NEWALL NEWALL MEASUREMENT SYSTEMS LTD

Digipac   Digital Readout

Contents

1.0 Introduction

1.1 EMC AND LOW VOLTAGE COMPLIANCE

The Digipac 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.

Certificate No FM36096

1.2 TECHNICAL SPECIFICATIONS

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

Operating Voltage: 115 or 230V (Factory Set)

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

Inputs: Spherosyn transducers

Resolution:

    Spherosyn   5µm (0.0002in) / 10µm (0.0005in) / 20µm (0.001in) / 50µm (0.002in)

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

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

2.0 Installation

⚠ This symbol appears on th equipment and refers to the safety aspects detailed below.

⚠ **2.1 MOUNTING**

Digipac is supplied with a fixing kit consisting of a M10 stud, nut and washers. Figure 1.2b shows use of this in conjunction with a mounting arm.

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

A single or double mounting arm bracket can be supplied as a optional extra.

An optional mounting assembly (Part no: 294-37740) is available which allows for tilt and rotation (See Figure 1.2a).

Select the location of the Digipac 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 Digipac, it is recommended that the unit's case is grounded to the machine upon which it is fitted. Use a wire or strap of a least $1.5mm^2$ (16 AWG) from the cabinet equipotential terminal (See Figure 1.3) 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.

⚠ **2.2 POWER SUPPLY**

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

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, ie. the floor or coolant tray, when disconnected from the cabinet.

The 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 a possible indication of some significant problem with the power source. Check the supply and wiring carefully. If the fuse is replaced, 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 operate the disconnect device.

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

Figure 1.1 Front View

Mounting Arm
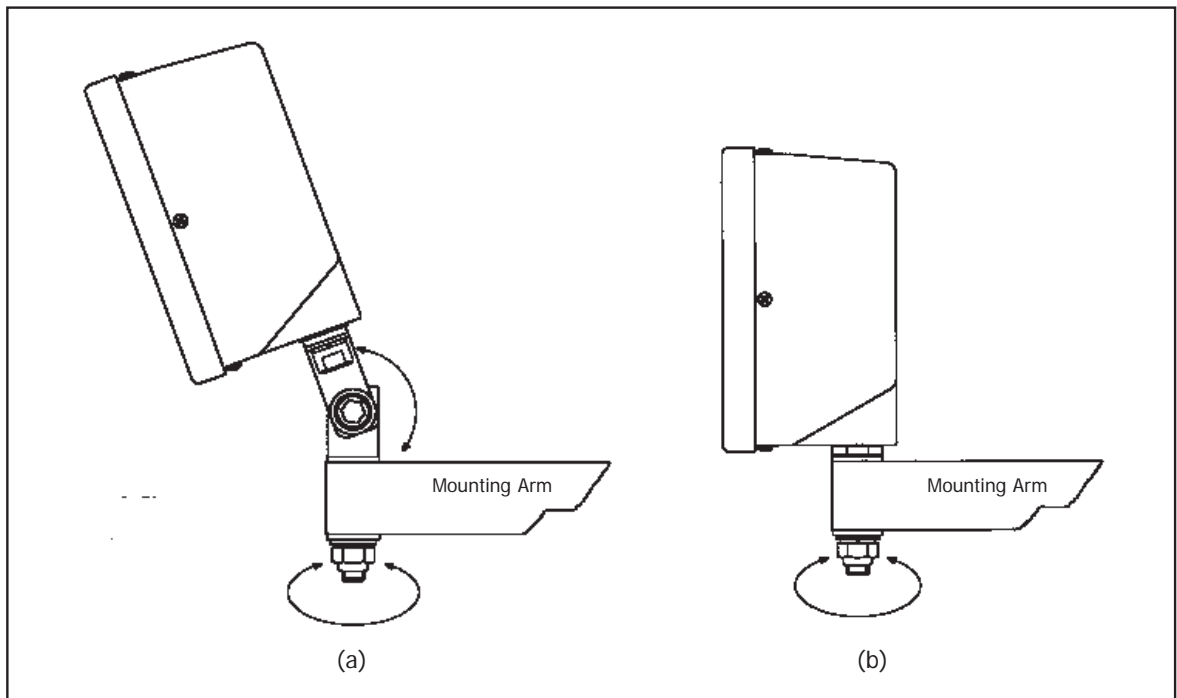
Mounting Arm

(a)

(b)

Figure 1.2   Mounting Arrangements

⚠ **2.3 CONNECTIONS**

Figure 1.3 shows the connection sockets at the back of the Digipac. The Digipac is designed for use with Newall's Spherosyn transducers only. The transducers are connected to the Digipac with 9 pin D type connectors. These connectors have locking bolts which secure the connectors to their sockets.

