SC-WEI

Weighing Controller

This intelligent weighing controller accepts input directly from a 4-wire or a 6-wire strain gauge.

The SC–WEI has a number of advanced functions designed specifically for the weighing industry, and is simple to set up and operate. It also features output and input isolation, eliminating the need for any special consideration when interfacing to analog/serial inputs, or PCs/PLCs/HMIs.

Order Codes

SC–WEI100 Strain gauge input + 2 relays

–HV	85–265V AC / 95–370V DC
–LV	15–48V AC / 10–72V DC

Options

-A	1 x mA/V analog output
-S2S	1 x RS232 (screw terminal)
-S4S	1 x RS485 (screw terminal)

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1 SPECIFICATIONS

Input 4/6-wire strain gauge, 1–5mV/V

Power supply HV (85–265V AC/95–370V DC) **or** LV (15–48V AC/10–72V DC)

Relay output 2 x 5A Form A relays

Analog output 1 x isolated 16 bit analog output, 4–20mA or 0–10V. Can be wired for either current or voltage. Fully scalable. Window programmable over any range within the controller's full-scale range. *OPTIONAL*

Serial port Isolated RS232 or RS485 (screw terminals) Output mode: Custom ASCII, Modbus RTU slave, Gedge, Ranger A (5 updates/sec) or Print. Data rate: 300–38400 baud. Parity: Odd, even or none. *OPTIONAL*

Max power 5W, fully optioned, 8 loadcells

Excitation 5V DC excitation supplied (powers up to 8 x 350Ω loadcells)

Sampling rate Up to 60Hz

Resolution 18 bit

Accuracy 0.005% of reading

Temperature drift Typically 3ppm/°C

Factory calibrated for 0–10,000 counts (2mV/V sensor gain at full scale). Features 2 cal sets, enabling the user to save and restore a previous calibration.

Security Calibration and setpoint functions have independent security code access

2 FEATURES

2.1 - Batching

To access batching features, the controller's **Mode** must be set to **Batch** (see 5.2F). It is then possible to perform the following functions from the [P] button or rear input pins:

Batch	This function is used to display the live weight of the system but take regular 'batches' of product without continually changing the setpoint. When the *Batch* function is activated the display will tare and SP 1 and SP 2 will turn on.
Batch Reset	Resets the batch value to zero and halts any current batching operations.
Batch Pause	Pauses the batching process and holds the current batched weight on the display.
Batch Resume	Resumes the batching process after it has been paused, or if power was lost during a previous batch.

See 5.2H–K and Appendix A for instructions on setting up and operating these features.

2.1A - Gain in Weight (GIW) Batching Direction

The **Batching Direction** parameter is set in 5.2G, and should be set to **GIW** (Gain in Weight) for applications where the weight increases as product is added to the weighing system.

*E.g. Setting a setpoint value of 50Kg for SP 1 and 45Kg for SP 2 and enabling **GIW** batching will allow the user to fill a container to 50Kg, with a potential speed change at 45Kg. (See 2.1C for an alternative method of setting up SP 2.)*

*The cycle is initiated when the **Batch** function is triggered. The display will tare, and when 45Kg net weight is shown, SP 2 will drop out. As product continues to feed, at 50Kg SP 1 will drop out, halting the fill.*

*If one of the display rows is configured to show **Live** (see 5.3B–C), it will now show the gross weight (I.e. Now 1050Kg, if the starting gross weight was 1000Kg). The user can then trigger the **Batch** function again to call another 50Kg batch.*

2.1B - Loss in Weight (LIW) Batching Direction

The **Batching Direction** parameter is set in 5.2G, and should be set to **LIW** (Loss in Weight) for applications where the weight decreases as product is removed from the weighing system.

*E.g. Setting a setpoint value of 50Kg for SP 1 and 45Kg for SP 2 and enabling **LIW** batching will allow the user to fill a container to 50Kg, with a potential speed change at 45Kg. (See 2.1C for an alternative method of setting up SP 2.)*

*The cycle is initiated when the **Batch** function is triggered. The display will tare, and when 45Kg net weight is discharged, SP 2 will drop out. As product continues to be discharged, at 50Kg SP 1 will drop out, halting the product flow.*

*If one of the display rows is configured to show **Live** (see 5.3B–C), it will now show the gross weight (I.e. Now 950Kg, if the starting gross weight was 1000Kg). The user can then trigger the **Batch** function again to call another 50Kg batch.*

*In this mode if there is not enough product to drop a batch, then the instrument will advise the operator by showing the message **Low Product**. If gross > SP 1, the **Batch Value** is reset to zero and the display flashes **Batch**. SP 1 is turned on (and SP 2 if set up). If gross < SP 1, batching is not started.*

2.1C - Setpoint Tracking

In applications where the batch weight is continuously being changed, it is possible to configure SP 2 so that it tracks SP 1, and always turns off at a fixed amount below the required batch weight.

*E.g. If your initial batch weight was 100Kgs and you wanted SP 2 to turn off 5Kgs before it reached the batch weight, you would set up the SP 1 value for 100Kgs and the SP 2 value for -5Kgs, and set the **Trail SP 1** option to **On** (see 6.2D).*

This would cause SP 2 to turn off at 95Kgs (i.e. 100Kgs - 5Kgs). Then if you wanted the next batch weight to be 200Kgs, you only need to change SP 1 to 200Kgs, and without altering SP 2 it will now turn off at 195Kgs (200Kgs - 5Kgs).

2.2 - Input signal averaging

This controller has input signal averaging (see 5.6), to reduce noise and optimise stable measurement. If your input signal contains large noise spikes, you can increase the size of the **Averaging Window** to ensure that these are still averaged. If the change in input exceeds the **Averaging Window** value it will not average, ensuring fast response when there are large differences between readings.

Note that increasing the window size too far will reduce the ability of the controller to respond quickly to real changes in input signal.

2.3 - Tare

To access tare features, the controller's **Mode** must be set to **Normal** (see 5.2F). It is then possible to **Tare/Reset Tare** from the P button or rear input pins:

Tare	This feature 'zeroes' the display, and is usually used to deduct the weight of the container from the total weight, leaving only the weight of the product.
Tare Reset	This feature clears the current tare value and shows the gross weight on the display.

See 5.2H–K and Appendix A for instructions on setting up and operating these features.

2.4 - Zero maintenance

The **Zero Maintenance** feature is used to automatically compensate for slow drift in loadcell output due to factors such as temperature change, rain and dust accumulation over time.

When **Auto Zero** is enabled (see 5.5B), the controller display will zero automatically if changes to the loadcell are within the user specified **Capture Band**, **Motion Band** and **Zero Band** parameters (see 5.5C–E):

Capture Band (5.5C)	This is the maximum number of display counts that the controller will automatically zero within. The **Capture Band** is referenced to the current zero value. If the input value on the load cell is not within the **Capture Band** setting then the controller displays the current loadcell value and does not zero. *Capture Band can be set from 1 to 254 counts, and should always be set to less than the smallest weight to be measured. Setting the Capture Band to 0 will turn the auto zero feature off.*
Motion Band (5.5D)	This provides a rate of change limit setting, to determine the number of counts/second allowed within the **Capture Band**. If the count change is within the **Capture Band**, but the speed of the count change is more than the selected **Motion Band**, then the controller displays the current loadcell value and does not zero. *The Motion Band can be set from 0 to 255 counts. Typical value is 1 or 2 counts/sec.*
Zero Band (5.5E)	This provides a limit for the number of counts of zero offset allowed to accumulate, relative to the calibrated zero setting. If the accumulated zero offset becomes greater than this window, then the controller displays the current loadcell value and does not zero. *The suggested limit for the Zero Band is 2% of the calibrated span. If the controller fails to zero, check for mechanical or electrical faults.*

