



DPG2000



DIGITAL READOUT SYSTEM

INSTALLATION/USER MANUAL

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1.0 INTRODUCTION

1.1 EMC and Low Voltage Compliance

The DPG2000 Digital Readout conforms to the relevant European standards for electromagnetic compatibility and low voltage directive as detailed below.

BS EN 50081-2: Electromagnetic compatibility.
Generic Emission Standard - Industrial Environment

BS EN 50082-2: Electromagnetic compatibility.
Generic Immunity Standard - Industrial Environment.

BS EN 61010-1: Safety requirements for electrical equipment for
measurement, control and laboratory use.



1.2 Technical Specifications

Dimensions:

Height:	140mm (5.5in)
Width:	240mm (9.5in)
Depth:	80mm (3.2in)
Weight:	2.5kg (5.5lbs)

Operating Voltage: 115 or 230V (switch selection)

Supply Voltage Fluctuation: Not to exceed +/-15% of the operating voltage

Supply Frequency: 50 to 60 Hz

Maximum Power Consumption: 18VA

Operating Temperature: 0 to 45°C

Storage Temperature: -20 to 70°C

Transducer Inputs: Dependant on model, one, two or three Spherosyn/Microsyn transducers

Selectable Resolutions:

Spherosyn/Microsyn 10	5µm (0.0002in) / 10µm (0.0005in) / 20µm (0.001in) / 50µm (0.002in)
Microsyn 5	1µm (0.00005in) / 2µm(0.0001in) / 5µm (0.0002in) / 10µm (0.0005in)

Environmental Conditions: Indoor Use, IP20 (IEC 529)

Relative humidity - maximum 80% for temperatures up to 31°C decreasing linearly to 33% at 45°C

Transient overvoltage according to INSTALLATION CATEGORY II of IEC664

POLLUTION DEGREE 2 in accordance with IEC664

Newall Measurement Systems reserves the right to change specifications without notice.

2.0 INSTALLATION

2.1 Mounting

The DPG2000 is supplied with a fixing kit consisting of a M10 stud, nut and washers. Figure 1.1 shows the use of this kit in conjunction with an optional mounting arm (Part No: 294-35670).

Be sure that the mounting arrangements are secure as the operator will need to apply pressure to the front panel when using the keypad.

An optional mounting assembly (Part no: 294-37740) is available which allows for tilt and rotation of the cabinet.

Select the location of the DPG2000 with due regard to safety and ease of operation. Keep clear of moving parts and coolant spray. Ensure that the natural ventilation around the cabinet is not restricted.

To ensure correct operation of the DPG2000, it is recommended that the case is grounded to the machine. Use a wire or strap of a least 1.5mm² (16 AWG) from the cabinet equipotential terminal, (Figure 1.2), to a suitable point on the machine body. The wire should be as short as possible. The machine must also be properly grounded to a good earth point.

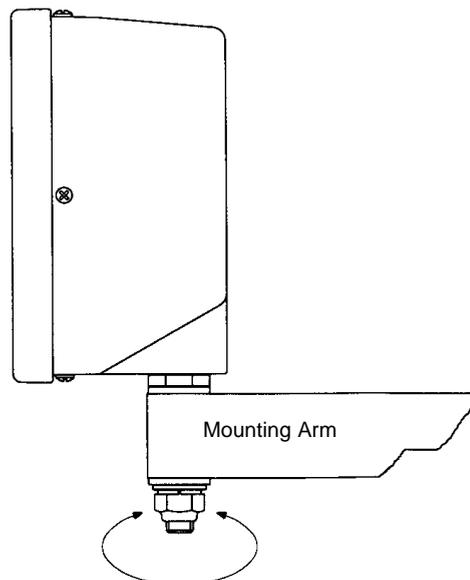


Figure 1.1 Standard Fixing with Optional Mounting Arm

2.2 Power Supply

BEFORE CONNECTING THE ELECTRICAL SUPPLY TO THE CABINET, CHECK THAT THE VOLTAGE SELECTOR SWITCH IS CORRECTLY SET. Figure 1.2 shows the position of this switch.