Switch off the Digipac before connecting or disconnecting the transducers. To fit the connectors into the appropriate socket on the back of the Digipac, first align the connector and then push firmly in place and secure with the locking bolts. To remove the connector, disengage the locking mechanism and pull the connector clear.

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 Digipac is mounted on the back of the unit as shown Figure 1.3.

When you switch on the Digipac the unit will automatically go through a brief self diagnostic routine.

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

After this routine, the unit will display measurements and 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 to change the main default settings for the Digipac (See Table 1). 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.

The Set-Up procedure can only be activated just after power is switched on to the unit. After switching on, press the concealed key which is located under the "**ne**" of the newall logo on the keypad (See Figure 1.1). 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 top axis 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 **[abs/inc]** key to scroll through this list until you reach the option you wish to change. To change the option when selected, press the **[Xo]** or **[Yo]** key.

Note: To leave the Set-Up routine press the concealed key ("**ne**" of newall).

Figure 1.3

INPUT
CONNECTORS
2 AXIS

MAINS SUPPLY SWITCH

Digipac

DIGITAL READOUT UNIT

SPHEROSYN transducers

CE

Sample Unit

Property of NMS

newall

IEC
INLET
(MAINS
SUPPLY)

CABINET
EQUIPOTENTIAL
TERMINAL FOR
GROUNDING TO
MACHINE

MAINS SUPPLY FUSE
NOT TO BE REPLACED BY THE OPERATOR
DISCONNECT MAIS SUPPLY BEFORE REPLACING

Figure 1.3   Connection Diagram

Setting	Digipac Default
Sleep	On
Resolution	(5µm/ 0.0002in)
Direction	1
Radius/Diameter	Rad
Linear Compensation	0

Table 1 - Default Settings

SLEEP
- ON
- OFF

INPUT TYPE
- SPHEROSYN
- MICROSYN

RESOLUTION
- (SPHEROSYN)- 5µm (0.0002in) / 10µm (0.0005in) / 20µm (0.001in) / 50µm (0.002in)

DIRECTION
- 0
- 1

READINGS
- RADIUS
- DIAMETER

LINEAR ERROR COMPENSATION
- USER DEFINABLE
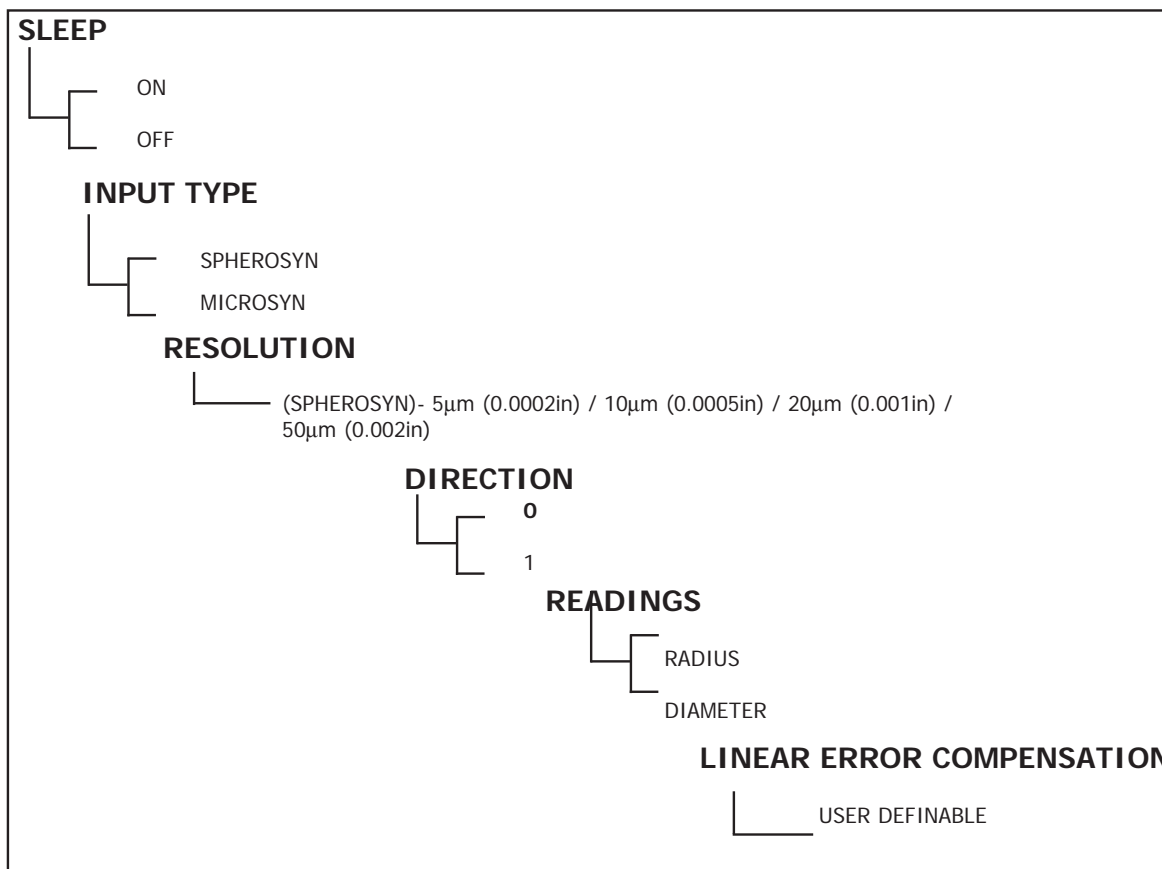
Table 2 - Menu Options

