NEWALL

NEWALL MEASUREMENT SYSTEMS LTD

A50 Single Axis Digital Readout System

CONTENTS

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

72mm (2.84”)

Width

144mm (5.67”)

Depth

70mm (2.76”)

Weight

0.55kg (1.22lbs)

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 A50 system should be disposed of in a safe manner applicable to electronic goods.

DO NOT BURN.

The casework is suitable for recycling. If you have any doubt about how to dispose of your unit, please return it to Newall and we will provide this service for you.

Input

One Spherosyn or Microsyn encoder

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”)

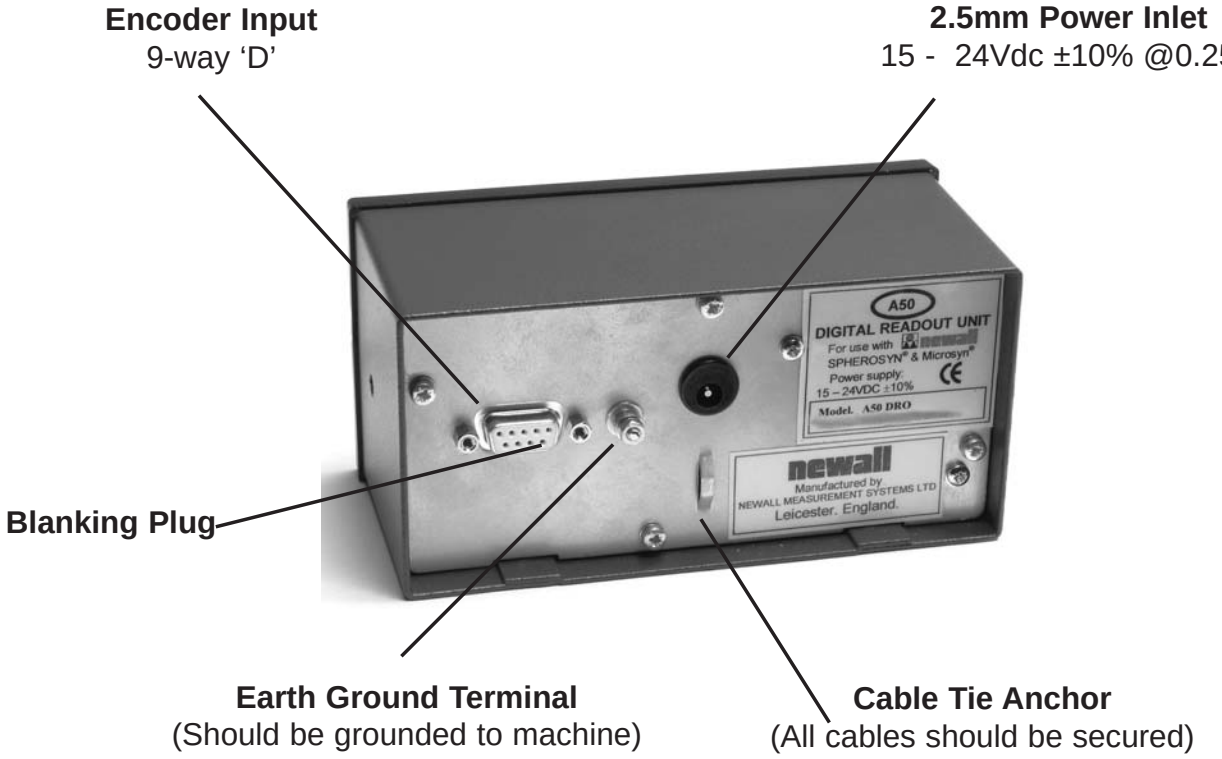
5µm (0.0002”)

10µm (0.0005”)

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

CONNECTIONS

- The A50 is suitable for use only with Newall Spherosyn and Microsyn analogue encoders.
- Ensure that all cables are secured to prevent their 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 supply before connecting the encoder, by disconnecting power supply connector
- Ensure that the A50 is grounded to the machine before turning on the machine supply.



NOTES

DO NOT CONNECT THIS UNIT DIRECTLY TO THE MAINS SUPPLY.