The mains supply is connected through a detachable supply cord. The cabinet is supplied with a cord fitted with a right-angled connector. If another supply cord is to be used, it must have a IEC320, 10A, EARTHED mains connector with a cord rated for at least 10A.

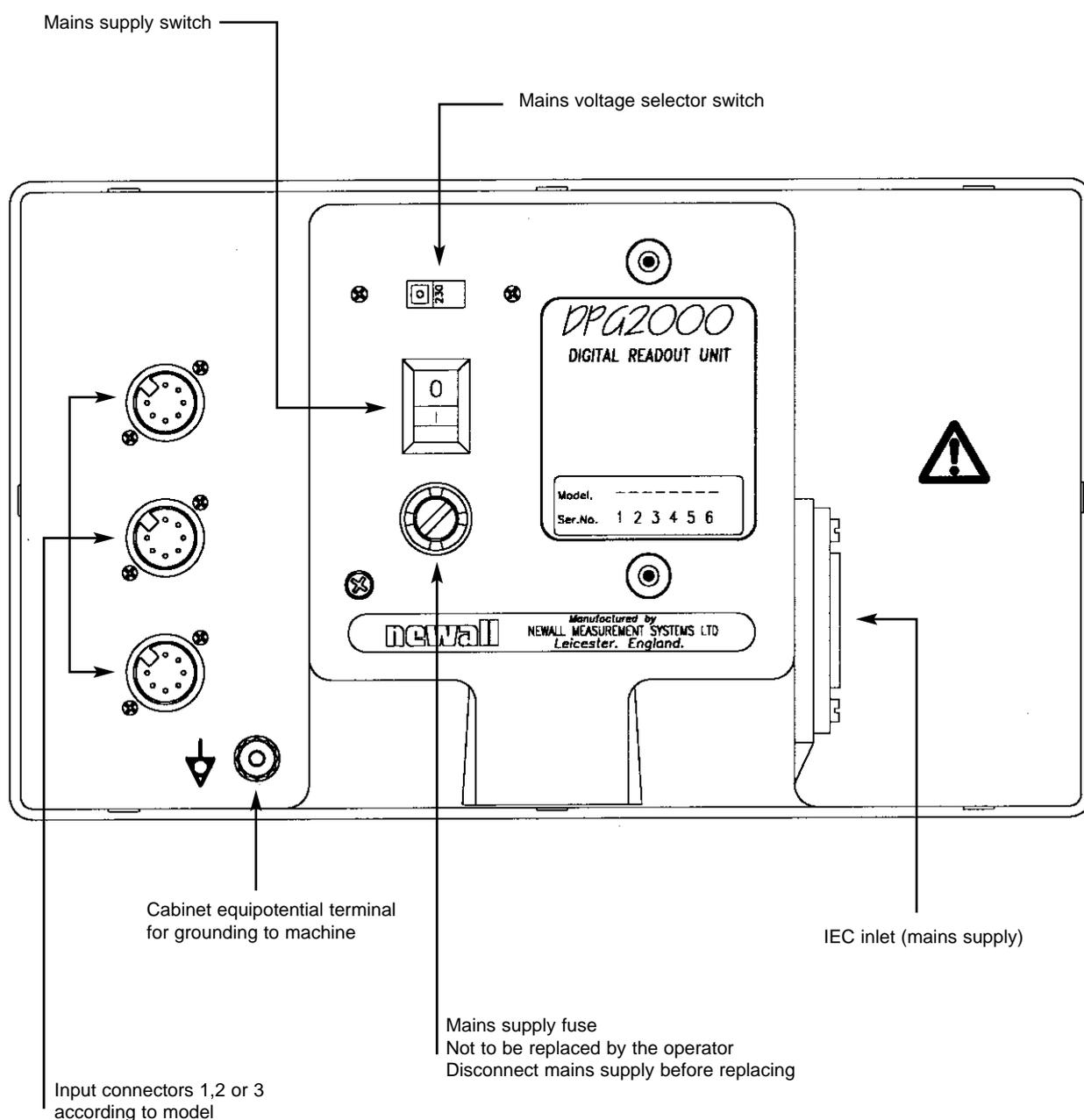


Figure 1.2 Connection Diagram

The PROTECTIVE EARTH CIRCUIT of the mains supply **MUST BE CONNECTED** to the protective earth terminal of the cabinet through the supply cord.

