Web Tech AutoWeigh

OPERATION MANUAL

Masterweigh® 7 Integrator

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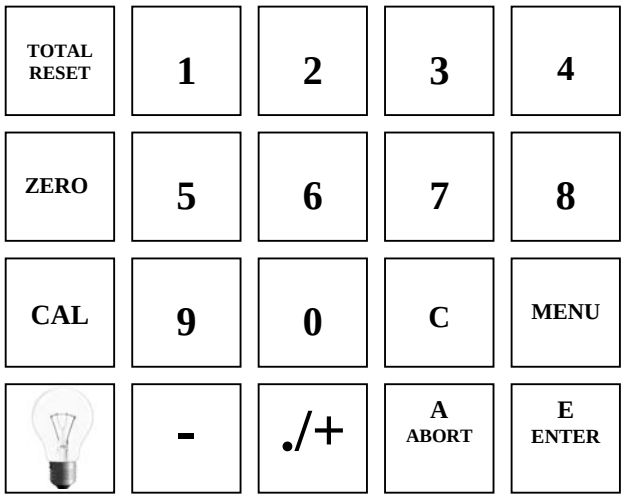
MASTERWEIGH 7 KEYBOARD LAYOUT



KEY FUNCTIONS

MENU

This key switches between the main display mode showing "Mass Rate/Mass Total" (MRMT) and the "Menu" mode.

- **AND** **./+**

When in "Menu" mode, pressing the (+) or (-) key once will go forward or backward one menu entry. If either key is held down, the menu changes will repeat at a rate of approx. 5 per second. When entering the data, the (./+) key is the decimal point.

A ABORT

When in the "Menu" mode and entering changes or new data, this key enables the user to abort the changes and restore the existing entries. The top level menu screen is then displayed.

C

Similar to "Abort", except that the current screen data only is cancelled and the existing entries restored. The display remains at the current screen.

E ENTER

In menu mode, the key accepts the default setting or confirms any data entered and moves to the next level in the operating sequence.

In MRMT display mode, if the “Enter” key is pressed, the current CPU (central processor unit) status is displayed, and also the number of times the CPU has been restarted.

KEYBOARD LAYOUT AND KEY FUNCTIONS (CONT'D)

If the display is flashing, the CPU fault status may be viewed by pressing the Enter key whilst in the MRMT display mode.

SPEED KEYS

TOTAL RESET

When this key is pressed MW7 clears the accumulated mass total.

ZERO

Activation of this key takes the operator directly to the belt zero function without having to scroll through the menu structure.

CAL

When this key is pressed, the operating display jumps to the fixed weight calibration function, ready to span the system

When this key is pressed, the display display backlighting operates.

NUMERIC KEYS

These keys are used to enter calibration data.

MENU ENTRY 1 – Parameter setup

Menu 1 is used firstly to enter the maximum capacity of the scale and the increment size.

1

Menu Entry 1 Parameter Set Up

2

Current capacity = 1000.000 tonnes/hour Enter new capacity? 0.000

3

Mass total increment=1.000 tonnes Enter new inc. (10 -- 0.001)? 0.000

4

Remote totaliser pulse width =100ms Enter new value? (20 - 1000) 0

Menu 1 can also be used to access and modify the precision zero reference and reference voltage, by pressing the "C" key. This data has been factory set, and does not reprogramming unless the unit has been reconfigured.

5

Menu Entry 1 Parameter setup

6

WARNING: Calibration data. Do not modify -- Press A to continue

7

Calibration zero = x.xxx milli-volts Enter new zero ref.? 0.000

8

Precision ref. = x.xxx millivolts Enter new precision ref. ? 0.000

9

Press E for Rate O/P span calibration else press A

10

Rate O/P = x.xxmA C for next. E to reset unit

1. At Menu Entry 1, press Enter to examine or modify the maximum capacity of the scale, the precision of the increment size, and the remote counter pulse width.

2. At this step, the current scale capacity is displayed. A new value may be keyed-in, then press Enter to continue. Otherwise press Enter with no data entry to retain existing values and continue. This value sets the 100% point for the 4-20mA mass rate output signal. Note that the system can measure mass rates above this value (assuming the instruments remain within their normal operating range), and higher values will be shown on the screen and totalised. However, the 4-20mA mass rate output signal will show 20mA for all mass rates above this value.
Note that units can be changed to tons, lbs, or kg if preferred, within Menu Entry 11.

