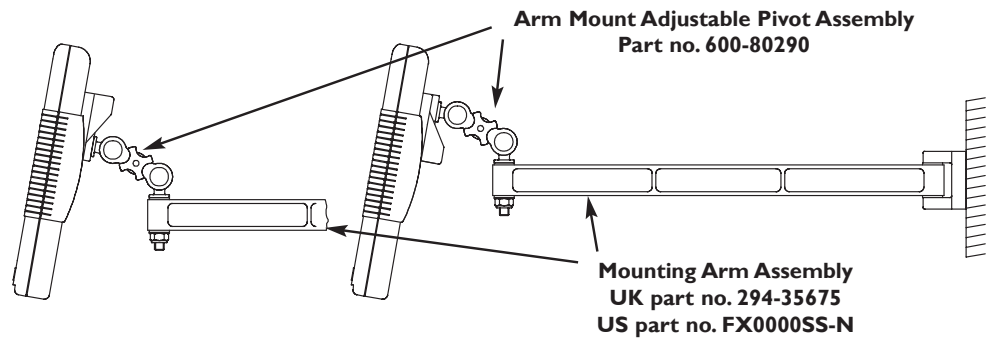
MOUNTING

- The **C80** can be mounted in a variety of ways, depending on the mounting assemblies purchased with the unit:

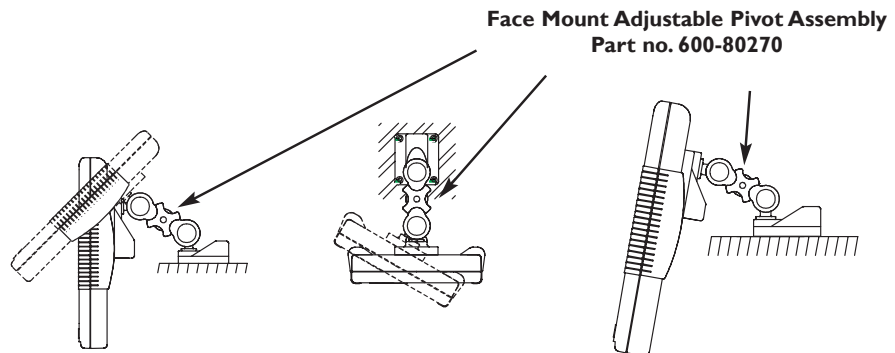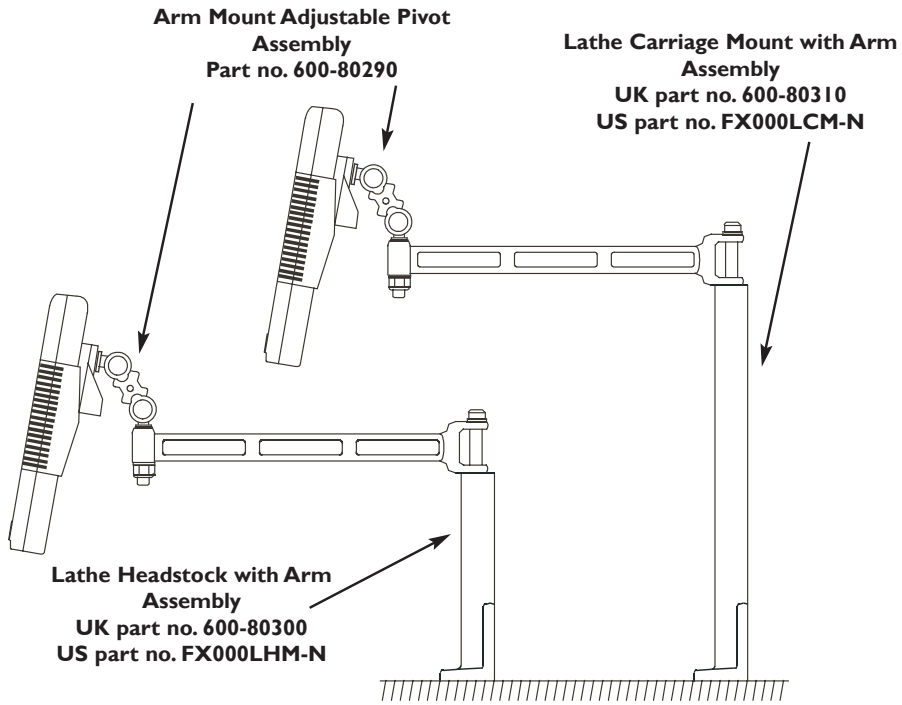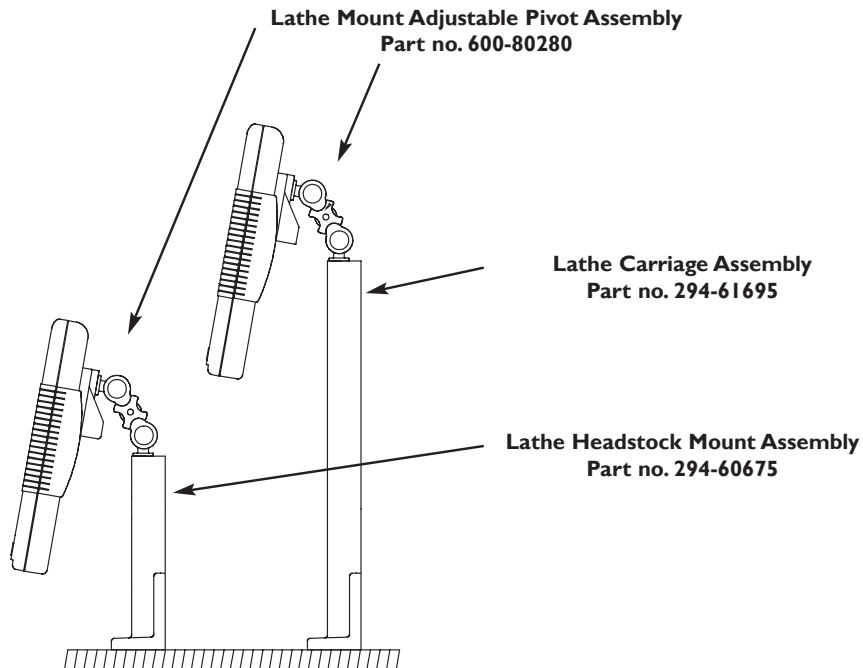## Arm Mounting (Non-adjustable)

**Mounting Arm Assembly
UK part no. 294-35675
US part no. FX0000SS-N**

**M10 stud & fixings,
supplied as standard**

Arm Mounting (Adjustable)

**Arm Mount Adjustable Pivot Assembly
Part no. 600-80290**

**Mounting Arm Assembly
UK part no. 294-35675
US part no. FX0000SS-N**

Face Mounting (Adjustable)

**Face Mount Adjustable Pivot Assembly
Part no. 600-80270**

Lathe Mounting (Adjustable) With Arm Assembly

Arm Mount Adjustable Pivot Assembly Part no. 600-80290

Lathe Carriage Mount with Arm Assembly UK part no. 600-80310 US part no. FX000LCM-N

Lathe Headstock with Arm Assembly UK part no. 600-80300 US part no. FX000LHM-N

Lathe Mounting (Adjustable)

Lathe Mount Adjustable Pivot Assembly Part no. 600-80280

Lathe Carriage Assembly Part no. 294-61695

Lathe Headstock Mount Assembly Part no. 294-60675

NOTES

OPERATION

Understanding the Displays

- The three **Axis** displays normally show the positions of the X, Y and Z axes.

- The three **Axis Label** displays normally show X, Y and Z, (in Lathe Mode X, Z and Z').

- While any axis is moving, the **Function** display shows the **Feedrate** of the fastest moving axis, and the **feed** indicator next to the display will illuminate.

  Feedrate is displayed in mm/sec (to a resolution of 0.5) or inches/min (to a resolution of 1.0).

- The **lathe** and **mill** indicators will be illuminated depending on whether the lathe or mill functions or both, are available.
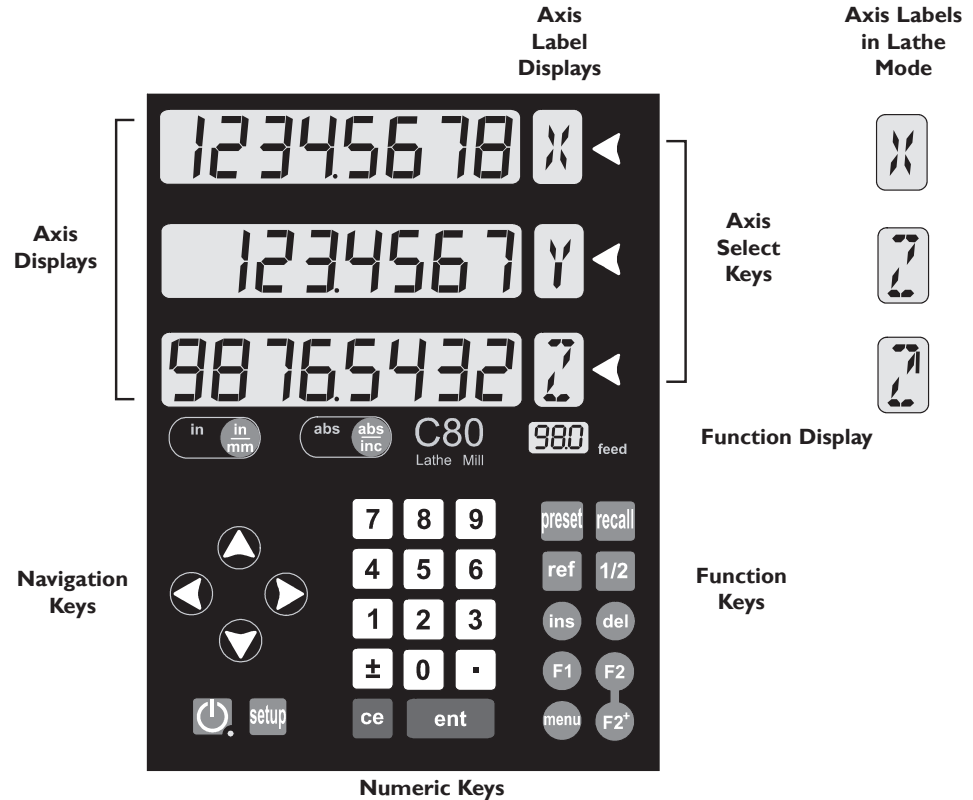
tip

At the beginning of each working session, set the datum in **Absolute Mode**, then switch the **C80** to **Incremental Mode**.