3.1 SLEEP/DATAHOLD

In the Set-Up routine, press the **[abs/inc]** key until "SLP O N" is displayed. Press **[Yo]** and the choice of "SLP OFF" appears. You can toggle between "SLP O N" or "SLP OFF" by pressing the **[Yo]** key.

Select "SLP O N" if you want to be able to use the Datahold facility. (See Section 5.7 for a description of Datahold).   Otherwise select "SLP OFF".

When the selection is made press **[abs/inc]** to continue to the next option.

3.2 INPUT TYPE

Select between Microsyn or Spherosyn for each axis. Press the **[Xo] [Yo]** or **[Zo]** key to toggle between the two selections.

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 followe*

3.3 RESOLUTION

The resolution option allows you to select the desired axis resolution. The resolutions which are available for each axis can be selected from:

5μm (0.0002in) / 10μm (0.0005in) / 20μm (0.001in) / 50μm (0.002in)

Press the **[Xo]** or **[Yo]** key to change the resolutions.

3.4 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 **[abs/inc]** until "DIR" (direction) is displayed.

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

Pressing each axis key **[Xo]** or **[Yo]** reverses the counting direction.   When the Digipac is displaying the choices you wish to use, press **[abs/inc]** to continue to next option.

3.5 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 **[abs/inc]** key until "R A D" or "DIA" is displayed.

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

3.6 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 **[abs/inc]** 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 and enter the factor you wish to use.

For example, to apply a factor of 200PPM to the X axis, press the following keys: **[X][2][0][0][ent]**
.

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

3.6.1 CALCULATING LINEAR ERROR COMPENSATION

To establish a multiplication factor, check the measurements displayed by the Digipac against a known distance. The multiplication factor should be established while in operational mode and **NOT** in the Set-Up routine.

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

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

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

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

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.

Note: To leave the Set-Up routine, press the concealed key ("*ne*" of the newall logo).

4.0 User Instructions

4.1 OPTIONS

Digipac is available in 2 axis only.

4.2 USING THE KEYPAD

Figure 1.4 shows the layout of the keypad. The keys are used as follows:

