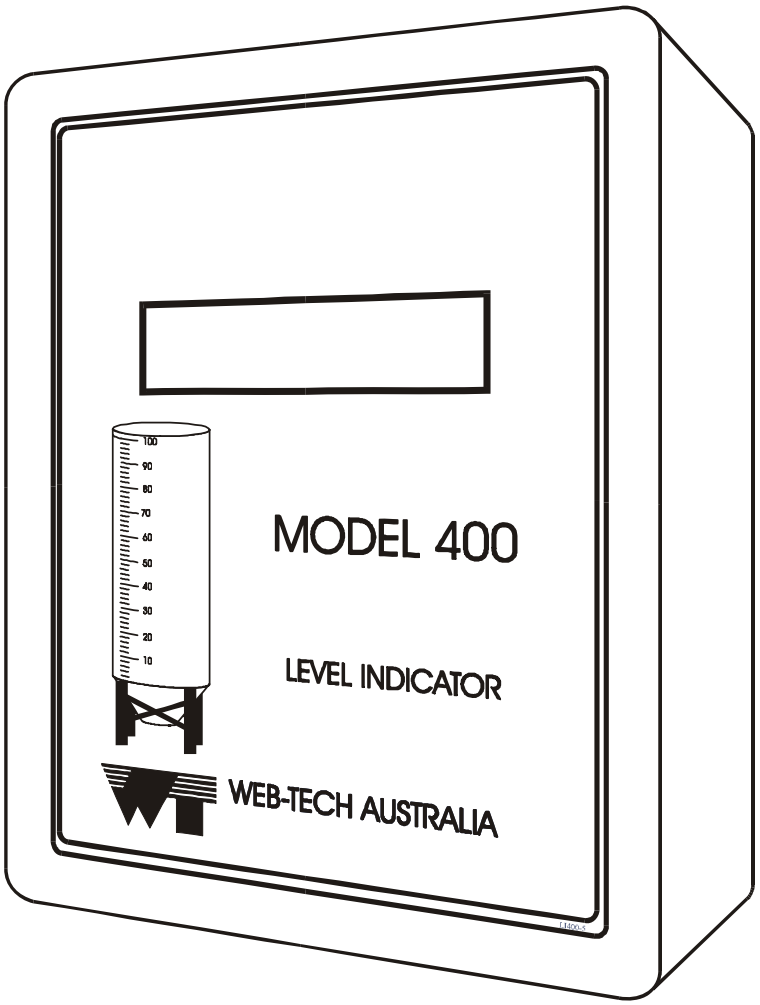
Model 400
Level Indicator
Operation Manual



WEB-TECH AUSTRALIA

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1.0 General Description

The Web-Tech Model 400 Level Indicator, is a microprocessor based instrument providing continuous measurement of material levels in silos and storage vessels for both new and existing applications. The instrument provides an indication of material level via a liquid crystal display. The Model 400 also provides a 4-20mA current signal which is directly representative of the quantity of material in the vessel. A standard feature of the instrument, is the provision of two fully programmable setpoints, enabling the activation of external devices such as motors, pumps, alarms, etc. at predetermined material levels.

1.1 Standard Features

- *embedded Motorola 8 bit microprocessor*
- *20 bit A/D resolution*
- *local large format LCD with LED backlighting*
- *isolated 4-20mA current loop (800 ? max)*
- *current loop fault indication*
- *auto-zero function*
- *security access facility*
- *12 bit D/A resolution on analogue output*
- *two (2) fully programmable setpoints*
- *system status relay output*
- *accepts both full and half bridge loadcells*
- *X1 and X10 selectable gain settings on analogue input*
- *easy programming of all functions*
- *all programmed variables retained indefinitely in non-volatile memory*
- *120/240Vac dual voltage operation*

IP66 (NEMA 4X) rated enclosure, featuring a quick release lockable cover.

1.2 Using the Keypad and Menu Display

The Model 400 Level Indicator uses a basic four key pad and large format alpha-numeric liquid crystal display to perform all of the setup and calibration functions required. This combination ensures that all of these functions can be carried out simply and quickly.

The keypad is used to scroll through and access the various functions and input calibration and setup information. The Operation of, and procedures to be followed when using the keypad are described in Section 3.1 Keypad Operation.

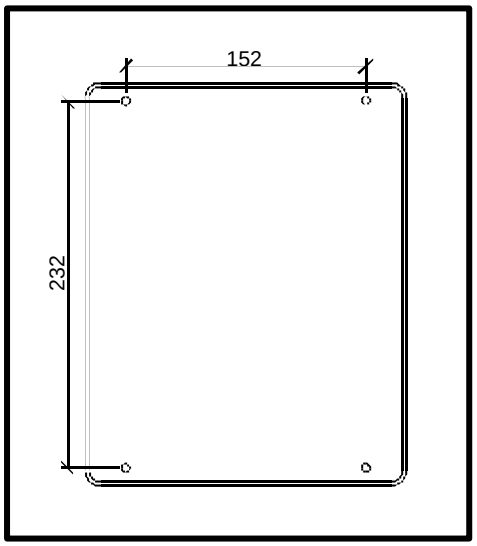


Figure 2-1
Standard Mounting Arrangement

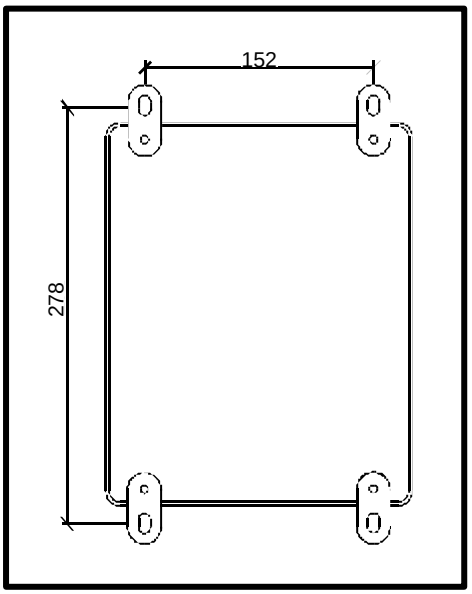


Figure 2-2
Mounting Arrangement Using Supplied Mounting Kit

2.0 Mounting Instructions

The Model 400 may be mounted by one of two methods. The mounting arrangement shown in Figure 2-1, is suitable for installations where the attaching screws can be inserted from behind the transmitter. Figure 2-2 shows the arrangement when using the supplied mounting kit. Either of these methods may be used without compromising the IP66 (NEMA 4X) rating of the enclosure.

The Model 400 has an operating temperature range of between -10°C and 50°C, when operated continuously. However, an installation location maintaining a temperature range of between 0°C and 50°C is preferred.

The transmitter should be wall mounted using the following procedure:

(a) Select a mounting location which will provide sufficient clearance for the opening of the enclosure door, and allow cabling access to the bottom of the enclosure.

(b) Decide upon which of the two mounting arrangements shown opposite, is the most suitable for your particular application. Drill holes in the wall using the dimensions shown in Figure 2-1 or Figure 2-2. The screws supplied in the enclosed mounting kit, (i.e. #10-32 pan head) can be used for the standard mounting arrangement detailed in Figure 2-1, providing the panel thickness does not exceed 3mm. If using the arrangement shown in Figure 2-2, you must supply the necessary hardware to attach the unit to the wall. The slots in the mounting feet supplied can accommodate screws up to 7mm in diameter.