By using the **C80** in this way, you will be able to return the machine to its absolute datum at any time, simply by switching back to **Absolute Mode**.

Using the Keypad

In normal operation, the keys are used as follows:

- Press (in/mm) to toggle the displays between (in) **inches** and (mm) **millimetres**.

- Press (abs/inc) to toggle the **C80** between (abs) **Absolute Mode** and (inc) **Incremental Mode**.

Absolute Mode
- *In this mode, the **C80** will display the positions of the three axes relative to a fixed datum.*

Incremental Mode
- *In this mode, the **C80** can be used to display each position relative to the last position. This is also known as **point-to-point** use.*

Sleep Mode
- Press (⏻) to temporarily turn off the displays and the keypad.

  While the unit is in **Sleep Mode**, all settings are preserved, but the positions of the three axes are updated. If any of the axes are moved while in **Sleep Mode**, the centre display will show `dISPLACd`, and if any of the keys are touched, the centre display will show `touchEd`.

STANDARD FUNCTIONS

Setting the Datum for Each Axis

Zero

- *To zero one display at the current position:*

  Press the **Select Key** ◀ for the axis to be zeroed. All readings will now be relative to this new zero point.

Preset

- *To preset one display to a known fixed value:*

  Press preset, then the **Select Key** ◀ for the axis to be preset, then enter the value.

  For Example: Press preset ◀ ± 1 9 · 6 ent to enter the value [- 19600]. All readings will now be relative to this new value.

- If you make a mistake while entering a number, pressing ce will clear the entry one character at a time.

Recall

- *To quickly recall the last preset value for an axis:*

  Press recall, then the **Select Key** ◀ for the axis to be preset. All readings will now be relative to this new value.

> ➥ Using **Zero** redefines the datum, so it will not be possible to restore the old datum.
>
> Using **Preset**, **Recall** or **Centerfind** will change the datum - but in **Absolute Mode, Digifind** can still be used to return to the old datum.
>
> *tip*
>
> Do not move the machine when the **C80's** power is off.
>
> When the power is switched back on again, the **C80** uses **Digifind** automatically to re-establish the datum for each axis.

Using Digifind

*In the event that a datum is lost, either due to movement following a power failure, or after a fixed point has been entered by mistake, it can easily be re-established, using **Digifind**.*

In order to use Digifind, the absolute datum for each axis should be marked permanently on the machine.

- Set the axis close to the marked datum - to within:
  6.3mm (0.25") for a Spherosyn encoder or
  2.5mm (0.1") for a Microsyn encoder.

- Switch the **C80** to **Absolute Mode**.

- Press ref, then the **Select Key** ◀ for the axis to be restored. The display will update to show the exact distance from the datum.

> ➥ **Digifind** works only in **Absolute Mode**.

Using Centerfind

*Centerfind works by halving the distance displayed on the selected axis. It works in either **Absolute** or **Incremental** Mode.*

For Example: to find the center of a workpiece that is 100mm wide:

- Set the tool to one edge of the workpiece, and press the **Select Key** ◀ for the axis to be centered. The display shows [0000].

- Set the tool to the other edge of the workpiece. The display shows [100000].

- Press 1/2 The display shows **'0'** in all axes. Press the **Select Key** ◀ for the axis to be centered.

  The display will now show [50000].

- Move the tool until the display shows [0000]. This is the center of the workpiece.

> *tip*
>
> Set the **C80** to **Incremental** before using **Centerfind.**
>
> By doing this, you will be able to return the machine to its absolute datum afterwards, simply by switching back to **Absolute Mode**.

SETUP

Using Setup Mode

- To enter **Setup Mode**, first exit from any **Special Function** that is running, then press `setup`. The centre display shows `SEt UP`.

- Press ▲ or ▼ to cycle up and down the list of options.

The options are listed below, and each is described in detail on the following pages.

Option	Default	Display
Machine Type	Generic	`9EnEr ic`
Encoder Type	all axes: Spherosyn	`SPHEroSn`
Encoder Resolution	all axes: 0.005mm	`0.005`
Radius / Diameter	all axes: Radius	`rAd`
Direction	all axes: 1	`d ir. 1`
Error Compensation	all axes: Off	`Err OFF`
Linear Compensation	see note 1	
Segmented Compensation	see note 1	
Axis Summing	X and Z' axes	`Add it ion`
RS232 Options	None	`nOnE`
Serial Rate	1.0	`1.0`
Baird Rate	9600	`9600`
Parity	None	`nOnE`
Zero Approach On / Off	all axes: Off	`2Er0 OFF`
Zero Approach Limit	see note 1	
Taper Display Axis	X axis	`tAPEr`
Add Function	see note 2	`Add Func`
Delete Function	see note 2	`dEL Func`
Reset		`rESEt`
Store		`StOrE`

- When you have finished setting all the options, select `StOrE`. Press `ent` to store any changes made.

  The middle display shows `StOrEd` for a few seconds as your settings are stored.

  The **C80** exits from **Setup Mode**.

- Alternatively, pressing `setup` at any time will exit from **Setup Mode** and abandon any changes.

NOTES

Machine Type

This setting allows you to choose whether the special functions for **Mill** *or* **Lathe** *are available.*

There are three possible settings:

Generic mode	`9EnEr ic`	all functions available
Mill mode	`nn iLL`	mill functions only
Lathe mode	`LAtHE`	lathe functions only

•   Press the **Select Key** ◀ next to the `t` to cycle between the three settings.

Encoder

Encoder Type

There are three possible settings for each axis:

Spherosyn	`SPHEroSn`
Microsyn 10	`uSn 10`
Microsyn 5	`uSn 5`

•   Press the **Select Key** ◀ next to the `X` `Y` or `Z` to cycle between the three settings for each axis.

Encoder Resolution

The **Resolution** *settings available for each axis will depend on the encoder type, and also on the* ⊞ *setting.*

	Display		Spherosyn	Microsyn 10	Microsyn 5
	mm	in			
1µm	0.001	0.00005			✓
2µm	0.002	0.0001			✓
5µm	0.005	0.0002	✓	✓	✓
10µm	0.01	0.0005	✓	✓	✓
20µm	0.02	0.001	✓	✓	
50µm	0.05	0.002	✓	✓	

•   Press the **Select Key** ◀ next to the `X`, `Y` or `Z` to cycle between the four available settings for each axis.

The **Encoder** settings must match the actual encoder in use, or the C80 will not display correctly.

Radius / Diameter

*Selecting the **Diameter** setting causes the **C80** to display double the actual movement on any axis.*

There are two possible settings for each axis:

Radius   `rAd`

Diameter   `diA`

Press the **Select Key** ◀ next to the X, Y or Z to cycle between the two settings for each axis.

Direction

*The **Direction** setting allows you to match the **C80** to the actual direction of travel of any axis.*

There are two possible settings for each axis:

`dir. 1`

`dir. 0`

Press the **Select Key** ◀ next to the X, Y or Z to cycle between the two settings for each axis.

Error Compensation

Errors can result from a number of sources, including machine wear. Where the degree of error increases linearly along the length of travel of the scale, **Linear Error Compensation** should be applied. However, where the errors are local to an area of travel, the **Segmented Error Compensation** should be applied.

There are three possible settings for each axis:

Off   `Err OFF`

Segmented Compensation   `SEG Err`

Linear Compensation   `Lin Err`

Press the **Select Key** ◀ next to the X, Y or Z to cycle between the three settings for each axis.

If one or more axes are set to **Segmented Error Compensation**, or **Linear Error Compensation**, then the next setup option will be to configure the compensation for each of those axes.

• Press ▼.

The middle display changes to `Err SEt`.

Segmented Error Compensation

*In this mode, the scale travel for each axis can be broken down into as many as 99 user-defined segments, with each segment having its own correction factor. The correction factors are calculated by the **C80** by comparison against known, user-supplied standards.*

•   When power is applied, the display for any axis that is set to use **Segmented Compensation** shows `rESEt`.

•   If the machine has not been moved since the power was turned off, simply press `ce`, and the **C80** will restore the last positions recorded.

•   Alternatively, set each axis close to the **Reference Point** - to within:
6.3mm (0.25") for a Spherosyn encoder or
2.5mm (0.1") for a Microsyn encoder,

and press the **Select Key** ◀ next to the X, Y or Z. The **C80** will re-establish alignment with the correction parameters.

### Linear Error Compensation

In this mode, a single constant correction factor for each axis can be applied to all displayed measurements. The correction factor is calculated by the user, and specified in parts per million (ppm). Values between -9999 and +9999 are allowed.

Segmented Error Compensation

If one or more axes are set to **Segmented Error Compensation**, then the following procedure should be followed to configure the compensation for each of those axes.