3. This step displays and allows alteration to the mass total increment. This increment is used for both the mass rate and the mass total displays. Enter the new value required and press the Enter key. No change is made if Enter is pressed without data entry. Note that the increment size programmed is also the increment size to cause one pulse output from the totaliser. Also, do not change the increment size during normal operation, as the change in setting will invalidate any existing accumulated mass total.

4. This step displays and allows alteration to remote counter pulse width; this value is limited to between 20ms and 1000ms. Note the value entry should be in multiple of 10ms, ie: 20, 30 .....990, 1000. No change is made if Enter is pressed without data entry. One pulse is outputted each time the mass total increases by one increment (as set in step 3 above).

MENU ENTRY 1 – Parameter setup (Cont'd)

Enter a pulse width that will match with the remote counter, or PLC response time, but keep the following in consideration when selecting this value: The pulse output can go no faster than the value you just selected, but the accumulation of the mass total may, and so the remote totaliser will fall behind the actual mass total. e.g. if the pulse width is set to 100mS, then at it's fastest rate, the output will be "on" for 100ms, then "off" for 100ms. This will give a maximum output of 5 complete pulses per second (100mS on and 100mS off = 200mS per total pulse cycle). Therefore, if the feeder is running faster than 5 increments per second (= 18000 increments per hour), then the remote total will be wrong. E.g. for an increment value of 0.01tonnes, the limit will be 180tph.

To modify factory calibration data:

5. At Menu Entry 1, press the "C" key to gain access to the factory calibration data. The correct values for these calibration constants have been engraved onto the main board of the Master Weigh 6 stack (the top board). Check that the values that are programmed are the same as the engraved values, and modify the values in the menu as required. This is normally factory set, and is only to be programmed if the electronics is re-configured.

6. The display will warn the operator not to modify data and to press A to exit and to continue. Press the Enter key at this point for access to the "Zero Reference".

7. Enter new data and/or press the Enter key to proceed.

8. Now access to the precision reference has been gained. Enter new data and/or press the Enter key again.

9. Either exit at this step by pressing the "A" key, or press Enter to access the menu which exercises the 4-20mA circuit.

9. Pressing "C" steps through the Rate O/P's to the desired value namely: 20.0, 10.04, 5.02, 7.53, 6.27, 5.645, 5.335, 5.178, 5.099, 1.790mA. Press Enter to reset unit. (A current meter needs to be connected across pins 1 & 2 of J10, or in series with the load if connected).

MENU ENTRY 2 Pulses per Belt Revolution Calibration

This calibration is carried out with the belt moving. The number of complete belt revolutions over a time period is counted by the operator, and the Masterweigh counts the pulses returned from the speed sensor device. The revolutions are then entered using the keypad and the pulses/rev calculated by the Masterweigh and then saved.

To enable the revolutions to be counted, a point on the belt should be marked with paint, and a suitable point on the framework chosen close to the belt. The count is then started as the belt mark passes this point and stopped as the mark again passes this point after the greater of 5 minutes or 5 belt revolutions.

1

Menu entry: 2 Pulse per rev = 1000 Revs =5

2

Manual entry of Pulses/Rev or press Enter to continue

3

Manual entry of N. of Revs or press enter to continue

4

To start belt pulse count, Press E Pulse counted = Time =

5

To stop belt pulse count, Press E Pulses counted = Time =

6

Enter number of belt revolutions ? Pulses counted = Time =

7

Pulses per belt revolution = Press E to save, otherwise press A

1. At Menu Entry 2, press Enter to proceed with calibration.

2. If the pulses per rev are known, then manually key in the number of pulses and press Enter. Otherwise simply press Enter to continue.

3. Manually key in the number of revs (for the above number of pulses) and press Enter. Otherwise press Enter to continue.

4. At the moment the belt mark passes the fixed point chosen, press Enter to start the Masterweigh counting pulses, and start counting revolutions. Note that the display panel will show the counting.

5. After at least 5 minutes, press Enter again to stop the count as the mark passes the fixed point.

6. Key in the number of revolutions counted, and press Enter to confirm.

7. Press Enter to save the number of pulses/rev just calibrated, otherwise press A to abort and return to the original values (if any).

MENU ENTRY 3 – Load Zero Calibration

This menu entry enables the operating zero to be calibrated. A specified number of belt revolutions are run (as determined by Menu 2), with no material or calibration weights on the belt. If the zero is correct then the mass total accumulated over the period will be zero. The display shows the currently stored value in millivolts, as read at the load-cell input including any contribution made by the autozero function.
Note that the zero value is automatically adjusted if the excitation voltage changes.