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

Part No: 307-60940

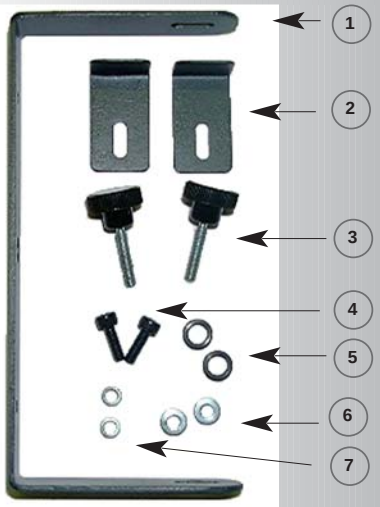
Contact your supplier for details.

NOTES

INSTALLATION

- The A50 is supplied with a mounting kit, allowing either stand or panel-mount use.

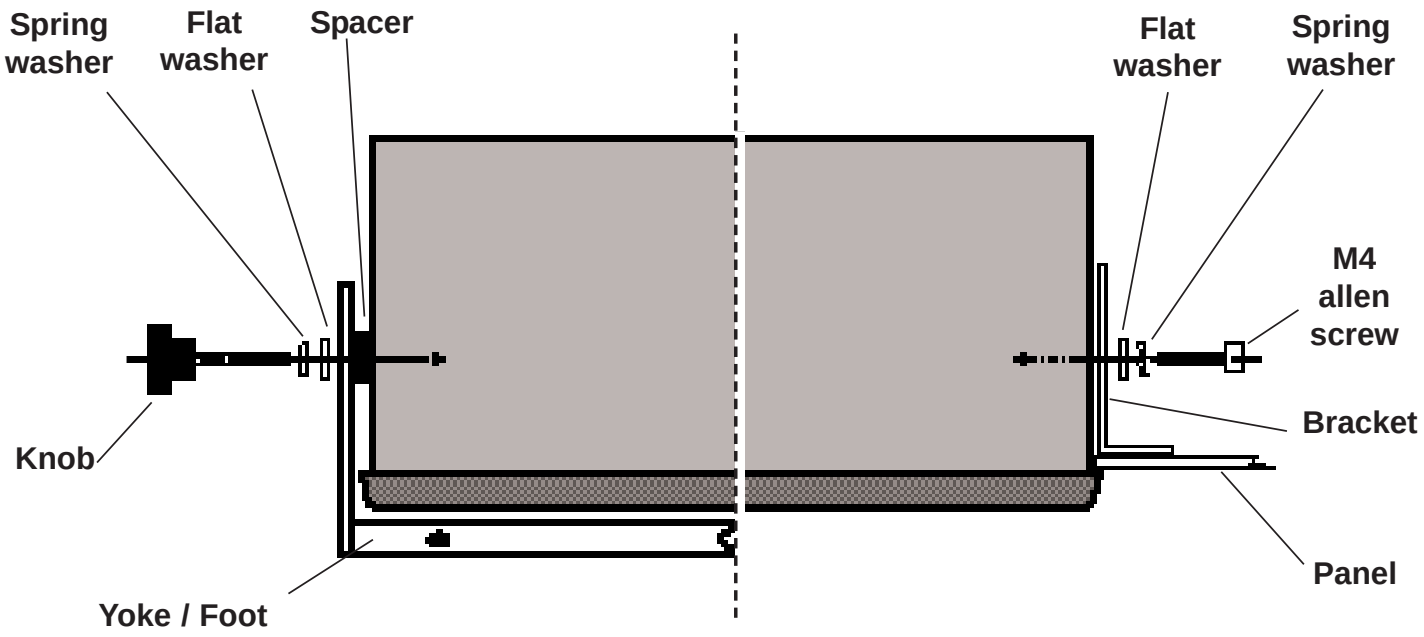
Mounting Kit Details



ITEM QTY	DESCRIPTION	
1	YOKE	1
2	BRACKET	2
3	KNOB	2
4	M4 x 12 CAP HD SCREW	2
5	SPACE WASHER	2
6	M4 FLAT WASHER	2
7	M4 S/C SPRING WASHER	2

Stand Mounting

Panel Mounting



OPERATION

Setting The Display

In normal operation, the keys are used as follows:

- Press ⏻ to toggle the display and keypad on and off.
- Press in/mm to toggle the display between in/mm **inches** and in/mm **millimetres**.
- Press abs/inc to toggle the A50 between abs/inc **absolute** and abs/inc **incremental** mode.