Identification of Correction Parameters

The scale travel is broken down into a number of user-defined segments, each with its own correction factor, measured against a high-accuracy standard. The following parameters need to be identified:
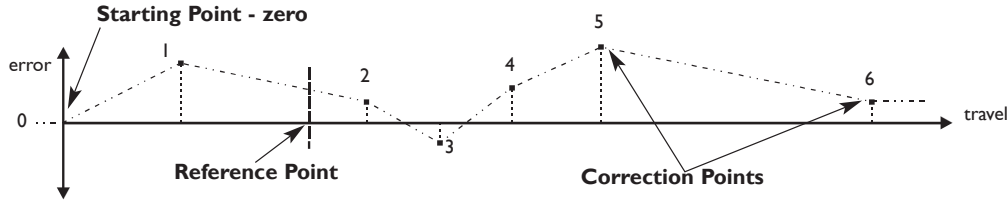
Each **Correction Point** is measured with respect to the **Starting Point - zero** - which is usually set close to one end of the scale. The **Reference Point** can be set anywhere along the scale, and does not need to coincide with either the absolute datum or any of the correction points. However, it may be convenient to make the absolute datum and the reference point the same.

Setting the Correction Points

As you follow the steps below, it is essential to take the following precaution:

> Always approach the **Starting Point**, **Correction Points** and **Reference Point** from the same direction. If you do not, then the size of the tool or probe will render the measurement inaccurate.

- Set one or more axes to **Segmented Compensation** as described on page 10.

  The display should show `Err SEt`.

- Press the **Select Key** ◀ next to the ⌈X⌉ ⌈Y⌉ or ⌈Z⌉ to enter the setup procedure for each axis to be configured.

  The display changes to `SEt ZErO`.

1 Set the machine to the point you have chosen to the **Starting Point**, and zero the high-accuracy standard at this point. Press `ent`.

2 The display changes to `Go to 1`.

  Set the machine to the point you have chosen to be **Correction Point 1**. Press `ent`.

3 The display changes to `EntSd 1`.

  Enter the distance from the **Starting Point**, as measured by the standard.
  For Example: Press `6` `7` `8` `·` `9` `ent` to enter a **Correction Point** of 678.9.

  The C80 will calculate and display the correction factor for this point.

- Press ▼ to go to the next point.
  Repeat steps **2** and **3** for each **Correction Point**.

  When all correction points have been entered, press `abs inc`.

4 The display changes to `GotO rEF`.

  Set the machine to the point you have chosen as the **Reference Point**. Press `ent`.

5 The display returns to `Err SEt`.

  If required, press the **Select Key** ◀ next to ⌈X⌉ , ⌈Y⌉ or ⌈Z⌉ to enter the setup procedure for another axis.

Linear Error Compensation

A single constant correction factor for each axis is applied to all displayed measurements.
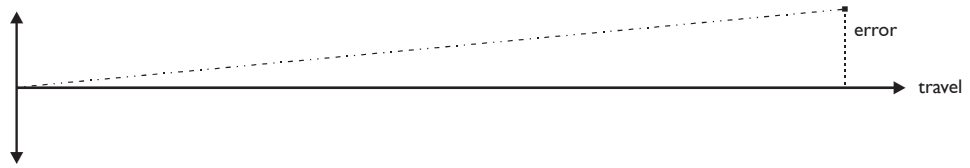
If one or more axes are set to **Linear Error Compensation**, then the following procedure should be followed to configure the compensation for each of those axes.

Calculating the Correction Factor

As you follow the steps below, it is essential to take the following precaution:

> **Either:** Use a stepped standard, and approach each edge from the same direction.
>
> **Or:** If you must approach each edge from opposite directions, then subtract the width of the tool or measuring probe from the value displayed on the **C80**.

For Example: To check the scale against a standard which is exactly 500mm wide:

- Set the tool or proble to one edge of the standard, and press the **Select Key** ◀ for the axis to be corrected.
  The display shows [0000].

- Set the tool or probe to the other edge of the standard.
  The display shows [499800].

- Calculate the correction factor:

  error = 500.000 - 499.8 = 0.2mm

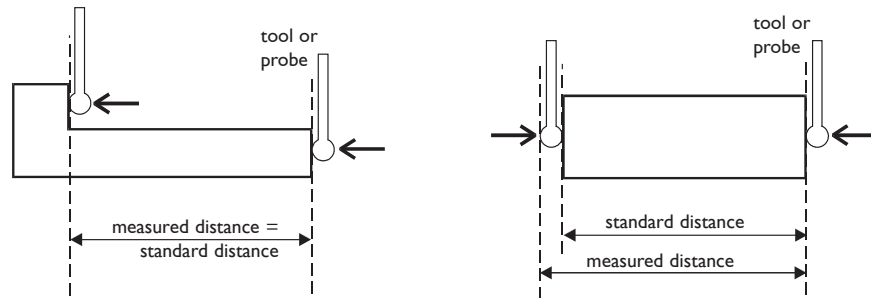 $$\text{Correction Factor} = \frac{\text{error}}{\text{standard}} = \frac{0.2}{500} \times 1{,}000{,}000 = +400 \text{ ppm (parts per million)}$$

  This value displayed on the C80 needs to be increased to match the standard, so this is a positive correction factor. If the display had shown 500.2 for the same standard, the correction factor would be negative -400 ppm.

Setting the Correction Factor

- Set one or more axes to **Linear Error Compensation** as described on page 10

  The display should show [Err SEt].

- Press the **Select Key** ◀ next to the [X] [Y] or [Z] to enter the setup procedure for each axis to be configured.

  The display shows [LC   0], or a previously entered value.

- *For Example:* Press [4] [0] [0] [±] [ent] to enter a **Correction Factor** of -400 ppm.

- Press [ent] again.
  The display returns to [Err SEt].

  If required, press the **Select Key** ◀ next to the [X], [Y] or [Z] to enter the setup procedure for another axis.

RS232 Options

The C80 DRO has the ability to offer basic RS232 communications via a dedicated hardware RS232 compatible port. This is designed for programming of the unit during manufacture, CSS communications and diagnostic purposes. It also fulfils the requirement to log positional data for quality purposes.

- The RS232 configuration settings can be found sandwiched between the **Axis Summing** and **Zero Approach** settings in the set-up structure

- The baud rates for communications are selectable from Set-up. The available baud rates are: 300, 1200, 2400, 4800, 9600, 14400, 19200, 38400

- From the Set-up structure one of three RS232 modes are selectable. These are:

No RS232

- All RS232 functions are disabled and no outputs are made

- This is the default condition

Continuous Output

- From the menu structure the frequency of output is to be defined. The options of frequency are: 0.1 - 60.0 in steps of 0.1 second.

Keyed Output

- When this option is selected, the axes data is transmitted when the ent key is pressed, without proceeding keys having been pressed. Thus this option does not require the use of a function key

Output Data Format

- The current axis data for the axes available on the system are to be transmitted

- For two axis systems, only two axes of data will be transmitted

- The data packet structure of 12 characters is defined as follows:

| A | : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | CR | LF |

Axis ID

Separator

8 characters for position

Carriage Return character

Line Feed character
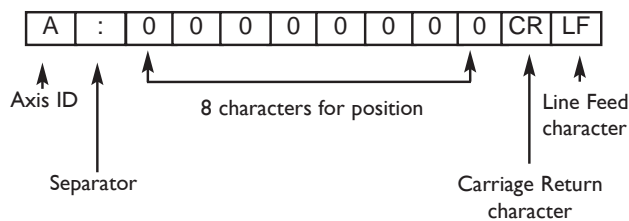
- The Axis ID is the character shown in the axis 15-segment display at the time of printing. The exception is that for three-axis Lathe applications a lower case 'z' is used to denote the compound Z'=axis. An upper case 'Z' is used to denote the standard Z-axis.

System Settings

Baud rate	=	Configurable (300, 1200, 2400, 4800, 9600, 14400, 19200, 38400)
Data bits	=	8
Parity bit	=	Configurable (Even, Off, None)
Stop bits	=	1
Flow control	=	None

Default System Settings
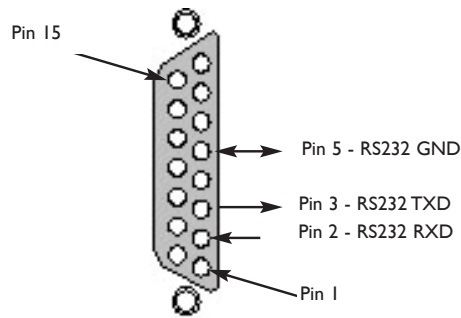
Serial option	=	None
Serial rate	=	1.0 (i.e. once per second)
Baud rate	=	9600
Parity bit	=	None

Connections

RS232 connection to the unit is made via a 15-pin D-type connector at the rear of the display.

Pin 15

Pin 5 - RS232 GND

Pin 3 - RS232 TXD
Pin 2 - RS232 RXD

Pin 1

RS232 Operation

The RS232 output is configured from the Setup Menu, where four settings are to be found.

- The first is labelled   `SEr iAL`   and refers to the mode of operation, either `ConStAnt`,   `Sin9 lE` or   `nOnE`   The options are cycled by pressing either the left or right keys on the directional pad.

- The second setting concerns the rate at which RS232 data is generated when in constant mode. It is labelled   `SEr rAtE`   and shows a value (in seconds) in the second axis window. Pressing the arrow button next to the value allows the serial rate to be changed. Values in the range 0.1-60.0 can be selected in 0.1s increments (see Note).

- The third setting relates to the baud rate of the RS232 communications. The first axis window is labelled   `bd rAtE`   and the second shows the current value. You can select `300` `1200` `2400` `4800` `9600` `14400` `19200` and `38400` by pressing either the left or the right keys on the directional pad.

- The final setting is the parity mode of the RS232 communications. The first axis window shows   `PAr itY` and the second shows the current setting - either   `EUEn` `Odd` or   `nOnE` . You can scroll through the options by pressing either the left or right key on the directional pad.

➥

The maximum serial rate is limited by the baud rate, i.e., for a baud rate of 9600 the maximum output serial rate is 0.5s.

Baud Rate	Maximum Serial Rate (s)
300	2.0
1200	1.0
2400	1.0
4800	1.0
9600	0.5
14400	0.5
19200	0.5
38400	0.5

Axis Summing

This setting works in conjunction with the **Summing** function.