1

```
Menu entry:  3
Zero cal. = 2.563mV        2.563mV  ZTrck
```

2

```
Manual entry of Zero Error,          0.000mV
or press Enter to continue
```

3

```
Press E to continue
Mass rate =  0.000
```

4

```
(Zero reset)  To Start zero cal, Press E
Mass rate  =  0.000      Revs =     0.0
```

5

```
To Abort zero calibration, Press A
Mass rate  =  0.000   Revs  =    0.0
```

6

```
To calculate new calibration, Press E
Mass total =       1.150    Revs =       10
```

7

```
Zero error =     2.756 millivolts
Press E to save, otherwise press A
```

1. At Menu Entry 3, press Enter to proceed.

2. (Optional) Using a digital voltmeter, measure the belt zero error value (in millivolts) at the loadcell, or read the mV level displayed in Menu 8.

Manually key in the value to the Masterweigh and press the Enter key to accept, or press Enter with no data entered to continue and allow Masterweigh to automatically carry out a zero calibration.

Note that entering this value does not negate the need to perform a zero calibration.

3. The current zero error is now displayed as a mass rate. Press Enter for the loadcell calibration procedure.

4. The mass total will now display zero. Check that the belt is empty, then press the Enter key to begin the zero calibration test.

5. The difference between the current loadcell zero and the actual load reading is accumulated over the test duration, which is the total number of belt revolutions specified in menu 2.

The test can be aborted at any time by pressing the Abort key. If the test is aborted, the existing value of the zero calibration is used. This zero calibration value normally includes contributions from both the load zero calibration (as carried out in this menu entry) and the auto zero tracking function. It is thus possible by entering the menu to this level and then aborting to reinitialise the working copy of the zero calibration and remove any auto zero tracking contribution.

MENU ENTRY 3 – Load Zero Calibration (Cont'd)

6. This display will come up automatically when the belt has completed the required number of revolutions. The measuring phase of the test has finished and the resulting mass total is displayed. This mass total should be approximately zero, however if non-zero then a new loadcell zero may be required.

Press the Enter key to display the millivolt offset resulting from this test. This value is what Masterweigh believes is required to establish a new zero calibration.

7. The new loadcell zero, or offset, is displayed in millivolts. Press the Enter key to save this value as the new loadcell zero, or press Abort to exit without saving.

MENU ENTRY 4 – Fixed Weight Calibration

This menu entry allows the automatic calibration of the load cell span. The test is run over a preset number of belt revolutions, as in Menu 2, during which calibration weights (or weigh chains) are placed on the belt or weighframe. A mass total is accumulated in the course of the test. This total is then compared with an expected or "target" weight and the span adjusted accordingly. The display shows the currently stored load cell span value. The span number shown is just an engineering number proportional to the “gain” required i.e. the higher the number, the higher the reading.

1

```
Menu entry : 4
Fixed weight calibrate, span = 222.1
```

2

```
Manual entry of Span Factor,      0.000
or press Enter to continue
```

3

```
Span Cal Mode = Fixed Weight
Press Clear to Change      Enter to accept
```

4

```
Current weight =                120.8 tonnes
Enter target weight ?           0.000 tonnes
```

5

```
Press E to continue
Mass rate =      0.000
```

6

```
To Start span calibration, Press E
Mass Rate = 0.000      Revs = 0.0
```

7

```
To abort span calibration, Press A
Mass rate = 1543.000          Revs = 1.507
```

8

```
To calculate new calibration, Press E
Mass total = 120.000          Revs = 10
```

9

```
New span factor = 223.580
Press E to save, otherwise press A
```

10 (Seen only if span invalid)

```
Span of 345678.123 is invalid
Press A to continue
```

1. Press Enter when at Menu Entry 4 to proceed.

2. At this stage the span factor can be set manually by entering the desired span factor and pressing the Enter key. If no value has been entered, then no change is made to the stored value and the next level is entered.

3. Masterweigh 7 has been provided with two methods of spanning (calibrating). Fixed Weight or Empirical (Menu 5).

After initial calibration, the user can, by toggling "Fixed Weight" to "R-Cal", perform a calibration verification. An explanation of this procedure follows this text.

For initial calibration, toggle this menu step to Fixed Weight by pressing the Clear "C" button, if R-Cal has been selected.

MENU ENTRY 4 – Fixed Weight Calibration (cont'd)

4. The target weight is the mass total that is expected over the number of belt revolutions as currently set. (Menu 2). This target weight may at this point be changed to suit the calibration weights being used. Note that this value will generally be determined by running this procedure and recording the result, immediately after performing an empirical calibration. (Menu 5). A load zero calibration should generally be performed (Menu 3) before running this procedure.