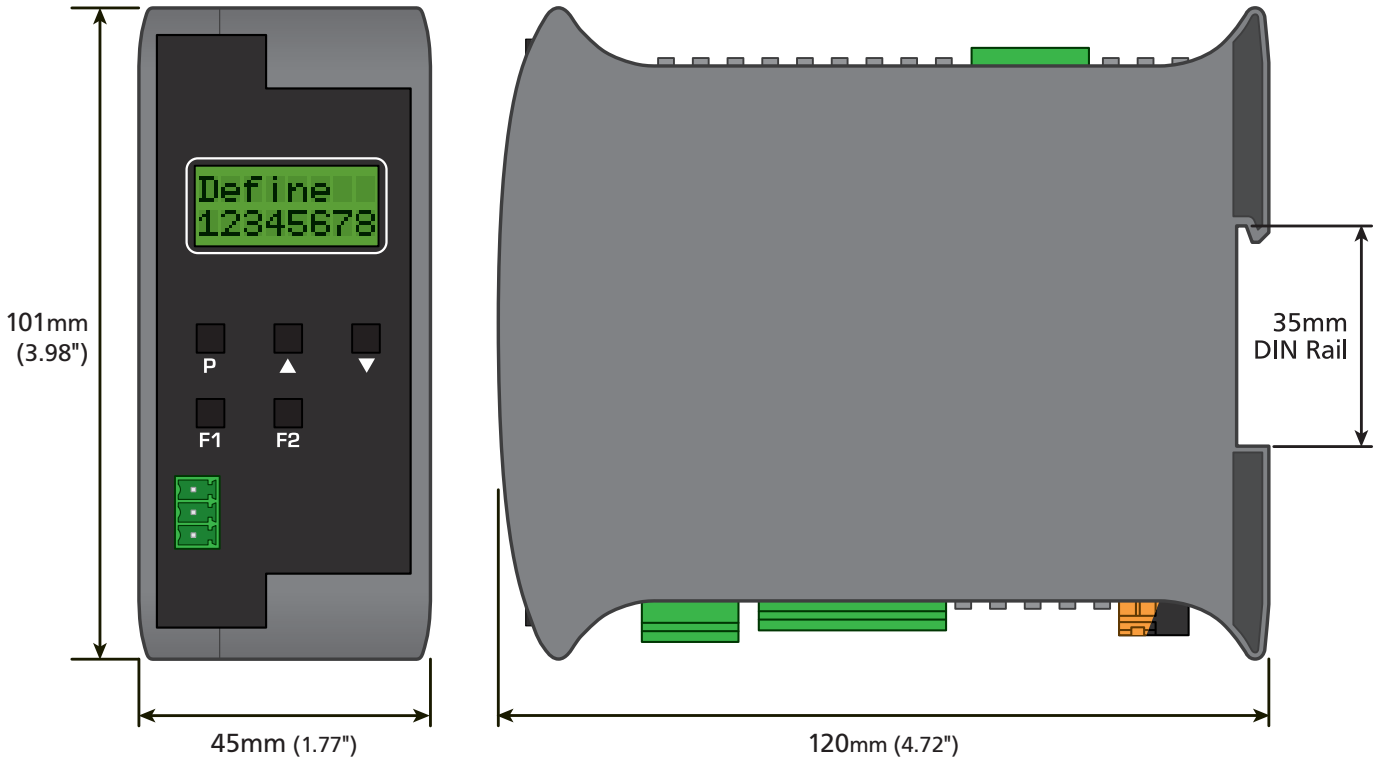
3 CASING & DISPLAY

3.1 - Case dimensions

Dimensions (H x W x D) 101 x 45 x 120mm (3.98 x 1.77 x 4.72").
When calculating space requirements, please allow 30–50mm (1.2–2.0") clearance above and below the unit for connectors and wiring.

DIN rail 35mm DIN rail mountable (rail not included)

Display 2 rows of 8 digits, 8mm (0.3") upper and lower case alphanumeric



3.2 - Front panel

F1 This button is used to access the **Input Setup & Calibration** menu (Section 5) and the **Factory Analog Output Calibration** menu (Section 9).

P This button is used to save your settings and advance to the next step in the setup process. The function of a single keypress of this button from the operational display can be user programmed (see 5.2H).

This button is typically used to scroll through options or increase values in the setup menu. Pressing this button from the main display will allow you to view/reset the *Peak* value, and view the raw input value (see 3.3).

This button is typically used to scroll through options or decrease values in the setup menu. Pressing this button from the main display will allow you to view/reset the *Valley* value (see 3.3).

F2 This button is used to access the **Setpoint Setup** menu (Section 6) and the **Setpoint Direct Access** menu (Section 7).

The front panel also features a 3-pin screw terminal which is active for models with serial output installed. For models without serial output, this terminal is inactive.

3.3 - Up and down button shortcuts

Pressing the ↑ and ↓ buttons from the main display allows instant access to a number of values held in the controller's memory. These variables will appear in the order shown below, and will cycle continuously at each press of the ↑ or ↓ button.

Press P to return to the main display. **Peak**/**Valley** may be reset to zero by pressing the ↑ and ↓ buttons **at the same time** while the variable is being displayed.

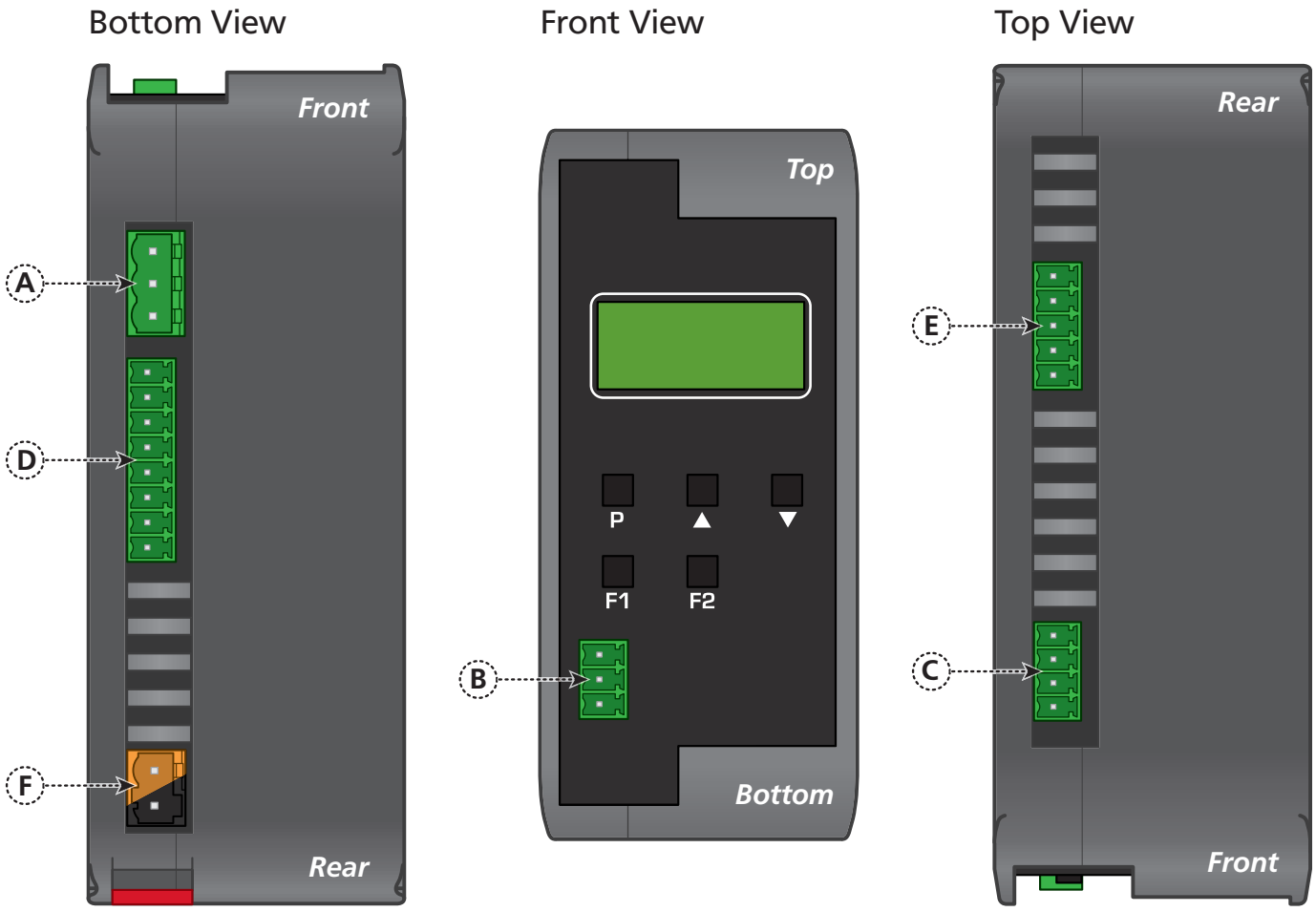
Up and down button shortcuts

↑	**Peak**	The maximum measured weight since the instrument was turned on or reset
	Raw IP	The current raw value of the input signal in mV
↓	**Valley**	The minimum measured weight since the instrument was turned on or reset

4 WIRING

BEFORE YOU BEGIN WIRING, ensure that the unit is switched off and the power supply is disconnected.