- Two of the axis displays show `Add it ion`.

   Press the **Select Keys** ◀ or ▶ to cycle between the two settings **X,Z** or **Z,Z'**.

Zero Approach

*This setting provides a visual indication that one or more axes are approaching zero, by flashing the **Axis Label** display.*

For Example: If **Zero Approach** is turned on for the X axis, with a **Zero Approach Limit** of 1.25, then the axis label display will flash for values

from `- 1250` `X`   to `1250` `X`

- When the axis is within:

   0.05mm (0.002") for a Spherosyn encoder or
   0.025mm (0.001") for a Microsyn encoder

   the display will stop flashing.

Zero Approach On / Off
There are two possible settings for each axis:

   Zero Approach On   `ZErO On`

   Zero Approach Off   `ZErO OFF`

   Press the **Select Key** ◀ next to the `X`, `Y` or `Z` to cycle between the two settings for each axis.

Zero Approach Limit
This setting allows you to choose how close to zero the axis needs to be for the display to flash.

- Press ▼ after setting **Zero Approach On / Off**.

   The displays for the selected axes change to `0000` or a previously entered value.

- Press the **Select Key** ◀ next to the `X`, `Y` or `Z` to choose which axis to edit.

- *For Example:* Press `1` `·` `2` `5` `ent` to enter a limit of 1.25.

- If required, press the **Select Key** ◀ next to the `X`, `Y` or `Z` to enter the limit for another axis.

Taper Display Axis

This setting works in conjunction with the **Taper** function.

- One of the axis displays shows `TAPEr On`
   and the other two displays show `TAPr OFF`.

   Press the **Select Keys** ◀ or ▶ to choose which axis will display the **Taper** function.

NOTES

⚠️

THE SERIAL
PROGRAMMING LEAD IS
SPECIFICALLY DESIGNED
FOR CONNECTION TO
C-SERIES DIGITAL
READOUTS. INCORRECT
CONNECTION MAY
CAUSE FAILURE.

⚠️

USE RESET WITH
CAUTION. ALL STORED
SETTINGS WILL BE LOST
IF THIS FUNCTION IS
USED.

⚠️

ALL RESTORE SETTINGS
ARE SAVED IMMEDIATELY.

➤

Reset will take
approximately 15
seconds.

Add / Delete Function

These two options allow you to download programmable functions from a PC connected to the **C80** via a serial lead connected to the 15D connection. This serial lead is an option and can be ordered separately if required. Use Part No. 307-83210. Please contact your supplier for pricing information.

New functions are available as Internet downloads and can be found on the Newall Website: www.newall.com

Reset

This will restore all settings to their factory defaults, and should, therefore, be used only if absolutely necessary.

The middle display shows ⟦ rESEt ⟧

- Press ⟦ ent ⟧ or the **Select Key** ◀ next to the ⟦r⟧ to select the **Reset** function.

- While all the stored settings are being erased, the top display shows ⟦CLEAr InG⟧, and the middle display shows ⟦ 0 ⟧, ⟦ 00 ⟧ etc.

- When **Rese**t has finished the middle display returns to ⟦ rESEt ⟧

  The **C80** remains in **Setup Mode**.

Store

*This will store all settings and exit to **Normal Operating Mode**.*

The middle display shows ⟦StOrE ⟧

- Press ⟦ ent ⟧ or the **Select Key** ◀ next to the ⟦S⟧ to select the **Store** function.

- The middle display shows ⟦StOrEd ⟧ for a few seconds, as your settings are stored.

  The **C80** exits from **Setup Mode**.

- Alternatively, pressing ⟦setup⟧ at any time will exit from **Setup Mode** and abandon any changes.

SPECIAL FUNCTIONS

In addition to the **Standard Functions** described on Page 7, the **C80** has a number of inbuilt **Special Functions**, that are accessible using the (F1), (F2) and (F2*) keys.

- Most **Special Functions** are designed to work specifically with **Mill** or **Lathe**, while **Generic** functions are designed to work with either.

- Most **Special Functions** require only one function key for operation, and can be allocated to either (F1) or (F2).

- The functions marked F2 require two function keys and can be allocated only to (F2) and (F2*).

The generic option also includes all Mill and Lathe Special Functions.

Mill Functions

Special Function	Display	
Bolt Hole Circle	`bOLt HOL`	
Arc	`ArC`	
Line Hole	`LinE`	
Polar Coordinates	`PoLAr`	

Lathe Functions

Tool Offsets	`tooL`	F2
Taper	`tAPEr`	
Summing	`Sunn`	
Vector	`UEctor`	
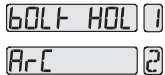
Generic Functions

Sub Datum and Job Numbers	`Sdnn`	F2

Each of the **Special Functions** listed here is described in detail later in this guide.

The Menu Function

Only two **Special Functions** are available for use at any one time.

To find out which function is allocated to each key:

- Press (menu) to see the **Menu**.

  The display shows, `bOLt HOL 1`
  `ArC 2`

- Press (menu) again to turn the **Menu** off.

If certain functions are running when you press (menu), then in place of the function name, the display will show `turn OFF`.

To use a function

- Press (F1), (F2) or (F2*), according to the instructions given later in this guide.

To allocate a function to a key:

- Press (menu).

- Press the **Select Key** next to the `1` or `2` to choose which function key to edit.

- Press ▲ or ▼ to cycle up and down the list of **Special Functions**.

- Press `ent` to allocate the selected **Special Function** to the function key.

If you want to allocate a function, press (menu) again to turn the **Menu** off, if you want to allocate a different function to that function key, then turn the function off before trying again.

➤

This function is also known as **Pitch Circle Diameter** (PCD).

MILL FUNCTIONS

Mill functions are available when the **C80 Setup** has been configured for either Mill or Generic operation

Bolt Hole Circle

This function will calculate the locations of the holes, given the following parameters:

1   Plane (**X,Y   X,Z** or   **Y,Z**)

2   Circle Center location

3   Circle Diameter

4   Number of Holes (up to 99)

5   Starting Angle (measured anti-clockwise from 3 o'clock)
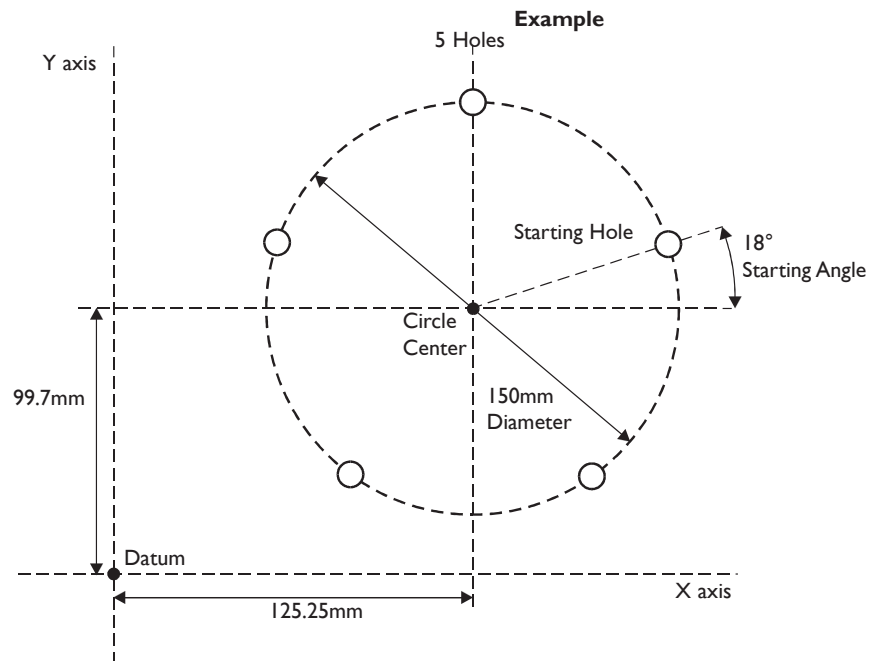
Example
5 Holes

tip

If you make a mistake while entering a number, pressing

ce will clear the entry one character at a time.

After an entry has been completed by pressing

ent , pressing the

navigation keys ◀ and

▶ will take you backwards and forwards one step at a time.

To turn the function off, finish making any entry, then press the function key again

To Set the Function Parameters:

•   Press F1 or F2 to turn the function on.

(For three axis units only)

•   The function display shows $\boxed{P}$, and the axis displays show in which **Plane** the holes are to be machined.

Press ▲ or ▼ to cycle between the three settings **X,Y   X,Z** or   **Y,Z**.

Press ▶ to move to the next step.

•   The function display shows $\boxed{C}$, and the axis displays show the coordinates of the **Circle Center**.

Press the **Select Key** ◀ next to the $\boxed{X}$, $\boxed{Y}$ or $\boxed{Z}$, to edit each value as required.

For Example: Press $\boxed{Y}$ ◀ 9 9 . 7 ent .

Press ▶ to move to the next step.

Bolt Hole Circle Continued

- The function display shows $\boxed{d}$, and the top axis display shows the **Circle Diameter**.

  Enter a new value if required.

  For Example: Press $\boxed{1}$ $\boxed{5}$ $\boxed{0}$ $\boxed{\text{ent}}$.

  Press $\blacktriangleright$ to move to the next step.

- The function display shows $\boxed{n}$, and the top display shows the **Number of Holes**.

  Enter a new value if required.

  For Example: Press $\boxed{5}$ $\boxed{\text{ent}}$.

  Press $\blacktriangleright$ to move to the next step.

- The function display shows $\boxed{A}$, and the top display shows the **Starting Angle**.

  Enter a new value if required.

  For Example: Press $\boxed{1}$ $\boxed{8}$ $\boxed{\text{ent}}$.

  Press $\blacktriangleright$ to finish setting the parameters.