Absolute mode

In this mode, the A50 will display the position relative to an fixed datum.

Incremental mode

In this mode, the A50 can be used to display each position relative to the last position. This is also known as *point-to-point* use.

Setting the datum

- *To zero the display at the current position:*
  press ◀. All readings will now be relative to this zero point.
- *To set the display to a known fixed point:*
  Example: ± 1 9 · 6 ent to enter the value - 19.600. All readings will now be relative to this fixed point.
- If you make a mistake while entering a number, pressing ce will clear the entry one character at a time.
- It is advisable to mark the Absolute Datum point physically on the machine , so as to be able to re-establish this datum after power loss. See Digifind Page 6

NOTES

Toggling the display off doesn't turn the power off - as long as the power supply is plugged in, all settings are preserved, and the position is updated.

tip

At the beginning of each working session, set the datum in **Absolute** mode, then switch the A50 to **Incremental** mode.

By using the A50 in this way, you will be able to return the machine to its absolute datum at any time, by simply switching back to **Absolute** mode.

If you are using **Segmented Error Compensation**, see page 10 for details of the datum setting procedure.

NOTES

Digifind works only in **absolute** mode.

Pressing ◁ in absolute mode redefines the datum.

Do not move the machine when the A50's power is off.

When the power is switched back on again, the A50 uses **Digifind** to automatically re-establish the datum.

tip

Entering a fixed point, or using **Centrefind, will change the datum in absolute** mode - but ref can still be used to return to the old datum.

OPERATION

Using Digifind

*In the event that the 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 point should be marked permanently on the machine.
- Set the machine close to the datum point - to within:
  6.3mm (0.25") for a Spherosyn encoder or
  2.5mm (0.1") for a Microsyn encoder.
- Switch the A50 to **absolute** mode.
- Press ref. The display will update to show the exact distance from the datum point.

Using Centrefind

Centrefind works by halving the distance displayed. It works in either absolute or incremental mode.

Example: - to find the centre of a workpiece that is 100mm wide:

- Set the tool or probe to one edge of the workpiece, and press ◁. The display will read 0.000.
- Set the tool or probe to the other edge of the workpiece. The display will read 100.000.
- Press 1/2. The display will read 50.000.
- Move the tool or probe until the display reads 0.000. This is the centre of the workpiece.

SETUP

Using Setup Mode

Setup mode is accessible immediately after the power has been switched on, as follows:

When power is applied, the A50 will go through a brief self-test routine. The display shows the model number, then the software version number, all segments and indicators light momentarily, after which the A50 is ready for use.

- To enter **Setup** mode, press ⏻ anytime before the self-test finishes.
- At the end of the test, the display will read SEt UP. Press any key to continue.

There are five options that can be configured:

Option	Default	Display
Encoder type	Spherosyn	SPHEr0Sn
Resolution	0.005mm	0.005
Direction	1	dir. 1
Radius / Diameter	Radius	rAd
Error compensation	Off	Err oFF

To cycle through the options, press abs inc. Each option is described in detail on the following pages.

When you have finished setting all the options, press ⏻ to return the A50 to normal operating mode.

NOTES

Normally, **Setup** needs to be done only once, and it is possible that the factory default settings are suitable for your needs without change.

tip

If the power is already switched on, pressing ⏻ abs inc ⏻ will enter setup mode.

If you have entered setup mode in this way, you will need to press ⏻ twice to return to normal operating mode.

NOTES

SETUP

Encoder Type

The **Encoder** setting must match the actual encoder in use, or the A50 will not display the measurement correctly.

There are three possible settings:

Spherosyn	SPHEr OSn	Microsyn 10	uSn 10
		Microsyn 5	uSn 5

- Press ◀ to cycle between the four settings.
- Press abs/inc to accept the setting and move on to the next option - **Resolution**.

Resolution

*The **Resolution** settings available will depend on the encoder, and also on the in/mm setting.*

	Display mm	Display in	Spherosyn or Microsyn 10	Microsyn 5
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)**	✓	

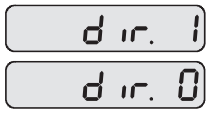
- Press ◀ to cycle between the four available settings.
- Press abs/inc to accept the setting and move on to the next option - **Direction**.