(c) Place the unit on the wall and attach using selected hardware. Care should be taken when screwing into the enclosure, to ensure that the torque applied to the screws does not exceed **2.7 Nm**.

2.1 Wiring Procedure

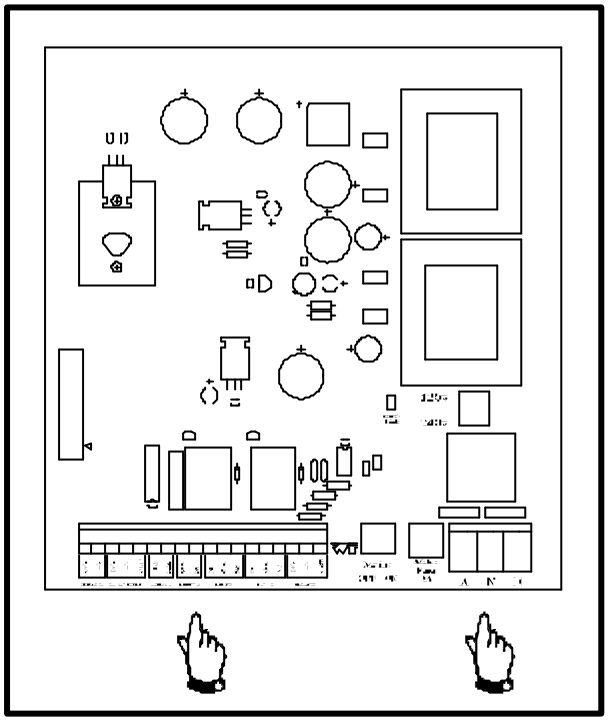


Figure 2-3
Terminal Blocks on Power Supply card

All connections to the Model 400 are made via the two terminal blocks shown in Figure 2-3 opposite. Terminal block TB1 accepts the AC power connections, while TB2 accommodates all other terminations. Refer to Figure 2-9 ,Figure 2-10 and figure 2.11

In order to maintain the IP66 (NEMA 4X) rating of the enclosure, suitable cable glands and fittings need to be used.

Care should be taken to ensure that all terminations are made in accordance with the following directions. Incorrect wiring may result in damage to the Model 400 and/or the attached equipment.

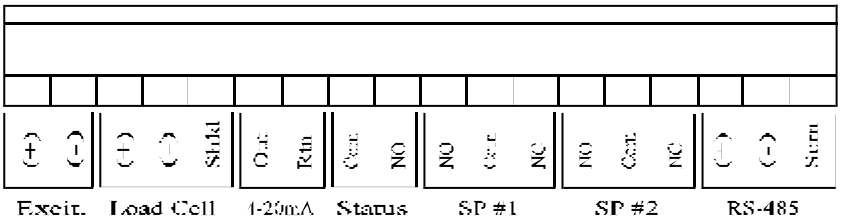
2.2 Connecting the Load Cell

The load cell is to be installed in accordance with the manufacturers' specifications and is therefore beyond the scope of this manual. Any queries regarding the load cell should be directed to the manufacturer.

Connect the load cell to the Model 400 as follows:

(a) Run interconnect cable between the load cell junction box and the Model 400. If using a half-bridge type load cell, use a suitable three core shielded cable such as **Belden 8791.** If using a full-bridge type load cell, use a suitable four core shielded cable such as **Belden 9773**.

(b) Connect the load cell wires to terminal block TB2 in accordance with the legends located below the terminal block as shown below.



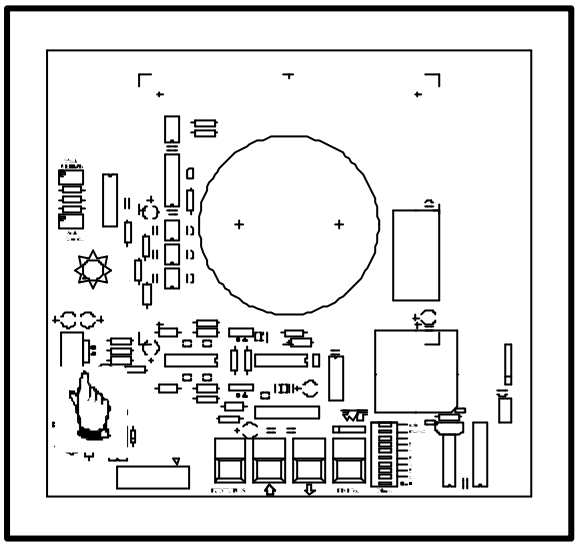


Figure 2-4
Full-Bridge/Half-Bridge Selection Link
(LK3 on CPU card)

NOTE: If using a half-bridge type load cell, connect the signal wire to the terminal marked **Load Cell (+)***.*

(c) If using a half-bridge type load cell, ensure that the selection link LK3 on the CPU card is in position **B**. This link should be in position **A** for full-bridge type load cells. The location of LK3 is shown by Figure 2-4.

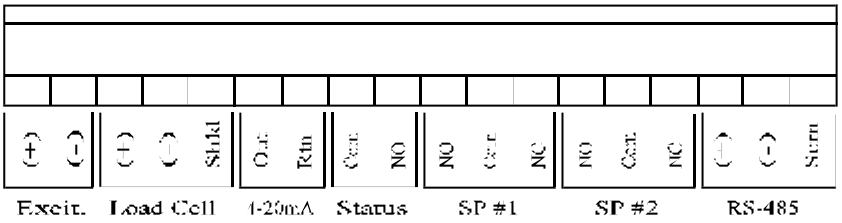
2.3 Connecting 4-20mA Current Loop

The 4-20mA current transmitter of the Model 400, provides a fully isolated industry standard current output capable of driving into a maximum loop load of 800?? ?

Connect the current transmitter output to the external equipment as detailed below:

(a) Run the interconnect cable between the external equipment and the Model 400. Use a suitable two core shielded cable such as **Belden 8790**.

(b) Connect the interconnect cable to the terminal block, TB2, in accordance with the legends located immediately below.



2.4 Connecting the Setpoint Relays

A standard feature of the Model 400, is the provision of two fully programmable setpoint relays to enable control of auxiliary equipment such as alarms, pump motors, etc.

The setpoint relays have a contact rating of 30VDC @ 10A and 240Vac @ 5A (resistive). Please ensure that the power requirements of the equipment connected to these relays does not exceed this rating.

Before connecting the auxiliary equipment to the setpoint relays, some consideration should be given as to how this equipment is best controlled.

The setpoints operate such that the relays are de-energized when the bin level is at or below its respective setpoint. The relays become energized when the bin level is at or above a level equal to the setpoint plus hysteresis. The Model 400 has a hysteresis value of 1% pre-programmed at the factory.

For example, if a setpoint is programmed at 10% say, then the relevant relay will de-energize when the bin level drops to 10%. This relay will remain de-energized for all bin levels below 10%. If the bin is then filled, the relay will become energized when the level reaches 11%. The relay will then remain energized for all bin levels above 11%.