- The function display shows $\boxed{01}$.

To Machine the Holes:

The two axis displays for the selected plane now show the distance to the first hole.

- To position the tool ready for machining the hole, move the axes until both displays show zero.

*The **function display** shows the number of the hole to be machined.*

- Press the **navigation keys** $\blacktriangleleft$ or $\blacktriangleright$ to move between the holes,
  or enter the hole number.

  For Example: Press $\boxed{4}$ $\boxed{\text{ent}}$ to move directly to hole 4.

- When all holes have been machined, press $\boxed{F1}$ or $\boxed{F2}$ to turn the function off.

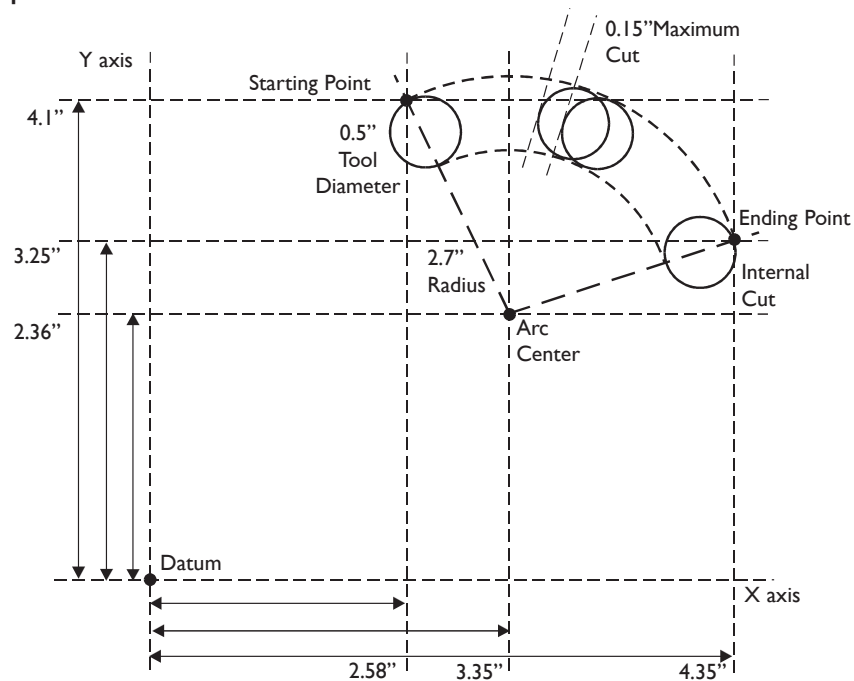The axis that is **not** involved in the **Bolt Hole Circle** function will read as normal.

Arc Contouring

This function will calculate the locations of the points along the line of the arc, given the following parameters:

1   Plane (**X,Y   X,Z** or   **Y,Z**)

2   Arc Center location

3   Arc Radius

4   Starting Point

5   Ending Point

7   Tool Diameter

8   Internal or External Cut (machined to the inside or the outside of the arc)

9   Maximum Cut (the smaller the cut, the more points calculated)

Example

tip

If you make a mistake while entering a number, pressing
`ce` will clear the entry one character at a time.

After an entry has been completed by pressing
`ent` , pressing the
navigation keys ◀ and
▶ will take you backwards and forwards one step at a time.

To turn the function off, finish making any entry, then press the function key again

To Set the Function Parameters:

•   Press `F1` or `F2` to turn the function on.

           (For three axis units only)

•   The function display shows ⊡P⊡ , and the axis displays show in which **Plane** the holes are to be machined.

           Press ▲ or ▼ to cycle between the three settings X,Y, X,Z or Y,Z.

           Press ▶ to move to the next step.

•   The function display shows ⊡C⊡ , and the axis displays show the coordinates of the **Arc Center**. Press the **Select Key** ◀ next to the ⊠, ⊠ or ⊠, to edit each value as required.

           For Example: Press ⊠ ◀ ⊡2⊡ ⊡·⊡ ⊡3⊡ ⊡6⊡ `ent` .

           Press ▶ to move to the next step.

NOTES

Arc Contouring continued

- The function display shows $\boxed{r}$, and the top display shows the **Arc Radius**.

  Enter a new value if required.

  For Example: Press $\boxed{2}$ $\boxed{.}$ $\boxed{7}$ $\boxed{\text{ent}}$.

  Press ❯ to move to the next step.

- The function display shows $\boxed{St}$, and the axis displays show the coordinates of the **Starting Point**.

  Press the **Select Key** ◀ next to the $\boxed{X}$, $\boxed{Y}$ or $\boxed{Z}$, to edit each value as required.

  For Example: Press $\boxed{Y}$ ◀ 4.826 $\boxed{\text{ent}}$.

  Press ❯ to move to the next step.

  ➥

  If you enter a **Starting Point** or **Ending Point** that is inconsistent with the **Centre** and **Radius** settings, then the **Centre** and **Radius** settings will override the inconsistent settings.

- The function display shows $\boxed{End}$, and the axis displays show the coordinates of the **Ending Point**.

  Press the **Select Key** ◀ next to the $\boxed{X}$, $\boxed{Y}$ or $\boxed{Z}$, to edit each value as required.

  For Example: Press $\boxed{Y}$ ◀ 4.174 $\boxed{\text{ent}}$.

  Press ❯ to move to the next step.

- The function display shows $\boxed{td}$, and the top display shows the **Tool Diameter**.

  Enter a new value if required.

  For Example: Press $\boxed{.}$ $\boxed{5}$ $\boxed{\text{ent}}$.

  Press ❯ to move to the next step.

- The function display shows $\boxed{IE}$, and the top axis display shows whether the cut is to be machined to the internal or the external of the arc. The display shows

      Internal $\boxed{rAd-tOOL}$

  or   **External** $\boxed{rAd\ tOOL}$.

  Press ▲ or ▼ to cycle between the two settings.

  Press ❯ to move to the next step.

- The function display shows $\boxed{Cut}$, and the top display shows the **Maximum Cut**.

  Enter a new value if required.

  For Example: Press $\boxed{.}$ $\boxed{1}$ $\boxed{5}$ $\boxed{\text{ent}}$.

  Press ❯ to finish setting the parameters.

- The function display shows $\boxed{01}$.

To Machine the Arc:

The two axis displays for the selected plane now show the distance to the Arc starting point

- To position the tool ready for machining the arc, (starting point) move the axes until both displays read zero.

  The function display shows the number of the hole to be machined.

- Press the **navigation keys** ◀ or ❯ to move between the positions,

- When the Arc machining has been completed, press $\boxed{F1}$ or $\boxed{F2}$ to turn the function off.

➥

The axis that is **not** involved in the **Arc** function will read as normal.

➥

The arc must be machined progressively. It is not possible to jump between points on the arc.

tip

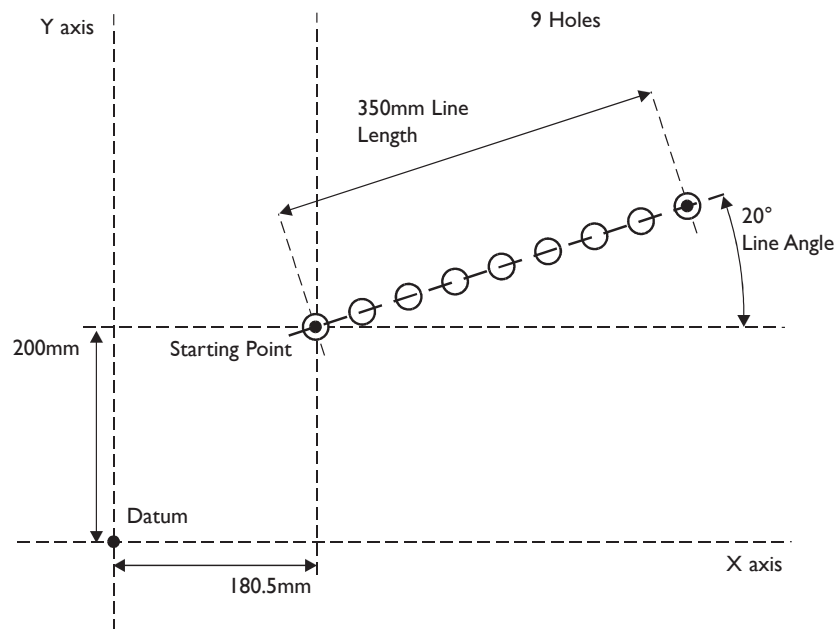Move away from the line of the Arc between points to avoid over cutting.

Line Hole

This function will calculate the locations of the holes, given the following parameters:

I	Plane (**X,Y X,Z** or **Y,Z**)
2	Starting Point
3	Line Length
4	Number of Holes (up to 99)
5	Line Angle

Example

To Set the Function Parameters:

- Press (F1) or (F2) to turn the function on.

  (For three axis units only)

- The function display shows [P], and the axis displays show in which **Plane** the holes are to be machined.

  Press ▲ or ▼ to cycle between the three settings **X,Y   X,Z** or   **Y,Z.**

  Press ▶ to move to the next step.

- The function display shows [St], and the axis displays show the coordinates of the **Starting Point**.
  Press the **Select Key** ◀ next to the [X], [Y] or [Z], to edit each value as required.

  For Example: Press [Y] ◀ [2] [0] [0] `ent` .

  Press ▶ to move to the next step.

- The function display shows [LEn], and the top display shows the **Line Length**.

  Enter a new value if required.

  For Example: Press [3] [5] [0] `ent` .

  Press ▶ to move to the next step.

continued

Line Hole Continued

- The function display shows $\boxed{n}$, and the top display shows the **Number of Holes**.

  Enter a new value if required.

  For Example: Press $\boxed{9}$ $\boxed{\text{ent}}$.

  Press ▶ to move to the next step.