4.1 - Pinouts



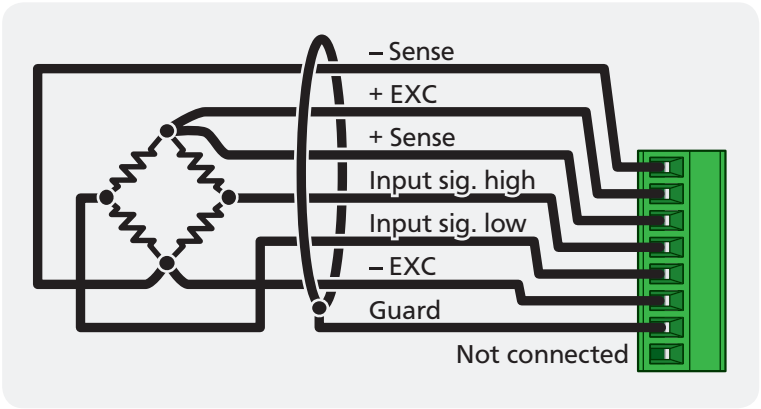
Key

4.1A	2 x Relay Output (4.3)	**4.1B**	Serial Port (4.5)
4.1C	Analog Output (4.4)	**4.1D**	Analog Input Module (4.2)
4.1E	Function Pins (4.6)	**4.1F**	Power supply HV/LV (4.7)

4.2 - Wire the strain gauge input module

Wire your loadcell input module as shown in the diagram. This input module is pre-calibrated for 0–10,000 counts full scale with a 2.000mV/V load cell sensor.

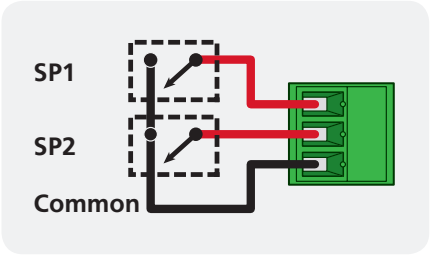
See 4.1D



4.3 - Wire the relay outputs

Wire the relay outputs as shown. Your controller has two 5A form A relays and two setpoints. These can be individually programmed to operate within the total span range of the controller.

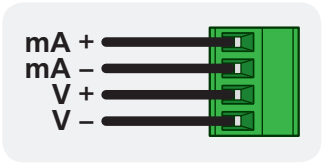
See 4.1A



4.4 - Wire the analog output (if installed)

If your controller has analog output fitted, wire it as shown for either voltage (0-10V) or current (4-20mA).

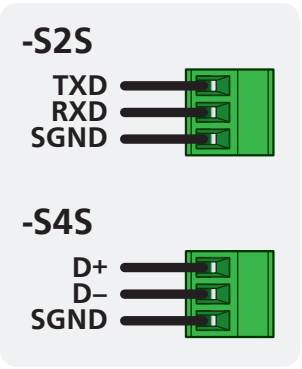
See 4.1C



4.5 - Wire the serial port (if active)

If you ordered an S2S or S4S, then the serial terminal on the front of your controller is active and can be wired as shown. **NB: Models without serial output will have an inactive serial terminal installed on the front panel.**

See 4.1B

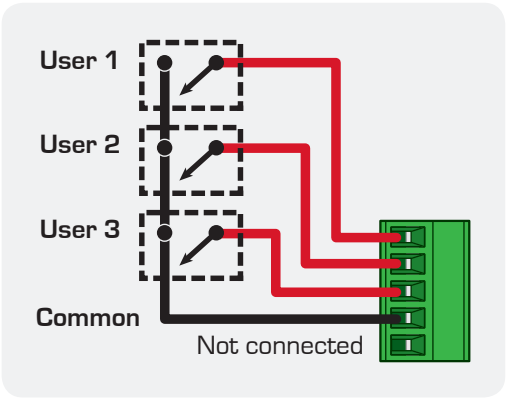


4.6 - Wire the function pins

Connect external switches to enable a function to be executed when its switch is activated.

Pin functions are user configurable, and can be set up in 5.2I–K.

See 4.1E and *Appendix A*



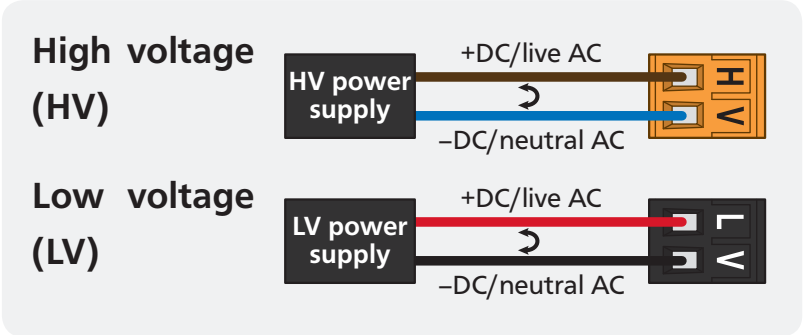
4.7 - Wire the power supply

NEVER connect your low voltage controller to mains power.

Wire your controller for low or high voltage power supply, as show in the diagrams below. Check the label on the unit against the colour of the connector:

- **Orange** = High voltage (85-265V AC, 95-370V DC)
- **Black** = Low voltage (15-48V AC, 10-72V DC)

See 4.1F



Once you have completed the wiring process it is safe to switch on your power supply. Ensure that your display is functioning before you proceed.

5 INPUT SETUP & CALIBRATION

5.1 - Enter F1 PIN number

A Enter the calibration mode by pressing the F1 button.

_ _ _ ENTER F1 PIN scrolls across the bottom row and **0** appears in the top row. Use the ↑ and ↓ buttons to enter your security code (factory default 1). Then press P. If the correct PIN is entered, setup is started at 5.2.

If an incorrect PIN number is entered, **_ _ _ ACCESS DENIED** scrolls across the display and it returns to normal operating mode.

You will have the opportunity to change your PIN number at the end of this section (5.10). If you have forgotten your PIN number, see Section 8.

5.2 - Input setup

A **_ _ _ INPUT SETUP** scrolls across the bottom row and **Skip** appears in the top row. Press P to skip to 5.3, or the ↑ button and then P to **Enter** input setup.

B **_ _ _ SUPPLY REJECTION FREQUENCY** scrolls across the display. Use the ↑ and ↓ buttons to select **50Hz** or **60Hz**, and then press P.

C **_ _ _ SAMPLING RATE** scrolls across the bottom row and the current sampling rate appears in the top row. Use the ↑ and ↓ buttons to select an option from the following list: **1Hz**, **2Hz**, **5Hz**, **10Hz**, or **50Hz/60Hz** (50 or 60Hz will depend on your selection in 5.2B above). Then press P.

D **_ _ _ DECIMAL POINT POSITION** scrolls across the bottom row and the current selection appears in the top row. Use the ↑ and ↓ buttons to select **No DP** (default), **0.0**, **0.00**, **0.000** or **0.0000**, and then press P to accept and continue.