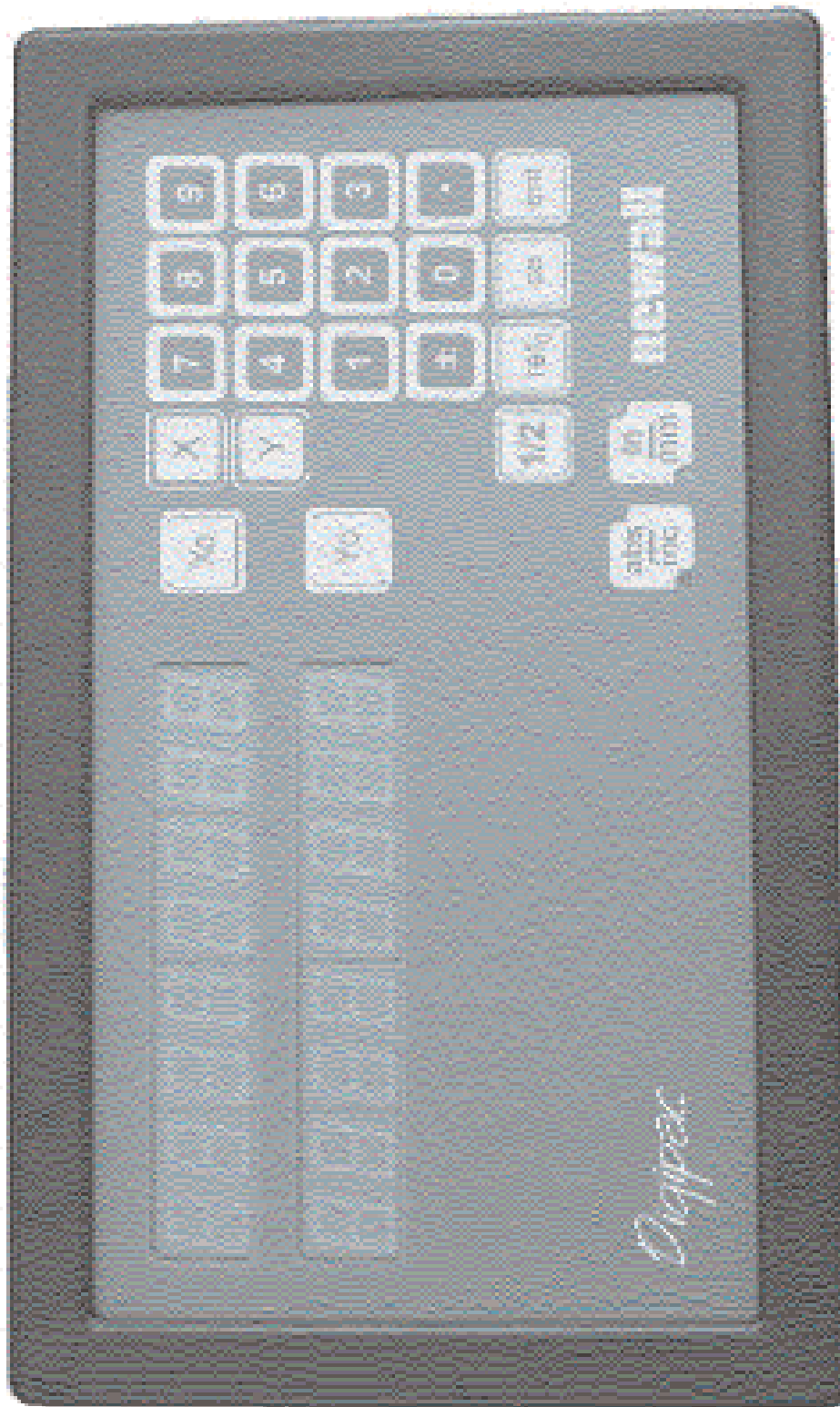| KEY	PURPOSE
Xo Yo	Set the current position for the axis to zero (reset)
X Y	Select axis to enter dimension (preset)
abs/inc	Switches between absolute and incremental readings (LED indicates choice of mode)
ce	Clear entry values in preset mode
½	Centre find function
ent	Enter key to confirm data entry
ref$_O$	Select the Digifind function
in/mm	Switches between inch and millimetre display (LED indicates choice of mode)
± 1 2 3 4 5 . 6 7 8 9 0	Numeric keypad for data entry

Figure 1.4   Keypad Layout

5.0   Standard Functions
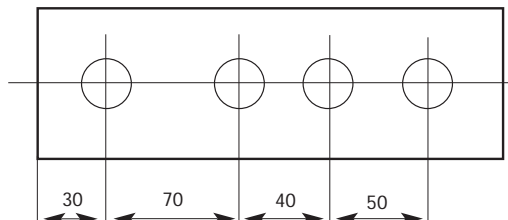
5.1 USING INCREMENTAL

(a)   Purpose and Use

When the Digipac 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 use.

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

As an alternative to resetting the axes, you can enter the coordinates relative to the current incremental
position.

Each time you switch to incremental mode, the Digipac display will show the position relative to the last reset
position, while in the incremental mode.
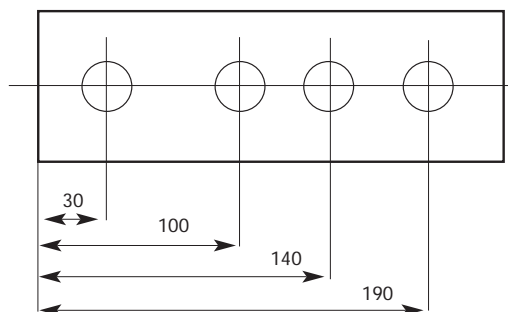
(b)   Keystrokes

OPERATOR STEPS	KEYSTROKES	AXES DISPLAY
Set to incremental mode	**[abs/inc]**	
Reset axes	**[Xo]** **[Yo]**	X 0.00 Y 0.00
Enter the coordinates of a position, eg X100, Y50	**[X][1][0][0][ent]** **[Y][5][0][ent]**	X 100.00 Y 50.00

5.2 USING ABSOLUTE

(a)   Purpose and Use

When the Digipac 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	**[abs/inc]**	

(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 the machine at the point you intend to establish the datum and then reset any or all axes, while in the absolute mode.