- The function display shows $\boxed{A}$, and the top display shows the **Line Angle**.

  Enter a new value if required.

  For Example:: Press $\boxed{2}$ $\boxed{0}$ $\boxed{\text{ent}}$.

  Press ▶ to finish setting the parameters.

- The function display shows $\boxed{01}$.

To Machine the Holes:

The two axis displays for the selected plane now show the distance to the first hole.

- To position the tool ready for machining the hole, move the axes until both displays read zero.

The function display shows the number of the hole to be machined.

- Press the **navigation keys** ◀ or ▶ to move between the holes, or enter the hole number.

  For Example:: Press $\boxed{4}$ $\boxed{\text{ent}}$ to move directly to hole 4.

- When all holes have been machined, press (F1) or (F2) to turn the function off.

➘
The axis that is **not** involved in the **Line Hole** function will read as normal.

Polar Coordinates

This function will convert the position of two selected axes into Polar coordinates.

The **C80** normally uses the **Cartesian Coordinate System**, in which the position of a point in any plane is defined by two coordinates (**X,Y   X,Z** or   **Y,Z**).

In the **Polar Coordinate System**, an imaginary line is drawn between the position of the point and the datum. The Polar coordinates displayed are the length of the line (P), and its angle, measured anti-clockwise from 3 o'clock.

Example
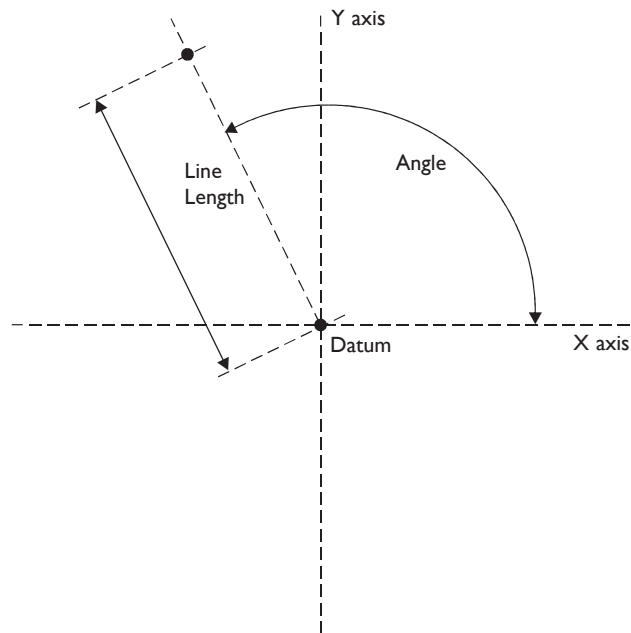
To Use the Function:

- Press F1 or F2 to turn the function on.

➤

The axis that is **not** involved in the **Polar Coordinates** function will display as normal.

- The axis label displays for two of the axes shows P and A.

  Press the **Select Keys** ◀ or ▶ to cycle between the three **Plane** settings **X,Y   X,Z** or   **Y,Z**.
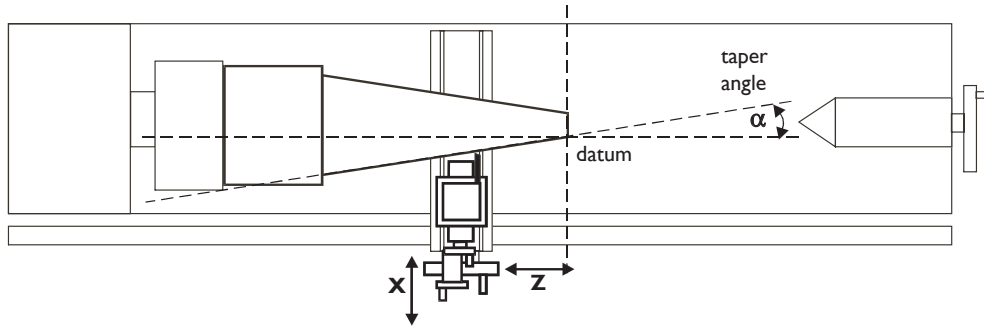
  Press ent to accept the setting.

LATHE FUNCTIONS

Lathe functions are available when the **C80 Setup** has been configured for either Lathe or Generic operation.

Taper

This function is used for turning or measuring a turned, tapered part.

One of the axes is used to display the **Taper** angle: the angle between the present machine position and the datum, in the X,Z plane.

The conventional way to set up a lathe is:

X Axis – cross travel

Z Axis – longitudinal travel

Z' Axis – compound travel.

If the **Machine Type** is set to **Generic**, then the axes will be labelled:

Axis 1 – X

Axis 2 – Y

Axis 3 – Z

To Set the Function Parameters:

The selection of which axis is to display the Taper angle is carried out in Setup Mode.

- To enter **Setup Mode**, first exit from any **Special Function** that is running, then press [setup].

  The centre display shows [*SEt UP*].

- Press ⬆ or ⬇ to choose [*tAPEr*].

  Press the **Select Key** ◄ next to the [X], [Z] or [Z] to choose which axis shows [*tAPEr On*].

- Press ⬆ or ⬇ to choose [*StOrE*], then press [ent] to store the change.

It is recommended that you use this function in **Incremental Mode**, as it involves changing the datum.

To Use the Function:

- Press (F1) or (F2) to turn the function on.

- Touch the tool to one end of the taper.

  Press the **Select Keys** ◄ next to the [X] and [Z], to set the datum.

- Touch the tool to one end of the taper.

- The axis display marked [A] shows the taper angle.

- Press (F1) or (F2) to turn the function off.

The axes that are **not** showing the **Taper** angle will display as normal.

NOTES

Tool Offsets

➤

The conventional way to set up a lathe is:

X Axis – cross travel

Z Axis – longitudinal travel

Z' Axis – compound travel.

If the **Machine Type** is set to **Generic**, then the axes will be labelled:

Axis 1 – X

Axis 2 – Y

Axis 3 – Z

tip

Set the **C80** to **Incremental Mode** before using **Tool Offsets.**

By doing this, you will be able to return the machine to its absolute datum afterwards, simply by switching back to **Absolute Mode**.

*This function allows you to program the **C80** with **Tool Offsets** for as many as 99 different tools, to save having to reset the datum every time you change tools.*

- This function is designed primarily for use in **Lathe Mode**, but can also be used in **Generic Mode**.

  Offsets can be set only for the first two axes, which on a lathe are the **X** and **Z** axes. In the examples opposite, the X axis is set to the diameter of the part, and the Z axis is zeroed at the face.

- **Tool 1 Offset** is special, in that it is tied to the **Machine Datum**, as explained below.

Offset between
Tool 1 and Tool 2

Tool 1 in use

Tool holder rotated to
use Tool 2
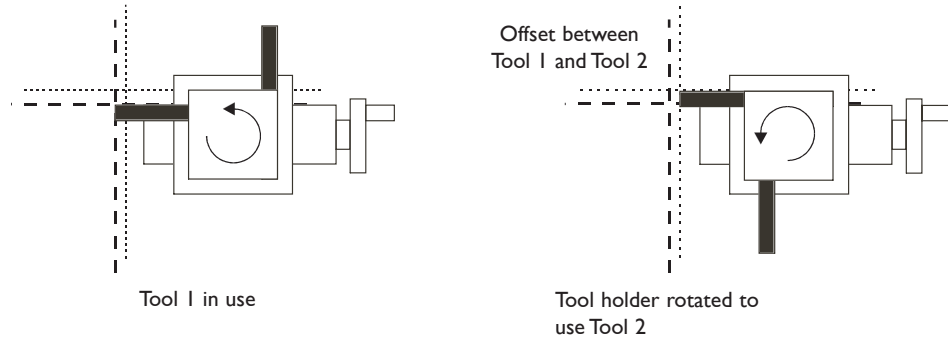
Tool Set Mode

This mode is accessed through **F2** and is used to set the offsets for each tool.

- Note that the setting of **Tool 1 Offset** in this mode will affect the **Machine Datum**. Similarly, a change to the **Machine Datum** will change **Tool 1 Offset**.

  It is recommended therefore that the **C80** is set to **Incremental Mode** before using this function.

- Note that the setting of each tool offset in this mode is independent of all the others, so a change to the **Machine Datum** or to **Tool 1 Offset** will not affect the other tool offsets.

Tool Usage Mode

This mode is accessed through **F2⁺** and is used once all offsets have been set.

- Note that a change to the **Machine Datum** while in this mode will change **all** the offsets.

  This can be useful if the same set of tools is to be used on parts of varying sizes.

Tool Mode Off

To turn off **Tool Set Mode**, press **F2**.

To turn off **Tool Usage Mode**, press **F2⁺**.

To Set the Tool Offsets:

- Press **F2** to turn on **Tool Set Mode**

- Press ▶ to select Datum Tool (Generally Tool No. 1)

  The function display shows the tool number [01]

1 Take a skim cut along the outside diameter of the part or touch the tool to the surface of the part (if cylindrical). Move the tool away from the part, taking care not to move the X axis. Measure the diameter of the part using a suitable gauge.

   Press the **Select Key** ◀ next to the [X] and enter the diameter of the part as measured.

   For Example: Press [X] ◀ [2] [0] [.] [5] [ent] to enter 20.5.

2 Take a facing cut or touch the end of the part with the tool. Move the tool away from the part, taking care not to move the Z axis.

   Press the **Select Key** ◀ next to the [Z] and press [ent] to zero the axis.

   The Tool Offsets Datum has now been established.

   Press ▶ to move to the next tool.

3 Touch the tool to the surface of the part. Move the tool away from the part, taking care not to move the X axis. Measure the diameter of the part using a suitable gauge.

   Press the **Select Key** ◀ next to the [X] and enter the diameter of the part as measured

   For Example: Press [X] ◀ [2] [0] [.] [5] [ent] to enter 20.5.