E **_ _ _ ROUNDING** scrolls across the bottom row and the current display rounding appears in the top row. Using the ↑ and ↓ buttons, select: **None** (default), **2**, **5**, **10**, **20**, **50**, **100**, **200**, **500**, or **1000**. Then press P.

*Rounding is quoted in display counts and is not influenced by decimal point position. For example, if your input signal is 5.3, the display will show: 5.3 (for rounding=**None**), 5.4 (for rounding=**2**), 5.5 (for rounding=**5**), 5.0 (for rounding=**10**), etc.*

F **_ _ _ MODE** scrolls across the bottom row and the current weighing mode appears in the top row. Use the ⬆ and ⬇ buttons to select **Normal** (default) or **Batch**, and then press P.

➡ If you selected **Normal**, skip to 5.2H now.

➡ If you selected **Batch**, continue to 5.2G now.

*In **Normal** (default) mode the controller displays the gross or net weight on the display, and does not perform any batch calculations. In **Batch** mode the controller displays batch or gross weight, and SP 1 and SP 2 function as dedicated batch control setpoints (see 2.1).*

G **_ _ _ BATCHING DIRECTION** scrolls across the bottom row and the current direction appears in the top row. Use the ⬆ and ⬇ buttons to select either: **LIW** (loss in weight, for emptying operations) or **GIW** (gain in weight, for filling operations). Then press P.

See Section 2.1 for additional information.

For 5.2H–K, please refer to the list of input functions in Appendix A.

H **_ _ _ PROG BUTTON** scrolls across the bottom row and the current selection appears in the top row. Referring to the table in Appendix A, use the ⬆ and ⬇ buttons to select a function to be performed when the P button is pressed: **Hold**, **Tare**[1], **Batch**[2], **Zero**, **Peak**, **Peak Rst** or **Print**. Then press P.

I **_ _ _ USER INPUT1** scrolls across the bottom row and the current selection appears in the top row. This controls the function that will be performed when the User 1 input pin (see 4.6) is activated. Referring to the table in Appendix A, use the ⬆ and ⬇ buttons to select: **Lock**, **Tare**[1], **Batch**[2], **Zero**, **Peak**, **Peak Rst**, **Print**, **Gross**, **Start**[2] or **Stop**[2]. Then press P.

J **_ _ _ USER INPUT2** scrolls across the bottom row and the current selection appears in the top row. This controls the function that will be performed when the User 2 input pin (see 4.6) is activated. Referring to the table in Appendix A, use the ⬆ and ⬇ buttons to select: **Hold**, **Tare**[1], **Batch**[2], **Zero**, **Peak**, **Peak Rst**, **Print**, **Gross**, **Start**[2] or **Stop**[2]. Then press P.

K **_ _ _ USER INPUT3** scrolls across the bottom row and the current selection appears in the top row. This controls the function that will be performed when the User 3 input pin (see 4.6) is activated. Referring to the table in Appendix A, use the ⬆ and ⬇ buttons to select: **Tare**[1], **Batch**[2], **Zero**, **Peak**, **Peak Rst**, **Print**, **Gross**, **Start**[2] or **Stop**[2]. Then press P.

[1] **Tare** feature is only available when the *Mode* is set to **Normal** (see 5.2F).
[2] **Batch**, **Start** and **Stop** features are only available when the *Mode* is set to **Batch** (see 5.2F).

5.3 - Display setup

Note that where **Net**/**Batch** is indicated, the option that will be displayed is controlled by the weighing mode selected in 5.2F. **Normal** mode = **Net**, **Batch** mode = **Batch**.

A **_ _ _ DISPLAY SETUP** scrolls across the bottom row and **Skip** appears in the top row. Press P to skip to 5.4, or the ⬆ button and then P to **Enter** display setup.

B **_ _ _ LINE 1 DISPLAY SOURCE** scrolls across the bottom row, and the currently selected line 1 (top row) display source appears. Use the ⬆ and ⬇ buttons to select: **Net**/**Batch** or **Live**, and then press P.

C **_ _ _ LINE 2 DISPLAY SOURCE** scrolls across the bottom row, and the currently selected line 2 (bottom row) display source appears. Use the ⬆ and ⬇ buttons to select: **Off**, **Net**/**Batch** or **Live**, and then press P.

5.4 - Calibration

This unit has been pre-calibrated for 0–10,000 counts (2mV/V sensor gain at full scale).

A **_ _ _ CALIBRATION TECHNIQUE** scrolls across the bottom row and **Skip** appears in the top row. Press P to skip to 5.5, or use the ⬆ and ⬇ buttons to select: **Auto**, **mV/V**, **Zero**, **E_Cal**, or **Cal Set**. Then press P.

- ➡ If you selected **Auto**, complete steps 5.4B–F now.
- ➡ If you selected **mV/V**, complete steps 5.4G–I now.

➡ If you selected **Zero**, complete step 5.4J now.

➡ If you selected **E_Cal**, complete steps 5.4K–L now.

➡ If you selected **Cal Set**, complete steps 5.4M–N now.

Auto *calibration uses zero and span values to calculate the scale and offset. This is the most accurate calibration method, but requires known low and high input signals, usually supplied by test weights. Zero and span calibration procedures are performed separately.*

mV/V *uses values from the loadcell manufacturer's test certificate.*

Zero *allows manual adjustment of the calibrated zero offset.*

E_Cal *allows the user to view and edit the electronic calibration values (zero offset and scale factor). These two values are updated when any calibration is performed. Noting these values and entering them into another instrument will copy the calibration. You may also 'trim' these values to alter the current calibration.*

Cal Set *allows the user to select and switch between calibration sets, giving them the option of saving and restoring a previous calibration.*

Auto calibration

B **_ _ _ CAL SET X – CALIBRATE ZERO** scrolls across the bottom row , where **X** is the Cal Set where the current calibration will be stored (see 5.4M–N).
– **CALIBRATE ZERO** scrolls across, and the currently selected option appears. Use the ⬆ and ⬇ buttons to select **Yes** or **No**, and then press P.

➡ If you selected **Yes**, continue to 5.4C now.

➡ If you selected **No**, skip to 5.4D now.

C **_ _ _ REMOVE WEIGHT – PRESS P TO ACCEPT** scrolls across the bottom row and the no-load value appears in the top row. Remove the weight. Use the ⬆ and ⬇ buttons to adjust the no-load value if required, and then press P.

D **_ _ _ CALIBRATE SPAN** scrolls across the bottom row and the current selection appears. Use the ⬆ and ⬇ buttons to select **Yes** or **No**, and then press P.

➡ If you selected **Yes**, continue to 5.4E now.

➡ If you selected **No**, skip to 5.4F now.

E **_ _ _ ADD CAL WEIGHT – ENTER DESIRED SPAN – PRESS P TO ACCEPT** scrolls across the bottom row and the current span value appears in the top row. Apply a calibration weight to the weigh platform. Then use the ⬆ and ⬇ buttons to

adjust the value, and press [P] to accept.

F If Auto calibration was successful, you will be directed back to the operational display. (To enter step 5.5, you must select **Skip** at 5.4A.)

If calibration fails, **_ _ _ CALIBRATION FAILED** will scroll across the display and you will be directed back to the operational display. Check your signal and connections, and then repeat the calibration procedure.

mV/V calibration

G **_ _ _ ENTER TOTAL FULL SCALE WEIGHT OF LOADCELLS IN COUNTS** scrolls across the bottom row and the current selection appears in the top row. Using the [▲] and [▼] buttons, enter the total full scale weight of the connected loadcell(s) in counts, referring to the manufacturer's test certificate. Then press [P].

H **_ _ _ ENTER MV/V FROM LOADCELL** scrolls across the bottom row and the current selection appears in the top row. Using the [▲] and [▼] buttons, enter the mV/V (or average mV/V) of the connected loadcell(s), and then press [P].

I **_ _ _ SET ZERO NOW ?** scrolls across the bottom row and the current selection appears. Use the [▲] and [▼] buttons to select **Yes** or **No**, and then press [P].