The supply cord should be secured to the mounting arm or pillar with cable ties to ensure that it cannot drop into a hazardous position when disconnected from the cabinet.

The power supply cord must be routed away from moving parts, swarf, coolant or sources of heat.

If a mains plug is not already fitted to the supply cord, or is of the wrong type, then a suitable EARTHED plug should be used which complies with the relevant specifications for plugs and socket-outlets.

The mains supply fuse is a 20x5mm, type T0.5A, 250V. It is not to be replaced by the operator. If the fuse blows it is an indication of some significant problem with the power source. Check the supply and wiring carefully. Before replacing the fuse, the cabinet must first be disconnected from the supply by the removal of the IEC socket from the inlet. Do not position the equipment so that it is difficult to disconnect the mains supply.

NOTE: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



2.3 Transducer Connections

Figure 1.2 shows the connection sockets at the back of the DPG2000. The DPG2000 is designed for use with Newall's Spherosyn and Microsyn transducers only. The transducers are connected to the DPG2000 with Bleecon type connectors. These connectors have a sliding sleeve that locks the connectors into their sockets.

Switch off the DPG2000 before connecting, or disconnecting the transducers. To fit the connectors into the appropriate socket at the back of the cabinet, first align the connector and then push firmly in place. You should hear a click confirming that the locking sleeve has engaged. To remove the connector, pull back on the connector sleeve to disengage the locking mechanism.

The transducers and digital readouts are connected at a separated extra low voltage (SELV) level. Any additional interconnections must also be at SELV level.



2.4 Switching On

The mains supply switch for the DPG2000 is mounted on the back of the cabinet as shown in Figure 1.2.

When you switch on the DPG2000 the cabinet will automatically go through a brief self diagnostic routine.

During this routine, the name DPG2000 will be shown, then the software version number will be displayed and finally, all segments of the displays will be lit.

After this routine, the DPG2000 is ready for use.

CONVENTIONS USED IN THIS MANUAL

The direction of travel of an axis refers to the travel of the tool relative to the workpiece. Keys on the keypad are signified in bold print, such as [**ent**] for the enter key.

3.0 SET-UP

The Set-Up procedure allows you to change the main settings for the DPG2000. For normal use, you will find that you only need to perform the Set-Up procedure once, and it is possible that the factory defaults are suitable for your needs without change. (See Table 1)

The Set-Up procedure can only be activated just after power is switched on to the cabinet. After switching on, press the concealed key which is located under the "ne" of the newall logo on the keypad (See Figure 1.3). The key must be pressed before the end of the initial self diagnostic routine.

When you have entered the Set-Up routine, the letters 'SET-UP' appear in the display.

The Set-Up procedure makes use of a menu system. The main menu consists of a list of options that can be customised for your use (See Table 2). You simply press the [\wedge] [\vee] keys to scroll through this list until you reach the option you wish to change. To change the option when selected, press the [**Xo**] [**Yo**] or [**Zo**] key. On the single axis version, the options can be changed by pressing the blue [**0**] key.

To exit the Set-Up routine press the concealed key ("ne" of newall).