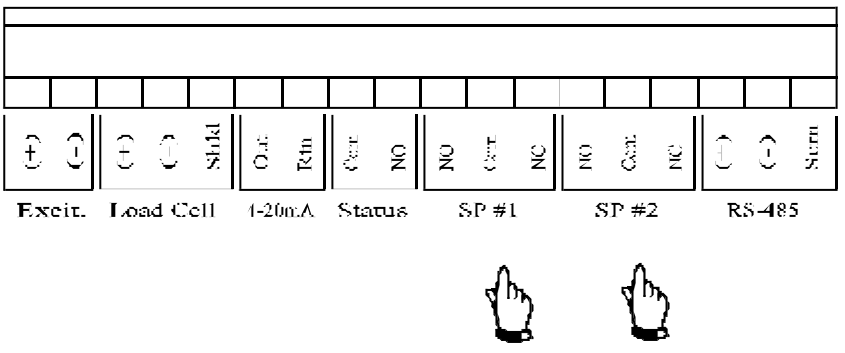
A detailed procedure for setting the setpoint levels, can be found in *Section 3.11.1 Programming Setpoint Levels*.

Setpoint relay legends: NO - normally open contact
NC - normally closed contact
COM - common contact

Connect the auxiliary equipment to the setpoint relays as follows:

(a) Run interconnect cable between the external equipment and the Model 400. Select a cable of sufficient rating so as to accommodate the power requirements of the equipment being connected.

(b) Connect the interconnect cable to the terminal block, TB2, in accordance with the legends located immediately below.



2.5 Connecting the Status Relay

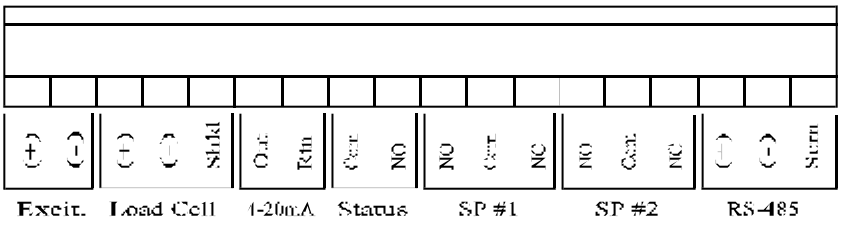
A small system status relay is incorporated into the Model 400. This relay would typically be connected to a PLC and be used to signal the PLC of any notifiable faults with the Model 400 or a power failure. This relay would normally be energized in a fully functional instrument. In the event of a fault or power failure occurring, the status relay would de-energize.

The status relay has a contact rating of 20VDC @ 0.5A. Under no circumstances should mains power or any other high power supply be connected to this relay.

Connect the status relay output to the external monitoring device (e.g. PLC) as detailed below.

(a) Run the interconnect cable between the external monitoring device and the Model 100. Use a cable suitable for use with the voltages and currents to be used.

(b) Connect the interconnect cable to the terminal block, TB2, in accordance with the legends located immediately below.



2.6 Connecting Mains Power

The Model 400 was designed as a dual voltage instrument and is therefore capable of operating from either 120Vac or 240Vac.

Do not turn on mains power until instructed to do so in the following procedure.

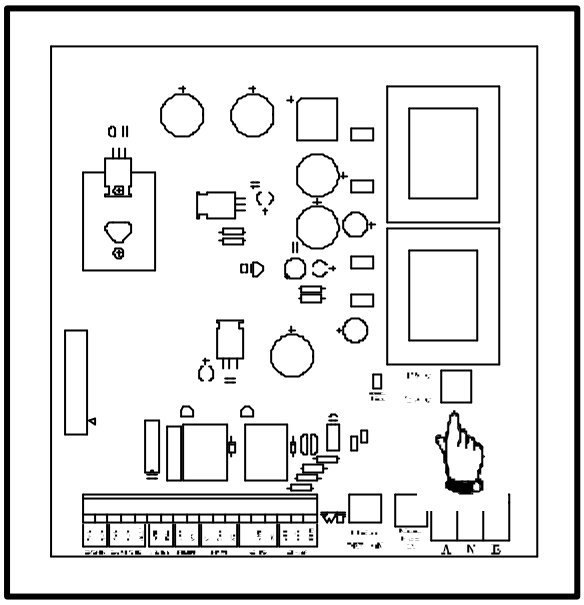


Figure 2-5
Mains Voltage Selection Switch on Power Supply card

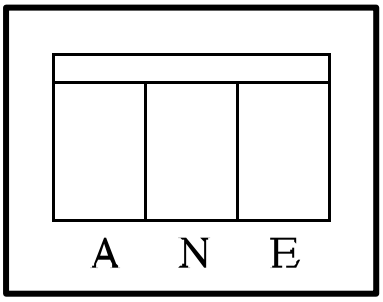


Figure 2-6
Mains Supply Terminal Block, TB1

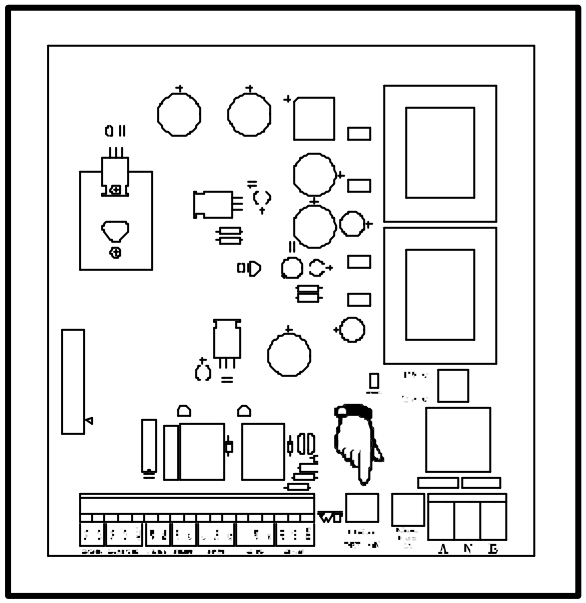


Figure 2-7
Mains ON/OFF Switch

To connect mains power to the instrument, proceed as follows.

(a) Verify local mains supply voltage (i.e. 120Vac or 240Vac) and set voltage selector switch to reflect this voltage. See Figure 2-5 opposite.

(b) Run power supply cable between the mains power source and the Model 400. Use cable of a suitable mains rating, for example, normal three core mains flex.

(c) Connect power supply cable to the terminal block, TB1, in accordance with the legends located immediately below. Terminal block TB1 is located directly below the mains voltage selector switch shown in Figure 2-5.

The active wire should be connected to the terminal labelled **A**, while the neutral wire is connected to the terminal marked **N**. The earth lead from the power cable is connected to the terminal labelled **E**. Figure 2-6 shows the mains supply terminal block, TB1.

(d) Check that the Mains ON/OFF switch is set to **OFF**. See Figure 2-7 opposite.

(e) Turn **ON** mains supply at the source.

(f) Turn **ON** the Mains ON/OFF switch. Check to see that the **+5v** indicator LED illuminates on the **Menu** Display located on the CPU card as shown in Figure 2-8.