OPERATOR STEPS	KEYSTROKES	AXES DISPLAY
Set to absolute mode	[abs/inc]	
Move machine to the datum location		
Reset axes	[Xo] [Yo]	X 0.00 Y 0.00

5.3 DIGIFIND

Digifind is a reference point used to find the datum should it be lost by power loss or accidental key stroke entry.

(a)   Using Digifind to Re-establish a Lost Datum

In the event that the datum positions are lost, align each axis to within ±6mm (± 0.25″) of the datum point.

By pressing the [ref₀] 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 Digipac is powered up the cabinet will automatically use Digifind to compensate for any axis movement of up to ±6mm (±0.25″).

5.4 DATA PRE-SET

To pre-set an axis dimension the following steps are required.

(a)   Keystrokes

OPERATOR STEPS	KEYSTROKES	AXES DISPLAY
To enter a negative dimension for X the axis	[X][±][1][9][.][6][ent]	X –19.600

Dimensions can be entered in either absolute or incremental modes.

5.5 INCH/MILLIMETRE

To change between millimetre and inch 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 Digipac, it will display the same unit of measurement which was set prior to power loss.

5.6 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]**	X 0.00
Locate to the second position (the other edge of the workpiece)		X 100.00
Use Centre Find to locate the centre point	**[X][½]** or **[½][X]**	X 50.00

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

Note: *If you are in absolute mode, remember that using centre find will set the datum to the centre point.*

5.7 DATAHOLD (SLEEP)

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

To select datahold, press the concealed key under the "**ne**" of the "newall" logo (See Figure 1.1).

While the Digipac 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 Digipac will continue to 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.

Note: *To cancel datahold, press the concealed key ("**ne**" of the newall logo).*

6.0 Troubleshooting

SYMPTOM	SOLUTIONS
1 Nothing happens when the unit is switched on. .	Check that the Digipac is correctly connected to a working power source Check the power lead is not damaged. Check that the supply voltage is correct for the Digipac 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)
2 When the unit is switched on the displays are frozen.	This suggests that the mains supply voltage is too low. Check that the power source is within the limits accepted by the Digipac. (See Section 2.2)
3 The displays work, but reset from time to time without the keys being pressed.	This suggests either that the mains supply voltage is too low, or that the power source has an intermittent fault. Check the power source as above. Check that all connections are sound.
4 The displays work, but give erratic readings, the last digit jitters or the measurements jump to new figures unexpectedly.	This suggests that the there is a poor earth (ground) connection. Both the Digipac, and the machine on which it is installed, must have proper earth (ground) connections. (See Section 2.1)
5 "`NO SIG`" or "`SIG FAIL`" appears in the display.	This means that the unit is not receiving a proper signal from the measurement transducer. Check that the transducer connection is good. Check that there is no damage to the connectors or to the transducer lead. If only one axis is displaying this message, connect the transducer from a working axis into the faulty axis. If the same message appears, the fault is likely to be in the Digipac and you should contact your local dealer. Note: The Digipac must be switched off then on again to remove the "`NO SIG`" message.
6 The unit will not respond to keys.	Switch the Digipac off and back on. Note that providing the machine has not been moved more than +/-6mm in any direction , you will not lose your current position by switching off and on.

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.

NEWALL MEASUREMENT SYSTEMS LTD

HEAD OFFICE
Newall Measurement Systems Ltd.
Technology Gateway, Cornwall Road
South Wigston
Leicester LE18 4XH
United Kingdom
Telephone: +44 (0)116 264 2730
Facsimile: +44 (0)116 264 2731
Email: sales@newall.co.uk
Web: www.newall.co.uk

Newall Electronics, Inc.
1778 Dividend Drive
Columbus, OH 43228
Telephone: +1 614 771 0213
Toll Free: 800.229.4376
Facsimile: +1 614 771 0219
Email: sales@newall.com
Web: www.newall.com

Newall Deutschland
Postfach 20
72117 Ammerbuch
GERMANY
Telefon: +49 (0) 7073 302908
Fax: +49 (0) 7073 302963
Email: manfred.friebe.newall.co.uk