Default Setting	DPG2000
Sleep	On
Input Type	Spherosyn
Resolution	5 μ m
Direction	1
Radius/Diameter	Rad
Linear Compensation	0

Table 1 - Default Settings



Figure 1.3 DPG2000 keypad

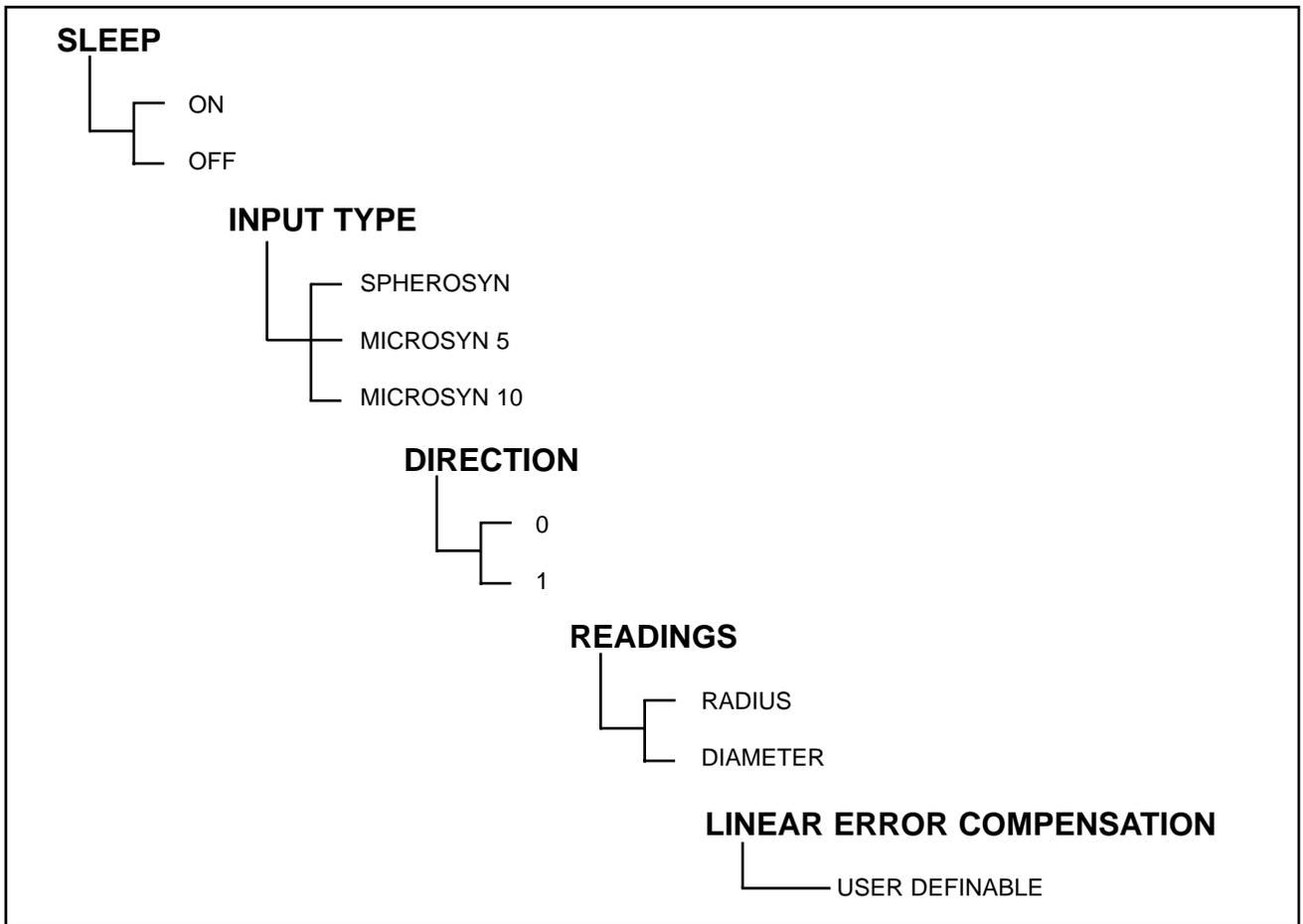


Table 2 - Set-Up Menu Options

3.1 Sleep/Datahold

In the Set-Up routine, press the [\wedge] key until "SLP ON" or "SLP OFF" is displayed. Toggle between "SLP ON" or "SLP OFF" by pressing the [Yo] key.