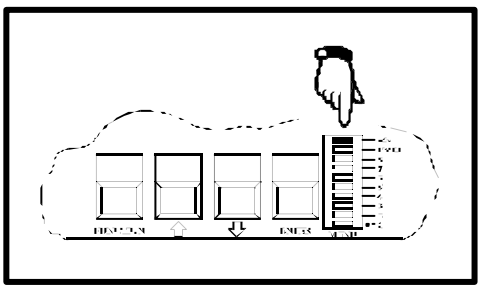


Figure 2-8
+5v Indicator LED on Menu Display

3.0 Setup and Calibration

The Model 400 offers to the user, a number of calibration and setup operations. These operations are designed to ensure instrument accuracy and provide the operator with the freedom to configure the device to suite their particular application. The information entered for each of these operations is stored within the instrument in non-volatile memory. This means that the data is retained indefinitely even with power removed.

3.1 Keypad Operation

All of the indicator functions offered, are configured using a simple four (4) key pad and basically follow the same programming sequence. This sequence is explained below:

- The operator first needs to select the function to be changed. This is done using the blue FUNCTION key. Each press of this key advances the Model 400 onto the next menu item.

- Once the desired function has been located using the FUNCTION key, the operator then presses the green ENTER key. This then allows the user to examine and/or change the selected function. After the ENTER key has been pressed, the display shows the current setting of the selected function. If no change to this setting is to be made, merely press the ENTER key again and the Model 400 will exit programming mode and return to normal level display mode.

- Once access has been gained to the desired function, its setting may be changed using the ↓ and ↑ keys. Most of the functions require numeric values to be entered, while others need ON/OFF or HIGH/LOW type responses. In the later instance, either ↑ or ↓ may be used to toggle between the two available options.

- When the display indicates the new function setting, press the green ENTER key to store the new value.

- If no further settings are to be altered, merely press the ENTER key once more. This will cause the instrument to exit its programming mode and return to its level display mode.

If, however, more functions are to be changed, press the FUNCTION key to select the next function and repeat the above process.

NOTE: The Model 400 is equipped with a key pad time out function. This means that once a key has been pressed, the operator has 120 seconds to press the next key. Failure to press a key within this period, results in the instrument automatically exiting the programming mode and returning to normal level display mode.

3.2 Calibrating the Model 400

There are a number of steps required to calibrate the Model 400. It is important that each of these steps be carried out correctly and in the right sequence. To simplify this process, the menu structure is designed to access each of the functions in the correct order. For first time users, it is recommended that the functions be programmed as they appear in the menu sequence. Once familiality has been gained with the Model 400, the steps may be performed in almost any order.

3.3 Entering Access Code

The Model 400 is equipped with a security feature which presents unauthorized access to the setup and calibration routines. To gain access to the setup routines, the operator must enter a particular two digit code between 1 and 99. Access will be denied until the correct access code has been entered. When first received, the Model 400 will have the security feature disabled, to activate the feature refer to Section 3.15 Changing the Access Code.

To enter the access code, proceed as follows:

(a) Press the **FUNCTION** key. Display should indicate

ENTER ACCESS CODE

(b) Press the **ENTER** key. The number "0" should appear in the bottom right hand corner of the display.

(c) Press the ⬆ and ⬇ keys to enter the correct access code.

(d) Once the correct code is displayed on the screen, press the **ENTER** key. If the correct code has been entered the display will read.

Access permitted Press FUNCTION

The operator can now access any of the menu functions.

If an incorrect code has been entered, the display will read

Access denied !! Press ENTER

If this should occur, press **ENTER** and repeat the above procedure, checking the access code before entering.

3.4 Turning LCD Backlight ON/OFF

The liquid crystal display is equipped with an integral backlight. This backlight increases the display's readability under low light conditions. It is recommended that the backlight be turned OFF if being used outside or under high ambient light levels.

The Model 400 also incorporates a contrast adjustment for the LCD. This adjustment can be used to increase the display's readability and is explained in Section 3.16 Adjusting the Liquid Crystal Display Contrast.

To turn the backlight on or off, proceed as follows:

(a) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(b) Press the **FUNCTION** key. The LCD should read

Backlight ON/OFF

(c) Press the **ENTER** key. The display should now indicate

Backlight status ON

NOTE: The above indication shows the current status of the backlight and therefore may show either ON/OFF.

(d) Use the ↑ or ↓ keys to toggle between the ON and OFF settings.

NOTE: The backlight will not toggle on and off as the ↑ and ↓ keys are pressed. It will remain in its current state until the new state has been entered.

(e) Once the desired backlight status has been selected, press the **ENTER** key. The backlight now adopts the new status.

(f) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

3.5 Selecting the Engineering Units

This instrument allows the operator to select the engineering units of the product to be monitored. The units available are as follows:

- Ounces
- Grams
- Pounds
- Kilograms
- Tons
- Tonnes
- Gallons
- Litres
- Percent

The units selected are purely for display and play no role in the instrument operation or calibration.

To select the desired engineering units, follow the below procedure:

(a) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(b) Press the **FUNCTION** key until the following prompt appears on the display.

Engineering units

(c) Press the **ENTER** key. The LCD should now read

Select units Kilograms

NOTE: The above screen, shows the current engineering units selected and therefore may indicate any of the above units.

(d) Use the ↑ and ↓ keys to scroll through the list of available units and identify the required setting.

(e) Once the desired engineering units have been located, press the **ENTER** key. The Model 400 will now adopt the new setting.

(f) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

NOTE: The selected units will be displayed using standard SI abbreviation !

3.6 Selecting Display Format

The Model 400 allows the user to select one of a number of different display formats. The formats available are three decimal places (0.000), two decimal places (00.00). one decimal place (000.0) or no decimal places (0000). All subsequent menu selections are presented using the selected format.

The formats available are purely for presentation and play no other part in the operation of the Model 400. For this reason it is important that the display format be selected **prior** to setting up and calibrating the instrument.

(a) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(b) Press the **FUNCTION** key until the following prompt appears on the display

Display Format

(c) Press the **ENTER** key. The LCD should now read

Select display format XXXX

NOTE: The above screen, shows the current display format and therefore may indicate any of the available formats.

(d) Use the ↑ and ↓ keys to scroll through the list of available display formats and identify the desired setting.

(e) Once the desired display format has been located, press the **ENTER** key. The Model 400 will now adopt the new setting.

(f) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

3.7 Entering the Vessel Capacity

The maximum storage capacity of the vessel being monitored, needs to be entered into the Model 400. This information is used to perform certain scaling calculations and also determines the upper limit for all subsequent function settings.

The value entered should reflect the capacity of the bin with respect to the engineering units nominated. For example, if kilograms are the selected units and the maximum bin level is 10,000 kilograms, then the vessel capacity should be set to 10,000, etc.

The vessel capacity may be entered as follows:

(a) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(b) Press the **FUNCTION** key until the following prompt appears on the display.

Vessel capacity

(b) Press the **ENTER** key. The display should now read

Enter capacity XXXX

NOTE: The above screen, shows the currently stored vessel capacity and therefore may indicate almost any value. The screen shown above is for illustration !

(c) Use the ↑ and ↓ keys to select the maximum capacity of the storage vessel.

(d) Once the LCD shows the desired capacity press the **ENTER** key. The Model 400 now recalculates using the amended capacity.