*Selecting **Yes** sets your zero position when the loadcells are powered up and in position.*

mV/V calibration is now complete. You will be directed back to the operational display. (To enter step 5.5, you must select **Skip** at 5.4A.)

Zero (offset) calibration

J **_ _ _ ADJUST OFFSET** scrolls across the bottom row and the current zero value appears in the top row. Place a known weight on the weigh platform if required, and use the [▲] and [▼] buttons to enter the desired value. Press [P] to accept.

The offset will be automatically calculated to match the desired weight, and the scale factor will not be altered. (Normally the weight would be removed and the value would be zero.)

Zero calibration is now complete. You will be directed back to the operational display. (To enter step 5.5, you must select **Skip** at 5.4A.)

E_Cal calibration

K **_ _ _ E_CAL ZERO OFFSET** scrolls across and the current selection appears in the top row. Use the ⬆ and ⬇ buttons to adjust the zero offset, and press P.

*This is updated after each calibration to show the controller's internal **ZERO OFFSET** electronic calibration value.*

L **_ _ _ E_CAL SCALE FACTOR** scrolls across and the current selection appears in the top row. Use the ⬆ and ⬇ buttons to adjust the scale factor, and press P.

*This is updated after each calibration to show the controller's internal **SCALE FACTOR** electronic calibration value.*

E_Cal calibration is now complete. You will be directed back to the operational display. (To enter step 5.5, you must select **Skip** at 5.4A.)

Cal set selection

M **_ _ _ SELECT CAL SET** scrolls across and the current selection appears in the top row. Use the ⬆ and ⬇ buttons to choose **Set 1** or **Set 2**, and then press P.

This feature allows you to save two sets of calibration values on the controller. This enables you to roll back to a previous calibration, if necessary. The set that you select in this step will be the active calibration set.

N **_ _ _ CALIBRATION TECHNIQUE** scrolls across the bottom row and **Skip** appears in the top row. You are now back at 5.4A. Press P to skip to 5.5, or use the ⬆ and ⬇ buttons to select a new calibration method, and then press P.

5.5 - Zero maintenance

See Section 2.4 for more information on zero maintenance parameters.

A **_ _ _ ZERO MAINTENANCE** scrolls across the bottom row and **Skip** appears in the top row. Press P to skip to 5.6, or the ⬆ button and then P to **Enter**.

B **_ _ _ AUTO ZERO** scrolls across the bottom row and the selection appears in the top row. Use the ⬆ and ⬇ buttons to select **On** or **Off**, and press P.

➡ If you selected **On**, continue to 5.5C now.

➡ If you selected **Off**, skip to 5.5E now.

*If **AUTO ZERO** mode is **On**, the controller's offset will be automatically adjusted so that the instrument reads zero when it senses that the scale is not loaded (see 2.4).*

C **_ _ _ CAPTURE BAND** scrolls across the bottom row and the selected capture band appears. Adjust this value using the ⬆ and ⬇ buttons, and press P.

*This is referenced to the current zero value, and is the maximum number of display counts that the controller will zero within. **CAPTURE BAND** can be set from **1** to **254** counts, and should always be set to less than the smallest weight to be measured.*

D **_ _ _ MOTION BAND** scrolls across the bottom row and the selected motion band appears. Adjust this value using the ⬆ and ⬇ buttons, and press P.

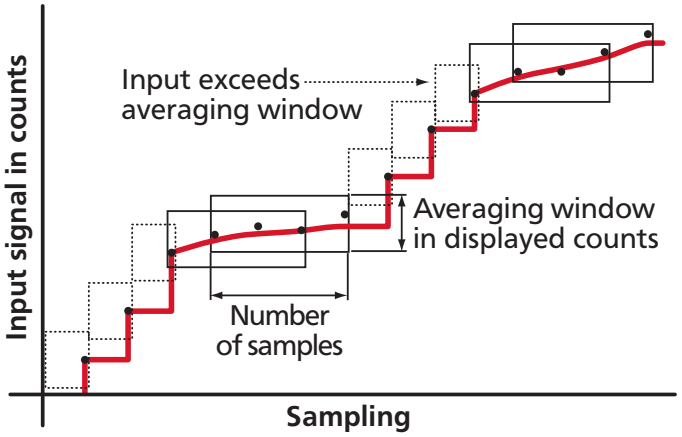
*This provides a rate of change limit setting, to determine the number of counts/second allowed within the **CAPTURE BAND**. **MOTION BAND** can be set from **0** to **255** counts. Typical value is **1** or **2** counts/sec.*

E **_ _ _ ZERO BAND** scrolls across the bottom row and the selected zero band appears. Adjust this value using the ⬆ and ⬇ buttons, and then press P.

*This provides a limit for the number of counts of zero offset allowed to accumulate, relative to the calibrated zero setting. If the accumulated zero offset becomes greater than this window, then the controller displays the current loadcell value and does not zero. The suggested limit for the **ZERO BAND** is 2% of the calibrated span.*

5.6 - Averaging

Your controller has input signal averaging, optimising stable measurement.
If the change in input exceeds the averaging window value it will not average, ensuring fast response when there are large differences between readings. (E.g. When product is being dropped into a bag.)



A **_ _ _ AVERAGING PARAMETERS** scrolls across the bottom row and **Skip** appears in the top row. Press P to skip to 5.7, or the ⬆ button and then P to **Enter** averaging setup.

B **_ _ _ AVE SAMPLES** scrolls across the bottom row and the currently selected averaging appears in the top row. Using the ⬆ and ⬇ buttons, alter the number of input samples that the controller will average, and then press P.

Increasing the number of samples will stabilise measurement, but it will also slow down response rates. A typical value is 4.

C **_ _ _ AVE WINDOW** scrolls across the bottom row and the currently selected averaging window value appears in the top row. Using the ⬆ and ⬇ buttons, alter the signal averaging window. Then press P.

*If your input signal contains large noise spikes, you can increase the size of the averaging window to ensure that these are still averaged. However, increasing the window size too far will reduce the ability of the controller to respond quickly to real changes in input signal. Setting **AVE WINDOW** to **0** will give continuous averaging as per the selected averaging samples. A typical value is 10% of your system capacity.*

5.7 - Analog output setup

To calibrate your analog output, see Section 9.

Factory analog output calibration is precisely set before shipping this instrument, and should not be adjusted unless advised by the manufacturer.

A **_ _ _ ANALOG OUTPUT SETUP** scrolls across the bottom row and **Skip** appears in the top row. If your controller does not have analog output installed, (or you do not wish to configure your analog output now), press P to skip to 5.8.

Otherwise, press the ⬆ button and then P to **Enter** analog output setup.

B **_ _ _ DATA SOURCE FOR ANALOG O/P** scrolls across the bottom row and the current analog output data source appears in the top row. Use the ⬆ and ⬇ buttons to select an option from: **Net**/**Batch**, or **Live**, and then press P.

*Note that where **Net/Batch** is indicated, the option that will be displayed is controlled by the weighing mode selected in 5.2F. **Normal** mode = **Net, Batch** mode = **Batch**.*

C **_ _ _ LOW SCALE VALUE FOR ANALOG O/P** scrolls across the bottom row and the currently selected low scale display value appears in the top row. Use the ⬆ and ⬇ buttons to enter your cal low position, and then press P.

D **_ _ _ HIGH SCALE VALUE FOR ANALOG O/P** scrolls across the bottom row and

the currently selected high scale display value appears in the top row. Use the ⬆ and ⬇ buttons to enter your cal high position, and then press P.

5.8 - Serial setup

A **_ _ _ SERIAL SETUP** scrolls across the bottom row and **Skip** appears in the top row. If your controller does not have a serial port installed, (or you do not wish to configure your serial options now), please press P to skip to 5.9.

Otherwise, press the ⬆ button and then P to **Enter** serial setup.

B **_ _ _ SERIAL MODE** scrolls across the bottom row and the current serial mode appears in the top row. Use the ⬆ and ⬇ buttons to choose between: **ASCII** (custom), **Modbus** (RTU), **Gedge**, **Ranger A** (Ranger A), or **Print**. Then press P.