SETUP

Direction

*The **Direction** setting allows you to match the A50 to the actual direction of travel of the machine.*

alternative settings



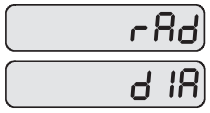
- Press ◀ to cycle between the two settings.
- Press abs/inc to accept the setting and move on to the next option - **Radius / Diameter**

Radius / Diameter

*Selecting the **Diameter** setting causes the A50 to display double the actual scale / machine movement*

radius

diameter



- Press ◀ to cycle between the two settings.
- Press abs/inc to accept the setting and move on to the next option - **Error Compensation**.

NOTES

tip

The **Direction** setting is quite arbitrary. Set it to whichever makes most sense to the job.

tip

The **Diameter** setting is useful for lathes, and other turning applications, to display diameter, rather than radius.

NOTES

Error Compensation

Errors can result from a number of sources including installation and machine wear. Where the degree of error increases linearly along the length of travel of the encoder, Linear Error Compensation should be applied. However, where the errors are local to a point of travel the Segmented Error correction facility could be used.

There are three possible settings:

off — Err oFF

linear error compensation — L in Err

segmented error compensation — SEG Err

See Pages 11 and 12 - details on using Linear and Segmented Error Compensation.

- Press ◀ to cycle between the three settings
- If you select **linear compensation** or **segmented compensation**, pressing abs inc will take you to the individual settings for the compensation method chosen, described below.

Linear compensation

In this mode, a single constant correction factor for the scale 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 compensation

In this mode, the scale travel can be broken down into as many as 99 user-defined segments, each with its own correction factor. The correction factors are calculated by the A50, by comparison against known, user-supplied standards.

- In this mode, when power is applied, the display will read rESEt.
- If the machine has not been moved since the power was turned off, simply press ce, and the A50 will restore the last position recorded.
- Alternatively, set the machine close to the reference point, and press ◀. The A50 will re-establish alignment with the segmented compensation.

If error compensation is applied, it is important that it is absolutely correct, If is not correct, errors could be increased rather than reduced.

tip

After setting up the error compensation, it is advisable to check its effect in normal operation.

Segmented compensation need not be over the entire scale length.

It can be applied to a length of high importance.

It can be as small as one segment.

Linear Error Compensation

Calculating the correction factor

Example - to check the scale against a standard which is exactly 500mm wide:

- Set the tool or probe to one edge of the standard, and press ◀. The display will read 0.000.
- Set the tool or probe to the other edge of the standard. Assume the A50 displays 499.800.
- Calculate the correction factor:

  error = (500.000 - 499.800) = 0.2mm

  correction error factor = $\frac{0.2}{500}$ x 1,000,000 = +400 ppm

  This measured value needs to be increased to match the standard, so this is a positive correction factor.

  If the display had read 500.2 for the same standard, the correction factor would be -400 ppm.

Setting the correction factor

- Enter **Setup** mode, by pressing , ⏻ abs/inc ⏻ and select **Error Compensation**.
- Select **Linear Compensation**, as described on page 10.

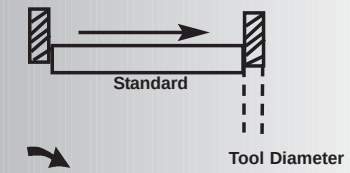
  The display will read LC 0, or a previously entered value.
- Press, 4 0 0 ent to enter a correction factor of 400 ppm (as above)
- To enter a different correction factor, press ◀ and start again.
- Press abs/inc to accept the setting and move back to the first option - **Encoder**.

NOTES

The correction factor cannot be established while in **Setup** mode.

Carry out the measurements in normal **operating** mode, then turn the power off and re-enter **Setup** mode as described on page 7.

Where the measurement of the standard included the tool / probe diameter this should be subtracted from the displayed measurement.



Only values between -9999 and +9999 are allowed.

tip

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

NOTES

Up to 99 segments can be defined.

To take advantage of **Segmented Error Compensation**, you will need access to a high accuracy standard, such as a laser measuring system.