4 Touch the end of the part with the tool. Move the tool away from the part, taking care not to move the Z axis

   Press the **Select Key** ◀ next to the [Z] and press [ent] to zero the axis.

   Repeat Steps 3 and 4 for each tool to be set.

   Press   to turn off **Tool Set Mode.**

To Use F2 Tool Offsets:
- Press **F2** to turn on **Tool Usage Mode**.

- Press ◀ or ▶ to select the tool.

  The function display shows the tool number [01], [02] etc, to [99].

- Press **F2** to turn off **Tool Usage Mode**.

To Edit the Tool Offsets for Worn or Replacement Tools:
- Press **F2** to turn on **Tool Usage Mode**.

- Press ◀ or ▶ to select a known good tool.

- Set the axis datum as described in Steps 1 and 2 above. All offsets are now aligned with the correct ***Machine Datum.***

- Press   to turn off **Tool Usage Mode**

- Press **F2** to turn on **Tool Set Mode**.

- Set the offsets for each tool as described in Steps 3 and 4 above.

- Press **F2** to turn off **Tool Set Mode**.

tip

If you make a mistake while entering a number, pressing [ce] will clear the entry one character at a time.

To turn the function off, finish making any entry, then press the function key again .

Summing

This function allows the movement of the Z' axis to be added to the movement of either the X axis or the Z axis.

The **Summing** function is useful when the compound is set to align with either of those two axes. If the compound is set at an angle, see the next section on the **Vectoring** function.

Combined Movement
Z + Z'

Combined Movement
X + Z'
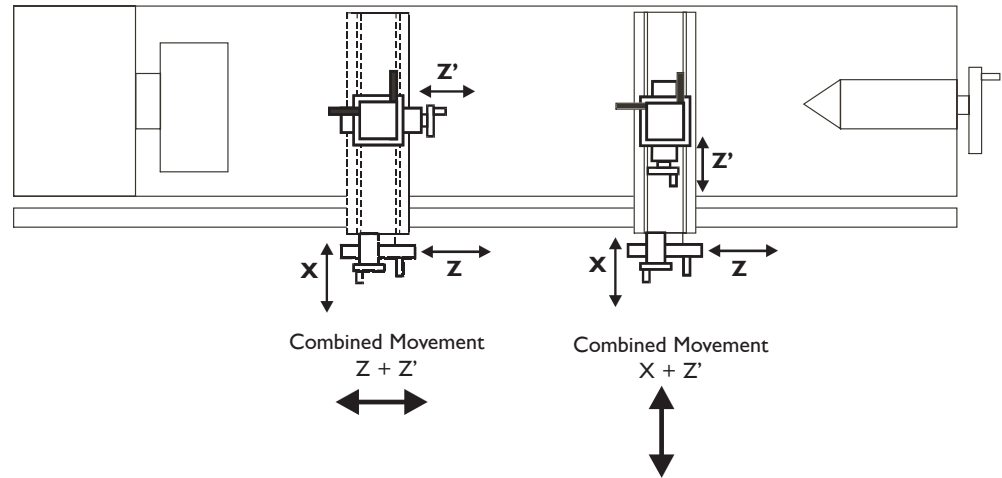
To Set the Function Parameters:

*The selection of which axes are to be added together is carried out in **Setup Mode**.*

- To enter **Setup Mode**, first exit from any **Special Function** that is running, then press [setup]. The centre display shows ⎡ SEt UP ⎤.

- Press ⬆ or ⬇ to choose ⎡Add it ion⎤.

  Press ◀ or ▶ to choose which axes are to be added: **X+Z'** or **Z+Z'**.

- Press ⬆ or ⬇ to choose ⎡StOrE ⎤, then press [ent] to store the change.

To Use the Function:

- Press (F1) or (F2) to turn the function on.

- For X + Z'

  The X display shows the Sum of the two selected axes and the axis identifier shows 5

  The Z display shows the Z axis as normal.

  The Z' display shows the Z' axis as normal.

- For Z + Z'

  The X display shows the X as normal.

  The Z display shows the Sum of the two selected axes and the axis identifier shows 5
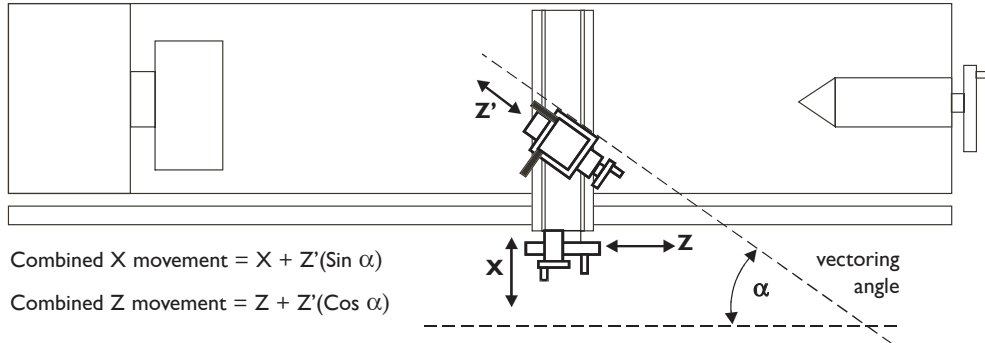
  The Z' display shows the Z' axis as normal.

  Any of the axes can be zeroed or preset in the usual way. The **Sum** display will be altered to take account of the new value.

- Press (F1) or (F2) to turn the function off.

Vectoring

This function allows the movement of the X and Z axes to be combined with the angle of the compound. Vectoring is only available on 3 axis units.

The **Vectoring** function is useful when the compound is set at an angle. If the compound is set to align with either the X or the Z axes, see the previous section on the **Summing** function.

Combined X movement = X + Z'(Sin α)

Combined Z movement = Z + Z'(Cos α)

To Set the Function Parameters:

- Press F1 or F2 to turn the function on.

- The ⋈ display shows **Angle**, and the centre display shows the **Vectoring Angle**.

  Enter a new value if required.

  For Example: Press 3 5 ent .

To Use the Function:

- The X display shows the combined X axis movement.

  The Z display shows the combined Z axis movement.

  The Z' display shows the Z' axis as normal.

  Any of the axes can be zeroed or preset in the usual way. The **Vectoring** displays will be altered to take account of the new value.

- Press F1 or F2 to turn the function off.

The conventional way to set up a lathe is:

X Axis – cross travel

Z Axis – longitudinal travel

Z' Axis – compound travel.

If the **Machine Type** is set to **Generic**, then the axes will be labelled:

Axis 1 – X

Axis 2 – Y

Axis 3 – Z

tip

If you make a mistake while entering a number, pressing ce will clear the entry one character at a time.

To turn the function off, finish making any entry, then press the function key again .

➤

The conventional way to set up a lathe is:

X Axis – cross travel

Z Axis – longitudinal travel

Z' Axis – compound travel.

If the **Machine Type** is set to Mill or **Generic**, then the axes will be labelled:

Axis 1 – X

Axis 2 – Y

Axis 3 – Z

➤

Absolute Datum vs Sub-Datum

Note that all **Sub-Datum**s are relative to the **Absolute Datum**, so if the **Absolute Datum** is changed, the **Sub-Datum**s will change accordingly.

The **Sub-Datum** function always works in **Absolute Mode**. If the C80 is in **Incremental Mode** when the function is turned on, the C80 will switch to **Absolute Mode**.

➤

Other functions may be used in conjunction with Sub-Datums, e.g. Bolt Hole Circle to produce a repeated pattern of holes about different Sub-Datum positions.

GENERIC FUNCTIONS

In Generic mode all Lathe and Mill functions are also available

Sub-Datums and Jobs

Sub-Datum

*This function allows as many as 99 machining steps to be stored in **Sub-Datum Memory**.*

In operation, the absolute datum of the machine is replaced by each **Sub-Datum** in turn, allowing the operator to work to zero for each step instead of having to constantly refer to a printed list of coordinates.

Example

SD1	SD2	SD3	SD4	SD5	SD6	SD7	SD8	....	....	....	....
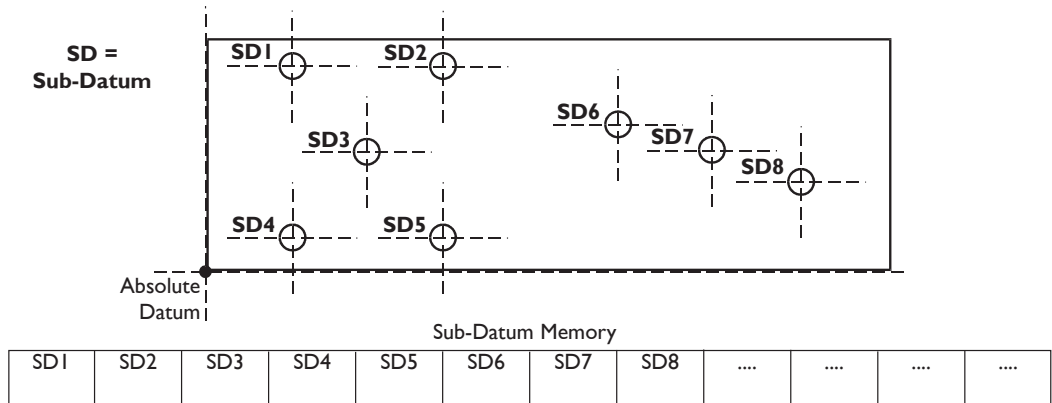
Jobs

*This function allows the stored Sub-Datums to be divided into groups so that a number of individual **Job**s can be identified by the operator.*
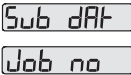
Note: **Because of the way in which the Sub-Datum Memory is used:**

When **Job** markers are inserted, all the following **Sub-Datum** numbers are incremented to account for the presence of the markers in memory.
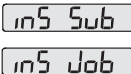
Example

Start Job 1	SD2	SD3	SD4	SD5	SD6	End Job	Start Job 2	SD9	SD10	SD11	...