(e) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

3.8 Setting the Minimum Display Increment

This feature allows the operator to specify the size of the minimum display increment. This increment size also affects the resolution of the 4-20mA current transmitter and the setpoint operation.

The minimum increment size could be described as the maximum change in vessel level which can occur before a change can be detected on display. For example, if an increment size of 10kg is entered, then the display will register changes in bin level of 10kg or greater. Changes of less than 10kg will not be registered. This stops the display from flickering in the least significant digits.

The minimum increment can be set to any value between 1 and vessel capacity.

The increment size can be altered by following the below procedure.

(a) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(a) Press the **FUNCTION** key until the following prompt appears on the display.

Minimum increment

(b) Press the **ENTER** key. The display should now read

Enter increment XXXX

NOTE: The above screen, shows the currently stored minimum increment and therefore may indicate almost any value. The screen shown above is for illustration only!

(c) Use the ↑ and ↓ keys to select the minimum increment size required.

(d) Once the LCD shows the desired increment size, press the **ENTER** key. The instrument will now show the vessel level using the new minimum increment.

(e) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

3.9 Entering Averaging Factor

In some situations, the signal from the load cell may become "noisy". This noise may be due to either electrical interference or mechanical vibration. The effect of this noise is to cause the level display to fluctuate.

The averaging factor determines the number of input samples over which the vessel level is averaged before the display is updated. The effect of this averaging is to reduce the fluctuations and produce a more stable and accurate level measurement.,

The Model 400 takes about ten samples per second. Setting the averaging factor to ten, means that ten consecutive samples will be taken and a simple average taken. This "averaged" level is what is displayed. An averaging factor of ten, means that the level display will be updated once every second. A setting of twenty

means an update rate of once every two seconds, etc. the averaging factor may be set anywhere between 1 and 25.

The averaging factor may be set as follows:

(a) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(b) Press the **FUNCTION** key until the following prompt appears on the display.

Averaging factor

(c) Press the **ENTER** key. The display should now read.

Enter averaging factor XX

NOTE: The above screen, shows the currently stored averaging factor and therefore may indicate almost any value between 1 and 25. The screen shown above is for illustration only!

(d) Use the ↑ and ↓ keys to select the desired averaging factor.

(e) Once the LCD shows the desired setting, press the **ENTER** key. The Model 400 will now adopt the new averaging factor and filter the incoming load cell signal accordingly.

(f) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

3.10 Calibrating the System Zero and Span.

The performance of the Model 400 is dependent upon the accuracy with which the zero and span operations are carried out. These two procedures provide the Model 400 with two essential pieces of information. Firstly, the

zero setup operation is performed, ideally, when the storage vessel is empty. It tells the on board microprocessor, that the current load cell output corresponds to an empty vessel.

The second operation, called span, is performed ideally when the vessel is full. This routine informs the microprocessor that the current load cell output corresponds to a full vessel.

The microprocessor uses these two pieces of information to determine the equation of the line passing through these two points. The Model 400 then uses this line equation to convert between load cell output and current bin level.

It is essential that both zero and span procedures be carried out, although the sequence in which they are performed is largely irrelevant.

The most accurate method for carrying out the zero and span, is to use an empty and full bin, respectively. This is referred to as the Preferred Method and is detailed in Section 3.10.1 Zero and Span Calibration (preferred method).

A more convenient, but less accurate method, is to either add or remove a known quantity of material to or from the storage vessel. These two alternative procedures are explained in Section 3.10.2. Zero and Span Calibration (by adding a known quantity of material) and Section 3.10.3. Zero and Span Calibration by removing and known quantity of material).

3.10.1. Zero and Span Calibration

(preferred method)

This preferred method for setting the Zero and Span parameters, provides the highest level of accuracy but can only be performed if you are prepared to completely empty and fill the storage vessel.

3.10.1.1 Zero Calibration

Perform the Zero operation as follows:

(a) Turn **ON** the Model **400** mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) Ensure that the storage vessel is empty.

(c) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

NOTE: Ensure that the auto-zero function is turned OFF before carrying out either zero or span. The auto-zero should remain OFF until both the zero and span have been carried out!

(d) Press the blue **FUNCTION** key, until the display shows the following prompt

Zero setup

(e) Press the green **ENTER** key ONCE. This selects the zero setup menu function. The display should now read

Enter bin level XXXX

(f) Press and should down the black key. Keep the key depressed until the LCD shows a bin level of 0. Release the key.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(f) Press the green **ENTER** key ONCE. The microprocessor new reads the output of the load cell and relates this reading to an empty vessel condition. This completes the zero setup procedure.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the zero setup.

(g) If additional function settings are to be changed press the **FUNCTION** key to select the next function, otherwise press **ENTER** key again.

3.10.1.2 Span Calibration

Perform the Span operation as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) Ensure that the storage vessel is full

(c) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

NOTE: Ensure that the auto-zero function is turned OFF before carrying out either zero or span. The auto-zero should remain OFF until both the zero and span have been carried out!

(d) Press the blue **FUNCTION** key, until the display shows the following prompt.

Span setup

(e) Press the green **ENTER** key ONCE. This selects the Span setup menu function. The display should now read:

Enter bin level XXXX

(f) Press and hold down the red ⬆ key. Keep the key depressed until the LCD shows the maximum vessel capacity. The value entered here should coincide with the value entered in Section 3.7 Entering the Vessel Capacity. Release the key.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(g) Press the green **ENTER** key ONCE. The microprocessor now reads the output of the loadcell and relates this reading to a full vessel condition. This completes the Span setup procedure.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the span setup.

(h) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

3.10.2 Zero and Span Calibration

(by adding known quantity of material)

Ideally, the Zero and Span calibration should be performed with an empty and full bin respectively. This affords the greatest level of accuracy. However, should the emptying and filling of the storage vessel for calibration not prove convenient and your application does not require high accuracy, then the following calibration procedure may be adopted.

This method of calibration may be "fine tuned" at later date when the vessel does become empty or full through normal operation. This "tine tuning" will provide the same degree of accuracy as if the preferred calibration procedure in Section 3.10.1 had been followed.

Perform the Zero and Span procedures as detailed below:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access code.

NOTE: Ensure that the auto-zero function is turned OFF before carrying out either zero or span. The auto-zero should remain OFF until both the zero and span have been carried out!

(c) Press the blue **FUNCTION** key, until the display shows the following prompt

Zero setup

(d) Press the green **ENTER** key ONCE. This selects the Zero setup menu function. The display should now read

Enter bin level XXXX

(e) Estimate or measure the quantity of material currently contained in the storage vessel.

(f) Use the ⬆ and ⬇ keys to adjust the displayed level until it coincides with the level determined in step (e) above.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(g) Press the green **ENTER** key ONCE. The microprocessor now reads the output of the load cell and relates this reading to the present level of material in the bin.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the zero setup.

The following operation relates to the SPAN setting procedure and needs to be carried out before the Model 400 can provide meaningful bin level information.

(h) Add a known quantity of material to the vessel.Determine the new level of material in the bin by adding the quantity just put in to the level obtained in step (e) above.

NOTE: The amount of material added should be at least equal to 25% of the vessel capacity. This is necessary to obtain a reasonable level of accuracy.