- ➡ If you selected **Gedge**, continue to 5.8C now.
- ➡ If you selected **Ranger A** or **Print**, skip to 5.8D now.
- ➡ If you selected **ASCII** or **Modbus**, skip to 5.8H now.

See Appendix B for more information about the available serial modes.

C **_ _ _ OUTPUT FORMAT** scrolls across the bottom row and the currently selected Gedge output format appears in the top row. Use the ⬆ and ⬇ buttons to choose between **C1**, **C2**, or **C3**, and then press P.

- ➡ Please skip to 5.8G now.

See Appendix B.3 for more information on Gedge output formats.

D **_ _ _ DATA SOURCE** scrolls across the bottom row and the currently selected serial data source appears in the top row. Use the ⬆ and ⬇ buttons to select an option from: **Net**/**Batch**, **Live**, or **Peak**, and then press P.

*Note that where **Net/Batch** is indicated, the option that will be displayed is controlled by the weighing mode selected in 5.2F. **Normal** mode = **Net**, **Batch** mode = **Batch**.*

E The step that you proceed to now will depend on the Serial Mode that you selected in 5.8B:

- ➡ If your Serial Mode = **Print**, continue to 5.8F now.
- ➡ If your Serial Mode = **Ranger A**, skip to 5.8G now.

F **_ _ _ PRINT UNITS** scrolls across the bottom row and the current units appear in the top row. These will be printed on the *Weigh Ticket* (see B.5) when the print function is triggered. Use the ⬆ and ⬇ buttons to choose between **None**, **Grams**, **Kgs**, **Tonnes**, **Lbs** or **KN**, and then press P.

➡ Please skip to 5.8H now.

This option controls the units that are printed on the Weigh Ticket (see B.5). ***It does not perform any conversion calculations.*** *Please scale the instrument to match the printed units.*

G **_ _ _ OUTPUT MODE** scrolls across the bottom row and the current output mode appears in the top row. Use the ⬆ and ⬇ buttons to select either **Cont.** (continuous) or **Pulsed**, and then press P.

In ***Cont.*** *(continuous) mode, the controller outputs a continuous stream of data. In* ***Pulsed*** *mode, the controller outputs a single string when the print function is triggered from a user input button or pin (see 5.2H–K and Appendix A).*

H **_ _ _ BAUD RATE** scrolls across the bottom row and the current selection appears in the top row. Use the ⬆ and ⬇ buttons to select one of: **300**, **600**, **1200**, **2400**, **4800**, **9600**, **19200** or **38400**. Then press P.

I **_ _ _ PARITY** scrolls across the bottom row and the currently selected parity appears in the top row. Using the ⬆ and ⬇ buttons, select: **None**, **Odd** or **Even**, and then press P.

J The step that you proceed to now will depend on the Serial Mode that you selected in 5.8B:

➡ If your Serial Mode = **Gedge**, **Ranger A**, or **Print**, continue to 5.8K now.

➡ If your Serial Mode = **ASCII** or **Modbus**, skip to 5.8L now.

K **_ _ _ DATA BITS** scrolls across the bottom row and the currently selected data bits appears in the top row. Using the ⬆ and ⬇ buttons, select: **7** or **8**, and then press P.

➡ The last step only applies to **ASCII** or **Modbus** mode. Proceed to 5.9 now.

L **_ _ _ SERIAL ADDRESS** scrolls across the bottom row and the currently selected serial address appears in the top row. Use the ⬆ and ⬇ buttons to alter the serial address, and then press P.

The serial address parameter is used to identify a particular device when it is used with other

*devices in a system. (It applies particularly to **Modbus** mode when used on an RS485 serial network.) The serial address of the controller must be set to match the serial address defined in the master device.*

Refer to Appendix B for more information on serial modes and registers.

5.9 - Clock setup

A **_ _ _ CLOCK SETUP** scrolls across the display and toggles with **Skip**. Press [P] to skip to 5.10, or the [▲] button and then [P] to **Enter** and set the date and time.

B **_ _ _ HOURS** scrolls across the display and toggles with the current selection. Use the [▲] and [▼] buttons to adjust the hour (from **0** to **23**), and press [P].

The controller's internal clock uses 24 hour time; you cannot select a.m. or p.m.

C **_ _ _ MINUTES** scrolls across the display and toggles with the current selection. Use the [▲] and [▼] buttons to adjust the minutes (from **0** to **59**), and press [P].

After pressing [P] the seconds timer will be reset to zero, and will immediately begin counting.

D **_ _ _ DATE** scrolls across the display and toggles with the current selection. Use the [▲] and [▼] buttons to adjust the date (from **1** to **31**), and press [P].

E **_ _ _ MONTH** scrolls across the display and toggles with the current selection. Use the [▲] and [▼] buttons to select a month (from **Jan** to **Dec**), and press [P].

F **_ _ _ YEAR** scrolls across the display and toggles with the current selection. Use the [▲] and [▼] buttons to adjust the display to the current year, and press [P].

5.10 - Edit F1 PIN number

A **_ _ _ EDIT F1 PIN** scrolls across the bottom row and **Skip** appears in the top row. Press [P] to skip and return to the operational display, or the [▲] button and then [P] to **Enter** and change your PIN number.

B **_ _ _ ENTER NEW F1 PIN** scrolls across the bottom row and the current PIN (default 1) appears in the top row. Using the [▲] and [▼] buttons, enter your new F1 PIN number. Then press [P] to exit to the operational display.

6 SETPOINT SETUP

6.1 - Enter F2 PIN number

A Enter setpoint setup mode by pressing and holding the F2 button for 3 seconds.

_ _ _ ENTER F2 PIN scrolls across the bottom row and **0** appears in the top row. Use the ⬆ and ⬇ buttons to enter your security code (factory default 1). Then press P. If the correct PIN is entered, setup is started at 6.2.

If an incorrect PIN number is entered, **_ _ _ ACCESS DENIED** scrolls across the display and it returns to normal operating mode.

You will have the opportunity to change your PIN number at the end of this section (6.3). If you have forgotten your PIN number, see Section 8.

6.2 - Setpoint setup

A **_ _ _ EDIT SETPOINT** scrolls across the bottom row and **Skip** appears in the top row. Press P now to skip to 6.3, or use the ⬆ and ⬇ buttons to select a setpoint to edit, and then press P.

B **_ _ _ SP VALUE** scrolls across the bottom row and the current value for the selected setpoint appears in the top row. Using the ⬆ and ⬇ buttons, adjust the display value at which the selected setpoint will activate, and then press P.

C The step that you proceed to now will depend on which setpoint you are editing (selected in 6.2A):

- ➡ If you are currently editing **SP 1**, skip to 6.2E now.
- ➡ If you are currently editing **SP 2**, continue to 6.2D now.

D **_ _ _ TRAIL SP1** scrolls across the bottom row and the tracking setting for the selected setpoint appears in the top row. Using the ⬆ and ⬇ buttons, select **Off** or **On**, and then press P.

*A setpoint with **TRAIL SP1** enabled will track the setpoint value of **SP 1**, with the setpoint value of the tracking setpoint becoming an offset value.*

E The step that you proceed to now will depend on your controller's weighing mode (selected in 5.2F):

- ➡ If your controller is in **Normal** mode, continue to 6.2F now.
- ➡ If your controller is in **Batch** mode, skip to 6.2J now.

F **_ _ _ SP SOURCE** scrolls across the bottom row and the activation source for the selected setpoint appears in the top row. Use the ⬆ and ⬇ buttons to choose **Net** or **Live**, and then press P.

G **_ _ _ SP ACTIVATION** scrolls across the bottom row and the current selection appears in the top row. Using the ⬆ and ⬇ buttons, select the relay activation to operate **Above** or **Below** the setpoint value, and then press P.