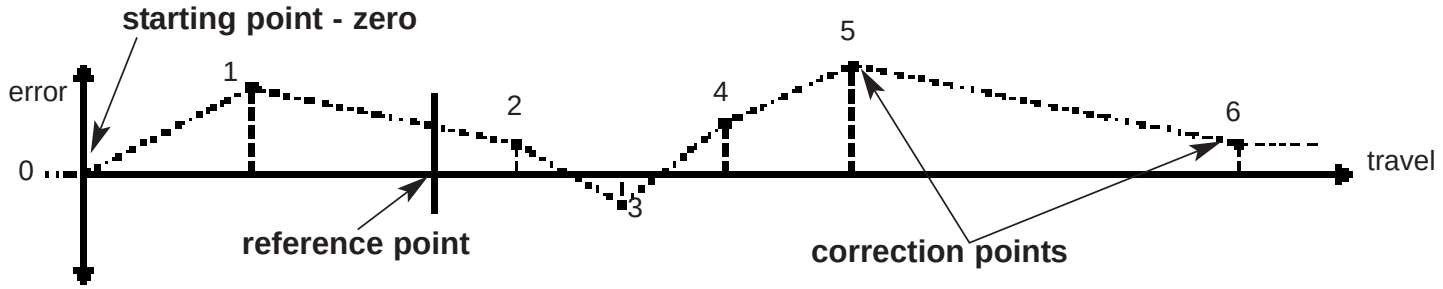
Error Compensation initially defaults to **off**, with no points set.

If **Error Compensation** is set to **OFF a**fter correction points have been set, the data is retained, but not applied. When **Segmented Error Compensation** is set to **ON** again, the data is applied

SETUP

Segmented Error Compensation

Identification of correction parameters

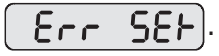


The scale travel is broken down into a number of user-defined segments, each with its own correction factor, measured against an high-accuracy standard. The following parameters need to be identified:

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

- Enter **setup** mode, by pressing  and select **error compensation**.
- Select **segmented compensation**, as described on page 10.

  The display will read  .

  Press ent to continue, or press  to accept any previous settings and move back to the first option - **Encoder Type**

Setting the correction points *continued*

The display will change to SEt 2Er0.

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

2 The display will change to Go to 1.

Set the machine to the point you have chosen to be **correction point 1**. Press ent.

3 The display will change to EntSd 1.

Enter the distance from the **starting point**, measured by the standard.

Example, Assume the laser measuring system displays 678.9 . Then press 6 7 8 · 9 ent to enter a correction point position of 678.9. The A50 will calculate the correction factor, and record this against its own position measurement.

· Repeat steps **2** and **3** for each correction point.

When all correction points have been entered, Press abs inc.

4 The display will change to Goto rEF.

Set the machine to the point you have chosen as the **reference point**. Press ent.

5 The display will return to Err SEt.

Press abs inc to accept the settings and move back to the first option - **Encoder Type**

Exit SetUp and begin normal operation

NOTES

This procedure must be carried out in strict sequence, and in full, to be valid. There must be no reversals in direction.

tip

Pressing ◀ at steps 2 or 3, will display the current position relative to the **starting point**.

tip

Do not worry about the direction of the standard measurement. eg. 678.9 and -678.9 are treated the same.

tip

Pressing ce will clear the entry one character at a time.

When all characters are deleted, pressing ce will take you back one step at a time.

NOTES

TROUBLESHOOTING

Symptom	Solutions
The display is blank.	· Press  . The display may have been switched off. · 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 at least 13.5Vdc (minimum operating limit)
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 15-24Vdc ±10%. · Check that all connections are sound.
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 A50, 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).
 **or**  **appears in the display.** *continued*	· This indicates that the unit is not receiving a proper signal from the encoder. · Check that the encoder connections are sound. *continued*

TROUBLESHOOTING

Symptom *continued*	**Solutions** *continued*
	· Check that there is no damage to the connectors or to the encoder. · Substitute a known working encoder, if one is available. · Switch the A50 off, then back on again.
The unit will not respond to any key presses.	· Switch the A50 off and back on again.
Readings are incorrect	· Check encoder type to ensure correct selection · Check error compensation factors · If using segmented error, verify datum position

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

NOTES

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

you will not lose the datum position by switching the power off and back on again.

CLEANING

- Disconnect the power supply from the A50 before cleaning.
- Do not use corrosive or abrasive cleaning materials.
- Do not use compressed air.
- Apply a small amount of cleaning fluid to a lint-free cloth. Use this to wipe over the case and keypad, taking care not to allow fluid into the connectors.

FOLLOW THESE INSTRUCTIONS CAREFULLY TO AVOID DAMAGE TO THE A50.

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