Select "SLP ON" if you want to be able to use the Datahold facility. (See Section 5.6 for a description of Datahold). Otherwise select "SLP OFF".

When the selection is made press [\wedge] to continue to the next option.

3.2 Input Type

Select between Spherosyn, Microsyn 5 or Microsyn 10 for each axis.

Pressing [Xo] [Yo] or [Zo] moves between transducer types for that axis. Pressing [ent] defines that axis to be the selected type.

Warning: The axis selected for the input type must match the actual transducer (Spherosyn or Microsyn) which is plugged into the corresponding axis. Erroneous readings will occur if this warning is not followed.

When the selection is made press [\wedge] to continue to the next option.

3.3 Direction

The direction option allows you to change the direction of travel of each axis. For example, if after installation the X axis is measuring positive from right to left, you can use this option to change the direction of the X axis so it measures positive from left to right.

In the Set-Up routine, press the [\wedge] until "DIR" (direction) is displayed.

Each axis display will show "0" or "1"

Pressing each axis key [**Xo**] [**Yo**] or [**Zo**] reverses the counting direction. When the unit is displaying the choices you wish to use, press [\wedge] to continue to next option.

3.4 Radius/Diameter

This option allows you to select any axis to display measurements at a two times (x2) factor. This is used on lathes and other turning applications to display part diameter rather than part radius.

In the Set-Up routine, press the [\wedge] key until "RAD" or "DIA" is displayed.

Pressing each axis key [**Xo**], [**Yo**] or [**Zo**], switches between radius and diameter readings for that axis. When the unit is displaying the choices you wish to use, press [\wedge] to continue to the next option.

3.5 Linear Error Compensation

This option allows you to apply a constant correction factor to all measurements displayed. This factor is expressed in parts per million (PPM).

In the Set-Up routine, press the [\wedge] key until LC (Linear Compensation) is displayed. The display will show "LC 0" or the last correction factor entered.

To insert, or change, a correction factor, select the axis [**Xo**] [**Yo**] or [**Zo**] and enter the factor you wish to use.

The value is entered by pressing the [\wedge] and [\vee] keys.

For example, to apply a factor of 200PPM to the X axis, press the following keys: [**X**] [\wedge] until the displays show 200 then press [**ent**].

If you make a mistake you can revert to the previous settings by pressing the [**ce**] key. This cancel function will not work after the [**ent**] key has been pressed.

If the unit is displaying measurements less than the actual measurement, enter a positive factor to compensate. A factor of 200PPM means displays are measurement x 1.000200. When each axis is displaying the correction factor you wish to use, press [\wedge] to return to the first option.

3.5.1 Calculating Linear Error Compensation

To establish a correction factor, check the measurements displayed by the DPG2000 against a known distance. The correction factor should be established while in the standard operating mode and not in the Set-Up routine.

For example, you might use a known (actual) distance of 500mm, against which the DPG2000 displays 499.8mm. The correction factor you would then apply is:

$$(0.2\text{mm}/500\text{mm}) \times 1,000,000 = 400\text{PPM}$$

If the DPG2000 displays 500.2mm over the same distance, the correction factor would be:

$$(-0.2\text{mm}/500\text{mm}) \times 1,000,000 = -400\text{PPM}$$

Warning: Once you have entered a multiplication factor for an axis, all measurements will be adjusted accordingly. If you wish to disable this adjustment, you will have to enter a compensation factor of zero.

You can re-edit any Set-Up function by locating it using the [^] and [v] direction keys.

To leave the Set-Up routine press the concealed key, which is located under "ne" of the newall logo.