***Above**: Relay turns on above the setpoint value and off below it. **Below**: Relay turns on below the setpoint value and off above it.*

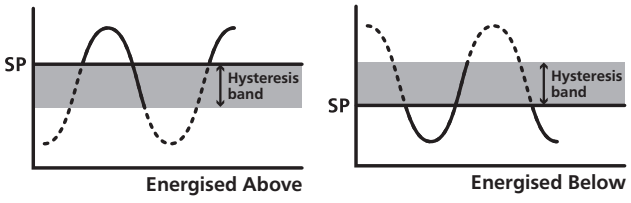
H **_ _ _ HYSTERESIS VALUE** scrolls across the bottom row and the hysteresis value for the selected setpoint appears in the top row. Use the ⬆ and ⬇ buttons to adjust this value if required, and then press P.

- ➡ If you set the Hysteresis Value to **0**, skip to 6.2J now.
- ➡ If you set the Hysteresis Value to anything else, continue to 6.2I now.

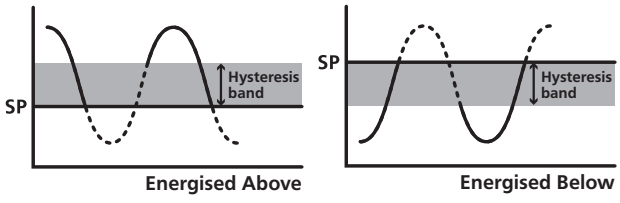
*The **HYSERESIS VALUE** defines the separation band between setpoint activation and deactivation, and will operate as per the **HYSTERESIS TYPE** setting selected in 6.2I.*

I **_ _ _ HYSTERESIS TYPE** scrolls across the bottom row and the hysteresis type for the selected setpoint appears in the top row. Using the ⬆ and ⬇ buttons, select either **Alarm** or **Cntrl** (control), and then press P.

***Alarm** - **SP VALUE** controls setpoint activation point. **HYSTERESIS VALUE** controls setpoint deactivation point.*



***Cntrl** - **SP VALUE** controls setpointdeactivation point. **HYSTERESIS VALUE** controls setpoint reactivation point.*



J **_ _ _ MAKE DELAY** scrolls across the bottom row and the current make delay time for the selected setpoint appears in the top row. This is the time delay

between setpoint activation, and when the relay turns on. Adjust this value in 0.1 second increments using the ⬆ and ⬇ buttons, and then press P.

K **_ _ _ USER ACCESS ?** scrolls across the bottom row and the direct access permission setting for the selected setpoint appears in the top row. Use the ⬆ and ⬇ to select either **Off** or **On**, and then press P.

When enabled, this option allows the selected setpoint's value to be edited directly after pressing the F2 button, without needing to enter a PIN number or go through all of the other options. Each setpoint can individually have this option enabled or disabled. See Section 7.

L **_ _ _ EDIT SETPOINT** scrolls across the bottom row and **Skip** appears in the top row. You are now back at 6.2A. To edit another setpoint, follow the instructions from 6.2A–L again. If you do not wish to edit another setpoint, press P now to skip to 6.3.

6.3 - Edit F2 PIN number

A **_ _ _ EDIT F2 PIN** scrolls across the bottom row and **Skip** appears in the top row. Press P to skip and return to the operational display, or the ⬆ button and then P to **Enter** and change your PIN number.

B **_ _ _ ENTER NEW F2 PIN** scrolls across the bottom row and the current PIN (default 1) appears in the top row. Using the ⬆ and ⬇ buttons, enter your new F2 PIN number. Then press P to exit to the operational display.

7 SETPOINT DIRECT ACCESS

If none of the setpoints have their direct access option enabled then this feature will be disabled and the F2 button will not respond to a short button press. (See 6.2K.)

A Begin by pressing the F2 button for less than 3 seconds.

B The name of the first access-enabled setpoint will appear in the bottom row and the current value for that setpoint will appear in the top row. Using the ⬆ and ⬇ buttons, adjust the selected value. Then press P to accept and continue.

C The name of the next access-enabled setpoint will appear on the display, along with its setpoint value. Repeat step 7B. The direct access menu will proceed through all access-enabled setpoints in this fashion. Pressing P for the last enabled setpoint will exit and return to the operational display.

8 RESET PIN NUMBERS

If you have forgotten your PIN number(s), follow the procedure below to reset both the F1 and F2 PINs to their factory default of 1.

This procedure will also allow you to view the current software installed on your controller, which may be required for support purposes.

A Press ⬆, ⬇ and P at the same time. (This key combination can be difficult to execute and you may need several tries to get it right.)

B A message will appear on the display, with details of the unit's current software configuration (Product Name, Firmware Version, and Macro Version). At the end, you will see **PIN RESET TO 1**.

C Both the F1 PIN number and the F2 PIN number have now been reset to '**1**'.

D You can change these, if required, by following the instructions in 5.10 (for the F1 menu) and 6.3 (for the F2 menu), using '**1**' to enter each menu initially.

9 FACTORY ANALOG OUTPUT CALIBRATION

Do not access this feature unless instructed by the manufacturer.

Factory analog output calibration is precisely set before shipping this instrument. For analog output scaling, see 5.7.

A Start with the controller powered off. Power up while holding the F1 button.

B **_ _ _ ENTER F1 PIN** scrolls across the bottom row and **0** appears in the top row. Use the ⬆ and ⬇ buttons to enter your security code (factory default 1). Then press P. If the correct PIN is entered, continue to 9C.

If an incorrect PIN number is entered, **_ _ _ ACCESS DENIED** scrolls across the display and it returns to normal operating mode.

If you have forgotten your PIN number, see Section 8.

C **_ _ _ CALIBRATE ANALOG O/P?** scrolls across the bottom row and the current selection appears in the top row. Use the ⬆ and ⬇ buttons to select **Yes** or **No**, and then press P.

- ➡ If you selected **Yes**, connect a mA or volt meter across the analog output connector (see 4.4), and then continue to 9D.
- ➡ If you selected **No**, the display will return to normal operating mode.

D **_ _ _ CAL LOW ANALOG O/P** scrolls across the bottom row and a calibration number, displayed in internal units (mA/V), appears in the top row. Using the ⬆ and ⬇ buttons, calibrate your low analog output as required, and press P.

E **_ _ _ CAL HIGH ANALOG OUTPUT** scrolls across the bottom row and a calibration number, displayed in internal units (mA/V), appears in the top row. Using the ⬆ and ⬇ buttons, calibrate your high analog output as required, and press P.

F Factory analog output calibration is now complete. The display will return to normal operating mode.

A APPENDIX A - INPUT FUNCTIONS

A number of user programmable functions are accessible from the P button and rear pins (see 5.2H–K). Note that availability of the **Tare**/**Batch** and **Start**/**Stop** features are subject to your weighing mode, as selected in 5.2F.

User programmable input functions

Function	Btn/Pin & Activation Time	Description
Hold	P ⟶ Continuous	Freezes the display value.
Lock	⟶ Continuous	Locks the control panel.
Tare *(see 2.3)*	P ⟶ ½ sec	Tares display value (flashes **Tare**).
	P ⟶ 2+ sec	Resets tare to zero (flashes **Tr Rst** and then shows gross).
Batch *(see 2.1)*	P ⟶ ½ sec	If no batch operation is active: Performs a batch operation; display shows **Batch** If a batch operation is in progress: Current batch is paused; display shows **Pause** If a batch operation has been paused, or you have just powered up following a power loss during batching: Controller will resume without resetting the batch value; display shows **Resume**
	P ⟶ 2+ sec	Resets the batch value to zero and flashes **BT RST**. Any current batching operations will be halted.
Zero *(see 2.4)*	P ⟶ ½ sec	Zeroes the weight if the zero offset (i.e. the difference between the current no load weight and the calibration no load value) is within the **ZERO BAND** (see 2.4). *If the offset is less than the limit set in **ZERO BAND** (see 5.5E), the zero value is updated and the display flashes **Zero**. If the offset is greater than the limit set in **ZERO BAND**, the zero value is not updated and the display scrolls **OUTSIDE OF ZERO BAND!***
	P ⟶ 2+ sec	Resets the zero offset value to the original calibration offset value. Display flashes **Rs Zer** and then shows gross.