(i) Press the blue **FUNCTION** key, until the display shows the prompt

Span setup

(j) Press the green **ENTER** and ONCE. This selects the Span setup menu function. The display should now read

Enter bin level XXXX

(k) Use the ⬆ and ⬇ keys to adjust the displayed level until it coincides with level determined in step (h) above.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(l) Press the green **ENTER** key ONCE. The microprocessor now reads the output of the load cell and relates this reading to the present level in the bin.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the span setup.

(m) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

This completes the Zero and Span calibration routine.

The information obtained by the microprocessor during the Zero and Span procedures, is now used to perform the internal calibration.

The Model 400 is now ready for use.

NOTE: The accuracy offered by the above procedure, can be increased by fine tuning. This fine tuning can be performed when the vessel becomes empty and / or full.

When the bin becomes empty, perform the Zero procedure detailed in Section 3.10.1.1. When the bin becomes full, perform the Span procedure detailed in Section 3.10.1.2. Maximum system accuracy is obtained by performing both of the above fine tuning routines.

If an error was made in estimating the bin level in step (e) above, this can be corrected by following the procedure explained in Section 3.13 Entering a Constant Offset.

3.10.3 Zero and Span Calibration

(by removing a known quantity of material)

Ideally, the Zero and Span calibration should be performed with an empty and full bin respectively. This affords the greatest level of accuracy. However, should the emptying and filling of the storage vessel for calibration not prove convenient and your

application does not require high accuracy, then the following calibration procedure may be adopted.

This method of calibration may be "fine tuned" at a later date when the vessel does became empty or full through normal operation. This "fine tuning" will provide the same degree of accuracy as if the preferred calibration procedure in Section 3.10.1 had been followed.

Perform the Zero and Span procedures as detailed below:

(a) Turn **ON** the Model 400 main switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

Note: Ensure that the auto-zero function is turned OFF before carrying out either zero or span. The auto-zero should remain OFF until both the zero and span have been carried out !

(c) Press the blue **FUNCTION** key, until the display shows the following prompt.

Span setup

(d) Press the green **ENTER** key ONCE. This selects the Span setup menu function. The display should now read

Enter bin level XXXX

(e) Estimate or measure the quantity of material currently contained in the storage vessel

(f) Use the ↑ and ↓ keys to adjust the displayed level until it coincides with the level determined in step (e) above.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(g) Press the green **ENTER** key ONCE. The microprocessor now reads the output of the load cell and relates this reading to the present level of material in the bin.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the span setup.

The following operation relates to the zero setting procedure and needs to be carried out before the Model 400 can provide meaningful bin level information.

(h) Remove a known quantity of material from the vessel. Determine the new level of material in the bin by subtracting the quantity just removed from the level obtained in step (e) above.

NOTE: The amount of material removed should be at least equal to 25% of the vessel capacity. This is necessary to obtain a reasonable level of accuracy.

(i) Press the blue **FUNCTION** key, until the display shows the prompt.

Zero setup

(j) Press the green **ENTER** key ONCE. This selects the Zero setup menu function. The display should now read

Enter bin level XXXX

(k) Use the ↑ and ↓ keys to adjust the displayed level until if coincides with the level determined in step (h) above.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(l) Press the green **ENTER** key ONCE. The microprocessor now reads the output of the load cell and relates this reading to the present level in the bin.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the zero setup.

(m) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

This complete the Zero and Span calibration routine.

The information obtained by the microprocessor during the zero and span procedure, is now used to perform the internal calibration.

The Model 400 is now ready for use.

NOTE: The accuracy offered by the above procedure, can be increased by fine tuning. This fine tuning can be performed when the vessel becomes empty and / or full.

When the bin becomes empty, perform the zero procedure detailed in Section 3.10.1.1. When the bin becomes full, perform the span procedure detailed in Section 3.10.1.2.

Maximum system accuracy is obtained by performing both of the above fine tuning routines

If an error was made in estimating the bin level in step (e) above, this can be corrected by following the procedure explained in Section 3.13 Entering a Constant Offset.

3.11 Programming the Setpoint Relays

The Model 400 offers two fully programmable setpoints as standard. These setpoints may be used to operate external equipment such as pump motors, alarm, etc. at pre-determined bin levels.

The setpoint procedures following, can be used for either setpoint relay. The two setpoint relays are identical, although there is no interaction between them.

Each setpoint relay requires the setting of three (3) separate parameters for correct operation. These parameters are the setpoint level at which the relay is to operate, the deadband which defines the hysteresis between when the relays turn on and off, and finally the polarity which determines the state of the relay above and below the setpoint.

It is strongly recommended that Section 2.4 Connecting the Setpoint Relays, be thoroughly read and understood before carrying out the following procedure.

3.11.1 Programming Setpoint Levels

This routine allows the operator to programme the level at which the setpoint relays will activate. As the setup for the setpoints is identical this routine may be used for either.

To programme the setpoint level, proceed as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt:

Setpoint #1

OR

Setpoint #2

(d) Press the green **ENTER** key ONCE. This selects the Setpoint #1/Setpoint #2 level setup menu function. The display should now read.

Enter SP # 1 Level XXXX

OR

Enter SP # 2 Level XXXX

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup date.

(f) Press the green **ENTER** key ONCE. The new setpoint level is now stored in memory.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the setpoint level.

(g) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

3.11.2 Programming Setpoint Relay Deadband

Each of the setpoint relays can be assigned hysteresis or deadband. This deadband defines the difference in level between when the setpoint relay turns on and when it turns off. This deadband is often used to eliminate setpoint relay chatter which may occur when very slow level changes occur at or about the setpoints. Also deadband could be used in some novel control applications. (e.g. hysteresis could be set to indicate when a particular quantity of material has been added/removed to/from the vessel).

This routine is identical for both setpoints.

The setpoint deadband can be setup using the following procedure:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt

Setpoint #1 deadband	OR	Setpoint #2 deadband

(d) Press the green **ENTER** key ONCE. This selects the Setpoint #1 / Setpoint #2 deadband setup menu function. The display should now read

Enter SP #1 deadband XXXX

OR

Enter SP #2 deadband XXXX

(e) Use the ⬆ and ⬇ keys to adjust the displayed level until it indicates the desired quantity of deadband.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(f) Press the green **ENTER** key ONCE. The new level of deadband is assigned to the designated setpoint.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the setpoint deadband.

(g) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

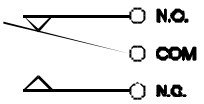
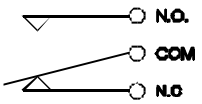
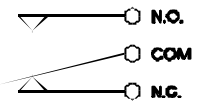
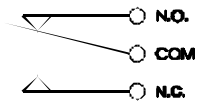
3.11.3 Setting Setpoint Relay Polarity

This facility allows the operator the flexibility to define the state of the setpoint relays above and below setpoint. The setpoint polarity feature is most often used to provide "fail-safe"operation of the relays.

For a more detailed discussion on fail-safe operation, refer to Section 2.4 Connecting the Setpoint Relays.