4.0 USER INSTRUCTIONS

4.1 Using the keypad

Figure 1.3 shows the layout of the keypad. The keys are used as follows:

Key	Purpose
X ₀ Y ₀ Z ₀	Set the current position for the axis to zero (reset)
ce	Clear entry
ent	Enter key to confirm data entry
abs inc	Switches between absolute and incremental readings (LED indicates choice of mode)
1/2	Centre Find function
ref ₀	Select the Digifind function
res	Setting Axes Resolutions
in mm	Switches between inch and millimetre display (LED indicates choice of mode)
^	Scroll Up
v	Scroll Down

5.0 OPERATING FUNCTIONS

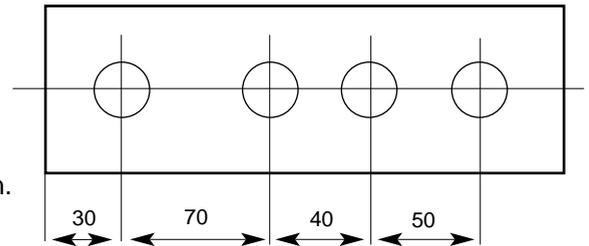
5.1 Using Incremental

(a) Purpose and use

When the DPG2000 is set to incremental mode, it can be used to display each new position relative to the last position. This is also known as point-to-point operation.

On setting to incremental, you can reset each axis by pressing [Xo] [Yo] or [Zo].

Each time you switch to incremental mode, the DPG2000 will display the position relative to the last reset position while in the incremental mode.



(b) Keystrokes

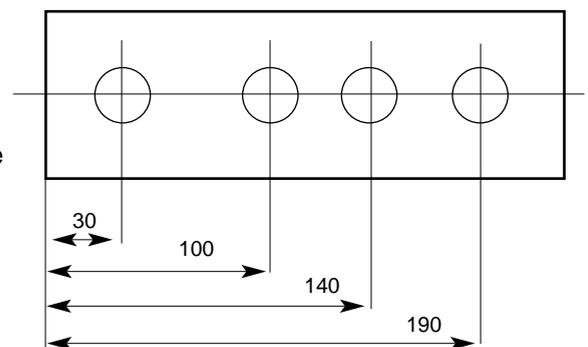
Operator Steps	Keystrokes	Axes Display
Set to incremental mode		
Reset axes	 	

5.2 Using Absolute

(a) Purpose and use

When the DPG2000 is set to absolute mode it will display the position relative to an established datum point.

(b) Keystrokes

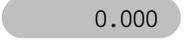


Operator steps	Keystrokes	Axes Display
Set absolute mode		

(c) Establishing the datum

When you reset the display in absolute mode, you are setting the current position of your machine as your datum point. All absolute positions will be measured relative to this datum.

To set the datum position, move the machine to the point you intend to establish as the datum and then reset any, or all, axes while in the absolute mode.

Operator steps	Keystrokes	Axes Display
Set to absolute mode Move machine to the datum location Reset axes	   	  

5.3 Digifind

Digifind is a reference function used to find the datum should it be lost due to power failure or an accidental key stroke.

(a) Using Digifind to re-establish a lost datum

In the event that the datum positions are lost, align each axis to within $\pm 6\text{mm}$ ($\pm 0.25''$) for Spherosyn or $\pm 2.5\text{mm}$ ($\pm 0.098''$) for Microsyn to the original datum point.

By pressing the [**ref.**] followed by the corresponding axis key, the display will update to a distance equal to the distance from the current position to the datum point.

Each time the DPG2000 is powered up the cabinet will automatically use Digifind to compensate for any axis movement of up to $\pm 6\text{mm}$ ($\pm 0.25''$) for Spherosyn and $\pm 2.5\text{mm}$ ($\pm 0.098''$) for Microsyn.

5.4 Inch/Millimetre

To change between inch and millimetre readings, press [**in/mm**]. The displayed data will be converted instantly. The LED beside the key reminds you which mode is being used.

When you switch on the DPG2000, it will display the same unit of measurement which was set prior to power loss.

5.5 Centre Find

Centre Find halves the dimension displayed for any or all axes selected. You can use Centre Find in either absolute or incremental mode. The keystrokes are the same in either case.

In the following example, Centre Find is being used on the X axis to find the centre point of a workpiece that is 100mm wide.