NOTES
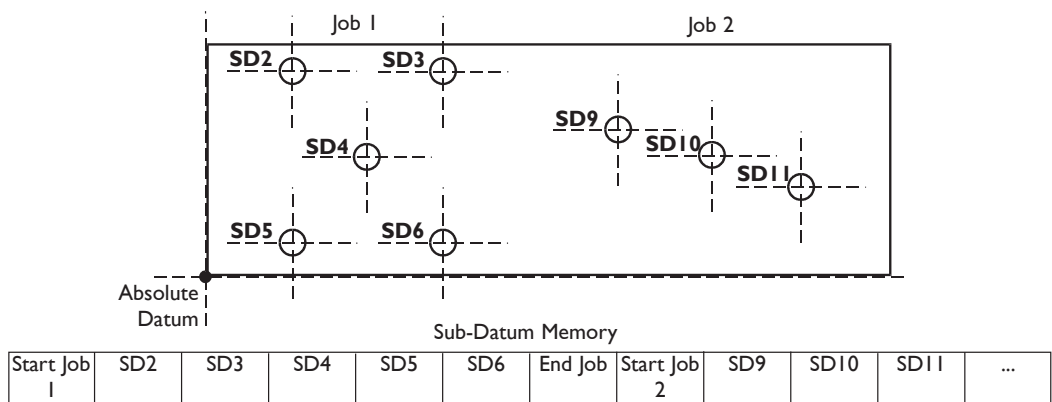
To Turn the Function On and Off:

- Press `F2` to turn the function on.

  The display shows `Sub dAt` `Job no`

- Press the **Select Key** ◀ next to the `S`.

  The display changes to `Sd no`.

- Enter the number of the **Sub-Datum** you wish to go to.

  For Example: Press `1` `ent` to go to **Sub-Datum** 1.

- The function display shows the **Sub-Datum** number `01`, `02` upto `99`

- Step from one **Sub-Datum** to the next by pressing the **Select Key** ◀ and ▶.

- Press `abs inc` to turn the function off.

To Set a Sub Datum:

- Go to the **Sub-Datum** that is to be set, then use either of these two methods:

  Teach Method;

- Move the machine to the position to be stored as the **Sub-Datum**.

  Press `F2`. All displays show `0.000`.

- The **Sub-Datum** is now set.

or

  Preset Method;

  You do not need to move the machine.

- Press `preset`, then the **Select Key** ◀ next to the first axis to be set.

- Enter the position of the Sub-Datum relative to the absolute datum, then press `F2`.

  For Example: Press `Y` ◀ `9` `9` `.` `7` `F2` to enter the Sub-Datum position 99.7 into the Y axis.

  The display will show the distance from the current machine position to the **Sub-Datum**.

- Set any other axes that need to be set.

To Insert a Sub-Datum:

- Go to the point where the new **Sub-Datum** is to be inserted.

- Press `ins`.

  The display shows `inS Sub` `inS Job`.

- Press the **Select Key** ◀ next to the `S`.

  Note: Pressing any other key will cancel the operation.

  All the following **Sub-Datum** numbers are incremented by one after a short time delay, and the display shows the current machine position.

- Set the new **Sub-Datum** as described above.

To Delete a Sub-Datum:

- Go to the **Sub-Datum** that is to be deleted.

- Press `del`.

  The display shows `dEL Sub`.

- Press the **Select Key** ◀ next to the `S`.

  Note: Pressing any other key will cancel the operation.

  All the following **Sub-Datum** numbers are decremented by one, after a short time delay, and the display shows the next **Sub Datum.**

tip

Once the function is on, you can go from one **Sub-Datum** to another, by either of these two methods:

1
Press `F2`, then `S` ◀ then enter the number of the **Sub-Datum** you wish to go to.

2
Press the **Select Keys** ◀ and ▶ to step from one **Sub-Datum** to the next.

tip

If you make a mistake while entering a number, pressing `ce` will clear the entry one character at a time.

To turn this function off, finish making any entry, then press `abs inc`.

NOTES

tip

Once the function is on, you can go from one **Sub-Datum** to another, by either of these two methods:

1
Press (F2), then $\boxed{S}$ ◀

then enter the number of the **Sub-Datum** you wish to go to.

2
Press the **Select Keys**
◀ and ▶ to step from one **Sub-Datum** to the next.

tip

If you make a mistake while entering a number, pressing
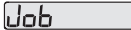
[ce] will clear the entry one character at a time.

To turn this function off, finish making any entry, then press (abs/inc).

To Insert a Job Marker:

- Go to the point where the new **Job** marker is to be inserted.

- Press (ins).

  The display shows $\boxed{\text{inS Sub}}$.
  $\boxed{\text{inS Job}}$

- Press the **Select Key** ◀ next to the $\boxed{J}$. Pressing any other key will cancel the operation.

  The display changes to $\boxed{\text{InSErt}}$.
  $\boxed{\text{Job}}$

  *For a **Start Job** marker;*

- Press [ent] to confirm.

  The display changes to $\boxed{\text{Job no}}$.

- Enter the number of the **Job** you wish to add.

  For Example: Press $\boxed{1}$ [ent] to insert the marker for **Start Job** 1.

  All the following **Sub-Datum** numbers are incremented by one, and the display shows the new **Start Job** marker.

  *For an **End Job** marker*

- Press ▲ or ▼.

  The display changes to $\boxed{\text{End JOb}}$.

  Press [ent] to confirm.

  All the following **Sub-Datum** numbers are incremented by one, and the display shows the new **End Job** marker.

To Delete a Job Marker:

- Go to the **Job** marker that is to be deleted.

- Press (del).

  The display show $\boxed{\text{dEL Sub}}$.

- Press the **Select Key** ◀ next to the $\boxed{S}$. Pressing any other key will abandon the operation.

  All the following **Sub-Datum** numbers are decremented by one, and the display shows the next **Sub-Datum**.

To Find a Job:

- Press (F2).

  The display shows $\boxed{\text{Sub dAt}}$.
  $\boxed{\text{Job no}}$

- Press the **Select Key** ◀ next to the $\boxed{J}$.

  The display changes to $\boxed{\text{Job no}}$.

- Enter the number of the **Job** you wish to find.

  For Example: Press $\boxed{2}$ [ent] to find **Job** 2.

  If you enter an invalid **Job** number, the display will show **Job** 1.

  Press ▲ or ▼ to choose a valid job number. Press [ent] to continue.

- The display shows the **Start Job** marker.

- To find the first **Sub-Datum** of the Job, Press ▶.

TROUBLESHOOTING

Symptom	Solutions
The display is blank.	• The **C80** may be in **Sleep Mode**. Press ⏻. • Check that the power supply is correctly connected to a working mains outlet. • Check that the power supply cables are not damaged. • Check that the power supply voltage is 15Vdc ±10%. • Disconnect all encoder cables. A defective encoder can prevent the **C80** from working. • Check power supply lead on rear of C80 display to ensure that it is illuminated
The display works, but resets from time to time without any keys being pressed.	• This suggests either that the supply voltage is too low, or that the power supply or mains supply has an intermittent fault. • Check that the power supply voltage is 15Vdc ±10%. • Check that all connections are secure.
The display works, but gives erratic readings, the last digit jitters or the measurements jump to new figures unexpectedly.	• This suggests that there may be a poor earth (ground) connection. • Both the **C80**, and the machine on which it is installed, must have proper earth (ground) connections. (see page 3) • There may be a problem with the encoder (see below).
⌐ no 5 iG ⌐ or ⌐ 5 iG FAiL ⌐ **appears in the display.**	• This indicates that the unit is not receiving a proper signal from the encoder. • Check that the encoder connections are secure. • Check that there is no damage to the connectors or to the encoder. • Switch the **C80** off and back on again. • Swap the encoder to another axis to confirm whether the encoder or the **C80** is at fault (see **tip**).
The unit will not respond to any key presses.	• Disconnect the **C80** from its power supply, wait 15 seconds and then reconnect.
Readings are incorrect	• Check **Encoder Type** to ensure correct selection. • Check the **Radius / Diameter** setting. The **Diameter** setting will cause the axis to read double. • Check **Error Compensation** factors. • If using **Segmented Error Compensation**, verify the datum position. • Swap the encoder to another axis to confirm whether the encoder or the **C80** is at fault (see **tip**). • Check that there is no damage to the encoder or its cable. • Check that the encoder is fixed firmly and aligned correctly, as described in the Spherosyn / Microsyn Installation manual. • Check that there is no binding on the scale. With the scale brackets slightly loosened, you should be able to slide the scale back and forth with minimal resistance. • If you have a Spherosyn scale, check that the scale is not bent, by removing it and rolling it on a flat surface.

If the solutions suggested above do not solve your problem, contact Newall for further instruction.

CLEANING

- Disconnect the power supply from the **C80** before cleaning.
- Do not use corrosive or abrasive cleaning materials.
- Do not use compressed air.
- Apply a small amount of mild soap to a lint-free cloth. Use this to wipe over the case and keypad, taking care not to allow fluid into the connectors.

tip

Providing the machine has not been moved more than:

6.3mm (0.25") for a Spherosyn Encoder or

2.5mm (0.1") for a Microsyn Encoder

the datum position will not be lost by switching the power off and back on again.

tip

When swapping encoders to trace a fault:

1

Check that two axes are set to the correct encoder types.

2

Move the encoder from the malfunctioning axis to a working axis.

If the fault stays with the same encoder, then the encoder is at fault. If the fault does not follow with the encoder the C80 is at fault

⚠️

FOLLOW THESE INSTRUCTIONS CAREFULLY TO AVOID DAMAGE TO THE **C80.**

BEI *NEWALL MEASUREMENT SYSTEMS*
BEI TECHNOLOGIES, INC.