User programmable input functions

Function	Btn/Pin & Activation Time		Description
Peak	P	½ sec	Displays the peak value for 2 seconds.
	P	2+ sec	Sets the peak value to the current input value (flashes **Peak Rst**).
	⊶	Continuous	Displays the peak value continuously.
Peak Rst	P ⊶	Continuous	Sets the peak value to the current input value (flashes **Peak Rst**).
Print *(see B.5)*	P ⊶	Continuous	Sends a single Ranger A output string. ***SERIAL MODE** (5.8B) must be set to **Ranger A**, and **OUTPUT MODE** (5.8G) must be set to **Pulsed**.*
Gross	⊶	Continuous	Displays the gross value continuously.
Start	⊶	½ sec	Starts a new batch, or resumes the batching process after it has been paused.
Stop	⊶	½ sec	Pauses the batching process and holds the current batched weight on the display.
	⊶	2+ sec	Resets the batch value to zero and halts any current batching operations.

B APPENDIX B - SERIAL MODES

B.1 - Custom ASCII mode

Custom ASCII is a simple, custom protocol that allows connection to various PC configuration tools. ('Custom ASCII' differs from the 'Modbus (ASCII)' protocol used by some devices.) Custom ASCII command strings must be constructed in this order:

<Start> <Controller Address> <Read/Write Command> <Register Address> <Separator Character> <Data Value> <Message Terminator>

Start - Use '**S**' for the start character of a command string (not case sensitive). This must be the first character in the string.

Controller Address - Use an ASCII number from '**1**' to '**255**' for the controller address. If the character following the start character is not an ASCII number, then address '**0**' is assumed. All controllers respond to address '**0**'.

Read/Write Command - Use ASCII '**R**' for read, '**U**' for unformatted read, or '**W**' for write (not case sensitive). Any other character aborts the operation.

*In Custom ASCII mode, data is normally read as formatted data (which includes decimals and any text characters that may be selected to show units). However it is also possible to read unformatted data by using a '**U**' in the read command. There is no unformatted write command, as when writing to fixed point registers, any decimal point and text characters are ignored.*

Register Address - The register address for the read/write operation will be an ASCII number from '**1**' to '**65535**'. This character must be specified for a write command, but may be omitted for a read command, (in which case the controller will respond with the data value currently on the display).

Separator Character - The separator character can be either a space or a comma, and is used to separate the register address from the data value.

Data Value - Must be an ASCII number. The absolute limits for this number are −**1000000** to +**1000000**, but note that not all registers will accept this range.

Message Terminator - This is the last character, and must be either a '**$**' (dollar) or an '*****' (asterisk). Neither of these characters should be used elsewhere in the

message string. If '$' is used, a 50ms minimum delay is inserted before a reply is sent. If '*' is used, a 2ms minimum delay is inserted before a reply is sent.

Custom ASCII Read/Write Examples

Example	Description
SR$	Read display value from all controllers, 50ms delay.
S15R$	Read display value from controller address 15, 50ms delay.
S3U40*	Read unformatted data in channel 4 from controller address 3, 2ms delay.
S2W2 –10000$	Write ⁻10000 to the display register of controller address 2, 50ms delay.
SWT CHAN_1$	Write ASCII text string Chan_1 to channel 1 text register, 50ms delay.

Controller Response - After the controller has completed a read or write instruction, it responds by sending a carriage return/line feed (CR/LF) back to the host. If the instruction was a read command, the CR/LF follows the last character in the ASCII string. If it was a write command, CR/LF is the only response sent back. The host must wait for this before sending further commands to the controller. If the controller encounters an error, it will respond with a null (0x00) CR/LF.

Custom ASCII Registers - *Active for models with relay output installed*

16 Bit Unsigned

Address	Function
1	Alarm status (SP1=Bit 0, SP2=Bit 1)
65	Hysteresis setpoint 1
66	Hysteresis setpoint 2
71	Make delay setpoint 1
72	Make delay setpoint 2

32 Bit Signed

Address	Function
3	Tared/Batch weight (net)
4	mV
39	Live weight (gross)
16	Tare value
12	Peak
13	Valley
6	Setpoint 1
7	Setpoint 2
34	D/A scale low value
36	D/A scale high value

B.2 - Modbus (RTU) mode

Modbus (RTU) is an industry standard RTU slave mode that allows connection to a wide range of devices. Modbus registers are all holding registers, and should be accessed via function codes 3 and 6.

Register addresses are displayed in the Modicon™ 5-digit addressing format. I.e. Register 65=40065 (subtract 1 for direct addressing).

Modbus (RTU) Registers - *Active for models with relay output installed*

16 Bit Unsigned

Address	Function
40001	Alarm status (SP1=Bit 0, SP2=Bit 1)
40065	Hysteresis setpoint 1
40066	Hysteresis setpoint 2
40071	Make delay setpoint 1
40072	Make delay setpoint 2

32 Bit Signed (2 x 16 Bit)

LSW	MSW	Function
40515	40516	Tared/Batch weight (net)
40517	40518	mV
40521	40522	Live weight (gross)
40529	40530	Tare value
40525	40526	Peak
40527	40528	Valley
40535	40536	Setpoint 1
40537	**40538**	Setpoint 2
40587	**40588**	D/A scale low value
40591	**40592**	D/A scale high value

B.3 - Gedge mode

This serial mode is used to drive Gedge displays. Depending on your output format selected in 5.8C, the Gedge output string will be constructed as shown:

- **C1= <STX> <*Displayed* Weight> <ETX>**
- **C2= <STX> <*Displayed* Weight> <D2> <D3> <D4> <D5> <D6> <D7> <ETX>**
- **C3= <STX> <*Gross* Weight> <*Tare* Weight> < *Net* Weight> <D2> <D3> <D4> <D5> <D6> <D7> <ETX>**

Gedge Command Strings	
STX	Start of transmission ($02)
ETX	End of transmission ($03)
CR/LF	Carriage return and Line feed ($0D $0A)
Weight	8 ASCII alpha/numerics: **<Space or minus sign> <Space> <6 digits>** (E.g. "– 002387") **or** **<Space or minus sign> <6 digits and decimal>** (E.g. "–002.387")
D2	Displayed weight identity. **G**: Gross. **N**: Net. **T**: Tare.
D3	**M**: Scale is in motion. **S**: Scale is still.
D4	**I**: In scale. **O**: Over scale. **U**: Under scale.
D5	**Z**: Gross is zero. **ASCII Space**: Gross is not zero.
D6	**E**: Stored tare is not zero. **ASCII Space**: Stored tare is zero.
D7	**P**: Print key operation. **ASCII Space**: No print key operation.

B.4 - Ranger A mode

Ranger A is a continuous output, used to drive remote displays and other instruments in the Rinstrum™ range. (Ranger is a trade name belonging to Rinstrum Pty Ltd.) Ranger A output strings are constructed as shown:

<Start> <Sign> <Output Value> <Status> <End>

Start - STX character (ASCII 02)

Sign - Output value sign (space for + and dash for -)

Output Value - Seven character ASCII string containing the current output value and decimal point. (If there is no decimal point, then the first character is a space. Leading zero blanking applies.)

Status - Single character output value status. '**U**'=Under, '**O**'=Over, '**E**'=Error.

End - ETX character (ASCII 03)

B.5 - Print mode

This mode outputs a *Weigh Ticket* (as shown) to the serial port when the *Print* function is triggered from the [P] button or input pins (see 5.2H–K).

The weigh ticket shows the current value of the selected *Serial Data Source* (as set in 5.8D), and the units selected in 5.8F.

Note that changing the display units in 5.8F **does not perform any conversion calculations**. You will need to scale the instrument to match the printed units.

A date and time will also be printed on the Weigh Ticket. **In order to print the current date and time, *Real-Time Clock* hardware must be installed**. If the required hardware is not installed, the controller time stamp will revert back to the firmware revision date and time whenever the unit is restarted.

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