Operator steps	Keystrokes	Axes Display
Locate to your first position (One edge of your workpiece) and zero the axis	Xo	0.000
Locate to the second position (The other edge of the workpiece)		100.000
Use Centre Find to locate the centre point	1/2 Xo	50.000

In either absolute mode or incremental mode, once you have used Centre Find you can locate the centre point by moving until the display is at zero.

If you are in absolute mode, remember that using Centre Find will set the datum to the centre point.

5.6 Datahold (Sleep)

Datahold allows you to disable the DPG2000 but retain power to the measurement transducers and the memory circuits. You can use Datahold to prevent unauthorised or accidental use of the DPG2000 whilst unattended.

To select Datahold, press the concealed key located under the "ne" of the "newall" logo (See Figure 1.3).

While the DPG2000 has been set to Datahold, the keypad will not function and the displays will be blank. If the machine axis is moved, "DISPLACD" (displaced) will appear in the display window. The DPG2000 will record all transducer movement and will update the display once Datahold is cancelled. If a key is pressed, "TOUCHED" (touched) will appear in the display to alert the operator that data entry has been attempted.

To cancel datahold, press the concealed key located under the "ne" of the "newall" logo.

5.7 Selecting An Axis Resolution

The resolution to which an axis position is displayed, can be selected by pressing the [res] key. This will display the current selection for all axes.

To alter an axis resolution select that axis by pressing either [Xo] [Yo] or [Zo]. The resolution can then be changed by pressing the [^] and [v] keys. Once the desired resolution is displayed press [ent].

If you make a mistake you can revert to the previous settings by pressing the [ce] key.

Operating Functions

The available resolution options depend on the transducer type selected in Set-Up. See Sections 1.2 and 3.2

Operator steps	Keystrokes	Axes Display
To enter resolution mode		  
To select the axis		
Scroll through resolution options	 	
To confirm your selection		

You can use the resolution function in either inch or millimetre mode. The keystrokes are the same in either case. The resolutions will be displayed in units corresponding to the selected mode.

6.0 TROUBLESHOOTING

Symptom	Solutions
<p>1 Nothing happens when the unit is switched on.</p>	<p>Check that the DPG2000 is correctly connected to a working power source.</p> <p>Check the power lead is not damaged.</p> <p>Check the selector switch on the DPG2000 is set to accept the correct power supply voltage.</p> <p>Check the fuse. Note that if the fuse has blown, this suggests a fault with the power source which must be corrected before the fuse is replaced. (See Section 2.2)</p>
<p>2 When the unit is switched on the displays are frozen.</p>	<p>This suggests that voltage of the power is too low.</p> <p>Check that the power source is within the limits accepted by the unit. (See Section 2.2)</p>
<p>3 The displays work, but reset from time to time without the keys being pressed.</p>	<p>This suggests either that the voltage of the power source is too low, or that the power source has an intermittent fault.</p> <p>Check the power source as above.</p> <p>Check that all connections are sound.</p>
<p>4 The displays work, but give erratic readings, the last digit jitters or the measurements jump to new Figures unexpectedly.</p>	<p>This suggests that there is a poor earth (ground) connection. Both the DPG2000 itself, and the machine on which it is installed, must have proper earth (ground) connections. (See Section 2.1)</p>
<p>5 "NO SIG" or "SIG FAIL" appears in the display.</p>	<p>This means that the DPG2000 is not receiving a proper signal from the measurement transducer.</p> <p>Check that the transducer connection is good.</p> <p>Check that there is no damage to the connectors or to the transducer lead. If only one axis is displaying this message, turn off the DPG2000 and connect the transducer from a working axis into the faulty axis. Turn the DPG2000 back on, if the same message appears, the fault is likely to be in the DPG2000 and you should contact your local dealer.</p>

7.0 CLEANING

Disconnect the cabinet from the power supply before cleaning.

It is recommended that the cabinet be wiped over with a lint-free cloth with a non corrosive/abrasive cleaning fluid. Do not use compressed air.

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