Each setpoint can have either of two polarity settings. HIGH and LOW. A HIGH polarity means that the setpoint relay will be de-energized if the level is at or below the setpoint. At levels at or above the (setpoint + deadband), the relay will be energized. A LOW polarity means that for levels at or below the setpoint, the relay will be energized. The relay will be de-energized for all levels at or above the (setpoint + deadband). Table 3-1 below illustrates the action of the setpoint relay polarity.

TABLE 3-1
Setpoint Relay Polarity Settings.

	POLARITY	
LEVEL	LOW	HIGH
At or below setpoint	ENERGIZED 	DE-ENERGIZED 
At or above (setpoint+deadband)	DE-ENERGIZED 	ENERGIZED 

To set the setpoint relay polarity, proceed as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code

(c) Press the blue **FUNCTION** key, until the display shows the following prompt:

Setpoint #1 polarity	OR	Setpoint #2 polarity

the event of a power failure or alike. Under these conditions, external equipment controlled by the setpoint relays, could be placed into a hazardous or undesirable state.

(a) Press the green **ENTER** key ONCE. This selects the Setpoint #1 / Setpoint #2 polarity setup menu function. The display should now read.

Select Setpoint #1 polarity LOW	OR	Select Setpoint #2 polarity LOW

(e) Use the ↑ or ↓ keys to toggle between the HIGH and LOW settings.

(f) Once the desired polarity has been selected, press the **ENTER** key. The Model 400 now adopts the setting change just made.

(g) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

3.12 Configuring the Auto-Zero Facility

The Model 400 is equipped, as standard with an auto-zero facility. This enables the Model 400 to automatically adjust the system "zero" to compensate for changes in the storage vessel "empty"condition.

These changes could be due to a number of reasons, namely, the addition/removal of equipment to/from the vessel, modifications to the vessel or perhaps the most common is the build up of material on the exterior of the vessel. All of these occurrences can lead to erroneous bin level indications.

The auto-zero function works by sensing when the bin level has dropped below a user defined threshold. Should the bin level then remain static for a period of time, the Model 400 assumes that this now represents the new "empty" condition and removes any remaining offset. This operation is performed whenever the level in the storage vessel drops below the programmed threshold. The auto-zero function may be disabled at any time.

The Model 400 permits the entry of a maximum correction parameter. When the accumulated offset correction exceeds this parameter, the instrument activates the fault relay and displays the fault condition on the LCD and Menu display. The instrument will continue

To provide bin level information when in this condition. This facility alerts the operator to the fact that the auto-zero function has accumulated a sizable offset. While this does not necessarily indicate a system fault, it does highlight a situation which warrants further investigation. This fault condition requires manual resetting.

3.12.1 Turning the Auto-Zero Function ON/OFF

It should be emphasised here, that the auto-zero facility is of no benefit in a large number of applications and may in fact prove to be a hindrance. For those applications, it is strongly recommended that the auto-zero function be turned OFF.

The auto-zero facility provides maximum benefit to those application where high accuracy is required and the weight of the empty storage vessel is prone to change due to build up of inaccessible material in or on the storage vessel.

The auto-zero function may be turned ON/OFF using the following procedure:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following.

Auto-Zero ON/OFF

(d) Press the green **ENTER** key ONCE. This selects the Auto-Zero ON/OFF menu function. The display should now read.

Auto-Zero Status OFF

(e) Use the ↑ or ↓ keys to toggle between the ON and OFF settings.

(f) Once the desired setting has been selected, press the **ENTER** key. The Model 400 now adopts the new auto-zero status.

(g) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press **ENTER** again.

3.12.2 Setting the Auto-Zero Threshold

The Auto-Zero threshold is a user defined level at which the auto-zero function becomes active. This threshold is usually set to a very low level, but the actual setting varies between different applications and may require an element of trial and error to arrive at the optimum setting.

To alter the auto-zero threshold proceed as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt

Auto-Zero Threshold

(d) Press the green **ENTER** key ONCE. This selects the Auto-Zero threshold adjust menu function. The display should now read.

Enter threshold XXXX

(e) Use the ↑ and ↓ keys to adjust the displayed level until it indicates the desired threshold level.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(c) Press the green **ENTER** key ONCE. The new Auto-Zero threshold is now stored in memory.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the threshold level.

(d) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise pressed the **ENTER** key again.

3.12.3 Setting the Auto-Zero Maximum Correction Parameter

The auto-zero function keeps a record of how far the present zero has deviated from the original zero which was determined during the Zero and Span calibrations. Under normal circumstances, this deviation or correction is quite small, however, under certain situations this correction may become quite sizable. While a large correction does not necessarily indicate a fault condition, it does highlight a condition which warrants further investigation. The auto-zero maximum correction parameter allows the user to programme into the Model 400, what is considered to be the maximum allowable deviation before an investigation is warranted. This Auto-Zero fault, while providing an indication of a possible problem, could also highlight an auto-zero threshold which is set too high.

The auto-zero maximum correction parameter can be set by performing the following routine.

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt.

Auto-Zero
Max. Correction

(d) Press the green **ENTER** key ONCE. This selects the auto-zero maximum correction setup menu function. The display should now read

Enter Maximum
Correct XXXX

(e) Use the ⬆ and ⬇ keys to adjust the displayed level until it indicates the desired maximum correction level.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(f) Press the green **ENTER** key ONCE. The new auto-zero maximum correction level is now stored in memory.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the maximum correction.

(g) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

3.12.4 Resetting the Auto-Zero Fault Condition

An auto-zero fault occurs when the accumulated auto-zero offset exceeds the maximum user defined correction enter in Section 3.12.3. The fault condition can be identified by the letters AZ appearing in the upper left-hand corner of the LCD. The Model 400 will continue to provide level information while in this fault condition.

The resetting of the auto-zero fault, requires the operator to reduce the accumulated correction to zero or at least to a level below the maximum correction.

Once an auto-zero fault has occurred, it is recommended that the bin be examined to try and ascertain if a problem exists. Look for an excessive build-up of material on the storage vessel, or any other reason as to why the empty vessel weight should have changed by an amount equal to or greater than the auto-zero maximum correction. Also check to see if the auto-zero threshold has been set too high.

If the fault is found to be due to conditions which are likely to be ongoing such as, modifications to the vessel or product build-up which can not be removed, it is recommended that the auto-zero fault be reset to zero and the system zero span be recalibrated. This procedure allows the Model 400 to establish the new "empty vessel" condition and clear the auto-zero fault.

If the fault is due to removable product build-up, remove **ALL** off the product and reset the auto-zero fault to zero. It is not necessary to recalibrate the zero and span.

To reset the auto-zero fault, proceed as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt.

Auto-Zero fault reset

(d) Press the green **ENTER** key ONCE. This selects the auto-zero fault reset menu function. The display should now read.

Reset Auto-Zero fault XXXX

NOTE: The value display on this screen, represents the correction accumulated thus far by the auto-zero function.

(e) Use the ↓ key to reduce the auto-zero correction by the desired amount. In most cases this correction should be set to zero.

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(f) Press the green **ENTER** key ONCE. The new auto-zero correction value will be stored in memory.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing that auto-zero correction.

(g) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

NOTE: After returning to normal level monitoring mode, the letters AZ should have disappeared from the display.

3.13 Entering a Constant Offset

The Model 400 allows the operator to enter an offset into the level calculations. This offset can be used to correct any constant level errors which appear over the entire range. for example, if the level indication is found to under read by 100kgs over the entire range, then an offset of 100kgs can be added to all bin levels before being displayed. The offset may be added to or subtracted form the bin level.

This feature is particularly useful when errors are made in the estimation of material level during the Zero and Span calibrations. (see Section 3.10.2 and 3.10.3). Also, if the "empty vessel" weight changes due to the addition/removal of equipment to / from the vessel, an offset can be entered equal to the weight of the added/removed equipment. This feature allows the accuracy of the system to be maintained quickly and easily.

A constant offset may be entered into the Model 400 by following the below procedure:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the menu

display should illuminate and the **LCD** should become active.

b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt

OFFSET ADJUST

(d) Press the green **ENTER** key ONCE. This selects the offset adjustment menu function. The display should now read

Enter offset add XXXX

(e) Use the ↑ and ↓ keys to enter the desired offset. For example, if the instrument is under reading by 100kgs, set the offset to "add 100". If the instrument is over reading by 100kgs, set the offset to "subtract 100".

NOTE: Either of the arrow keys must be pressed at least once before the Model 400 will accept the new setup data.

(f) Press the green **ENTER** key ONCE. The entered offset will be stored in memory and included in all future level calculations.

NOTE: If neither of the arrow keys have been pressed, the Model 400 will exit the function at this point without changing the offset.

(g) If additional function settings are to be changed, press the **FUNCTION** key to select the next function, otherwise press the **ENTER** key again.

NOTE: After returning to normal level monitoring mode, the display level should have shifted by the size of the offset just entered.

3.14 Calibrating the 4-20mA Current Transmitter

The current transmitter incorporated into the Model 400, can be calibrated or "aligned" with the connected external equipment. Normally, a 4mA current transmitter output would correspond to a zero level indication on the external equipment and a 20mA output would produce a full bin indication. Occasionally, a mismatch occurs between the Model 400 and the equipment connected to it. This mismatch may be due to any number of causes but usually results from component tolerancing or differences in equipment calibration. This feature of the Model 400 ensures the same level of accuracy under all of these circumstances.

Two separate procedures are detailed below, one for the 4mA adjustment and one for the 20mA adjustment. The two adjustment are **not** interactive.

The 4mA adjustment routine, sets the input to the current transmitter to zero therby producing a current of 4mA out to the external equipment. A calibration potentiometer on the level indicator is adjusted until the connected equipment registers an empty vessel level. A similar process is carried out for a 20mA adjustment except the input to the current transmitter is set to full scaled producing a 20mA output current. An adjustment is made to ensure a full vessel indication on the external equipment. After calibration, the level displayed on the external equipment should match the level displayed on the Model 400.

3.14.1 Calibrating the 4mA Current Transmitter Output

To calibrate or align the 4mA current transmitter output proceed as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(b) Press the blue **FUNCTION** key, until the display shows the following prompt

4mA Calibration

(c) Press the green **ENTER** key ONCE. This selects the 4mA calibration menu function. The display should now read.

Calibration 4mA Output now

The current transmitter output should now be approximately 4mA.

(d) Locate the 4mA adjust. potentiometer on CPU board and adjust until the external equipment indicates a zero level (i.e.empty vessel)

NOTE: The automatic key pad time out function, will cause the Model 400 to exit the above function if no key is pressed for two minutes. To prevent this occurring during the current transmitter calibration, simply press the ↑ *and* ↓ *keys from time to time to reset the internal timer.*

If the automatic time out should activate, merely repeat the above procedure.

(f) Press the green **ENTER** key. The current transmitter output should now reflect the present level of material in the bin. The Model 400 will exit programming mode and return to normal level display mode.

3.14.2 Calibrating the 20mA Current Transmitter Output

To calibrate or align the 20mA current transmitter output proceed as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Enter Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt.

20mA Calibration

(d) Press the green **ENTER** key ONCE. This selects the 20mA calibration menu function.

The display should now read

Calibrate output	20mA now

The current transmitter output should now be approximately 20mA.

(e) Locate the 20mA adjust. potentiometer on the CPU card and adjust until the external equipment indicates a 100% level (i.e. full vessel)

NOTE: The automatic key pad time out function, will cause the Model 400 to exit the above function if no key is pressed for two minutes. To prevent this occurring during the current transmitter calibration, simply press the ↑ and ↓ keys from time to time to reset the internal timer.
If the automatic time out should activate, merely repeat the above procedure.

(f) Press the green **ENTER** key. The current transmitter output should now reflect the present level of material in the bin. The Model 400 will exit programming mode and return to normal level display mode.

3.15 Changing the Access Code

A security feature has been incorporated into the Model 400 to prevent unauthorised access to the setup and calibration routines.

The access code can be set to any number between 0 and 99 . If the access code is set to 0, the security feature will be disabled and no access code will be required to change the setup and calibration parameters.

To change the current access code, proceed as follows:

(a) Turn **ON** the Model 400 mains switch. The **+5V** indicator **LED** on the Menu display should illuminate and the **LCD** should become active.

(b) If the security feature has been enabled, carry out the procedure detailed in Section 3.3 Entering Access Code.

(c) Press the blue **FUNCTION** key, until the display shows the following prompt.

Change Access Code

(d) Press the green **ENTER** key ONCE. This selects the change access code menu function. The display should now read.

Enter New Access Code XXXX

NOTE: The numeric value shown on this screen is the current access code.

(e) Use the ↑ and ↓ keys to adjust the displayed code until the desired value is reached.

NOTE: Setting the access code to 0 will disable the security feature.

(f) Press the green **ENTER** key ONCE. The new access code is stored in memory.

(g) If additional function settings are to be changed, press the **FUNCTION** keys to select the next function, otherwise press the **ENTER** key again.

following procdures allows the user to nominate a preferred access code.

3.16 Adjusting the Liquid Crystal Display Contrast

The LCD of the Model 400 has a contrast adjustment to improve the display readability. The adjustment potentiometer is located just below the LCD itself. Adjust the CONTRAST potentiometer to obtain the best display visibility.

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Product Specifications

Enclosure

NEMA 4X Fibreglass

Dimensions ..... 267 x 216 x 158 mm.
Mounting ..... Suitable for wall mounting only.
Shipping Weight .....

Power Requirements

Mains Supply* ..... 240V AC 10%, 50-60 Hz.
..... 117V AC 10%, 50-60 Hz.
* Mains supply voltage is switch selectable.

Load Cell Excitation

Voltage ..... 10 volts DC, fixed.
Current ..... 200mA, internally limited.

Load Cell Input

Range ..... -1 to +1 volt.
Resolution ..... 20 bits.
Type ..... Will accept both full-bridge and
..... half-bridge type load cells.

Display

LCD with LED backlighting

Analogue Output

4-20mA current transmitter .... Fully isolated, internal loop supply
.. 800 ohm max. loop resistance.

Setpoint Relay Outputs

Quantity ..... two, identical.
Programmable range 0 - 100%.
Contact rating ..... 240V AC @ 5A, resistive.
..... 30V DC @ 10A, resistive.

Status Relay Output

Contact rating ..... 20V DC @ 0.5A, resistive.

Environmental

Temperature..... -10^{o}C to 50^{o}C, when operated