If a new value is entered then pressing the Enter key will save this as the new target weight. If the Enter key is pressed without entering a target weight, then no change to the stored value occurs.

5. The current mass rate is shown, the number of belt revolutions is zeroed. Press the Enter key to start the test.

6. Once started the test will run until the currently specified number of belt revolutions has been counted. (Refer to Menu 2).

7. During this step the weight is totalised over the specified number of belt revolutions, after which time the totalisation is automatically stopped. If the Enter key is pressed during the test, then the totalisation will be terminated, with a mass total of zero. The test can be aborted at any time by pressing the Abort key.

8. The resulting mass total is displayed along with the number of belt revolutions counted. Press the Enter key to calculate the new span calibration factor.

9. The new derived load cell span is displayed. Press the Enter key to save this value as the new loadcell span. Press the Abort key if this value is not to be stored.

10. Should the span value calculated be outside the range 0.1 to 3000 then the Masterweigh will display a warning message. Under these circumstances the new span will not be saved, and the unit will revert to the value previously stored.

Calibration Methods

1. Ideally conveyor belt scales should initially be calibrated using empirical data obtained from accurate static scales. However, in most situations this task is impossible to achieve, but the fact remains that there is no substitution for data being input to Masterweigh 7 that has been derived from actual material bearing down on the load cell via the weighframe/carriage at normal conveyor speeds.

2. A calibration chain, a device that rolls on top of the belt provides the next best method of calibration. It imparts load to the load cells through the belt, but can not simulate belt tensions as a fully loaded belt does.

3. Static calibration weights are often used where a chain is impractical to use. Bars of a known weight are loaded directly onto the weighframe and hence simulate a load. This method does not take into consideration belt tension or weight transfer through the belt. It does however, exercise the weighframes mechanics.

4. R-Cal is an electronic method of checking the calibration. A simulated loadcell signal is created by running the belt empty and electronically unbalancing the load cell by switching in a reference signal across one arm of the loadcell bridge.

MENU ENTRY 4 – Fixed Weight Calibration (cont'd)

This method provides a reasonable method of quickly checking a weightometer but is no substitution for the aforementioned calibration methods.

The software required to implement this function is supplied in all Masterweigh 7 units but the hardware required for the use is an optional extra and therefore only supplied to order.

Assuming that your system is rigged for R-Cal, proceed as follows.

Initially, calibration Menu 4 should be accessed and the Enter key pushed until the sub menu Span Cal Mode is reached.

Menu 4:

Span Cal Mode = R-Cal Press Clear to change, Enter to accept

Toggle the clear key until R-Cal has been selected.

Now proceed as for normal calibration which is performed as described under Menu Entry No. 4.

When Masterweigh 7 completes the test, note the number but do not accept it by pressing enter. Press the Abort key.

The total achieved should be logged and future R-Cal tests reference to it. If the value recorded in subsequent tests exceeds +/- 0.5% of the original value perform a full calibration using weights etc.

Note: Zero system prior to R-Cal test.

MENU ENTRY 5 – Empirical Span Calibration

This menu entry enables the manual entry of totalisations and the resultant recalculation of the load cell span. To use this calibration facility, it is necessary to weigh a quantity of material with the belt scale and then to accurately determine the actual mass of that material by independent means (i.e. via a weighbridge or static scale). The two totals are then entered and the Masterweigh computes the new span factor.

1

Menu entry: 5 Empirical calibration, span = 211.7

2

Enter weigh bridge total? 0.000

3

Enter belt scale total? 0.000

4

New span = 205.6, previous = 211.7

1. At menu Entry 5, press Enter to proceed.

2. Enter the exact mass total, as measured by the weighbridge. Press Enter when the data is correct.

3. Enter the mass total as measured by the weigher. Press Enter.

4. Press Enter to store the new span value as the load cell span calibration factor. Press Abort if no update is required. Press Menu and Enter to save.

THIS PAGE INTENTIONALLY LEFT
BLANK TO INSERT APPROPRIATE
SOFTWARE VARIATIONS IF
APPLICABLE.

MENU ENTRY 6 – NULL LEVEL

This entry displays the level at which the load is considered to be zero. This allows any variations in belt weight to be shown as zero. Below this level, the mass rate display will show zero, no increment of the mass total will occur, no pulses will be output to remote counters and the mass rate analogue output will be set to 4.0mA.

1

Menu entry : 6
Null level = 20.000 tonnes/hour

2

Max Mass Rate = 23.195
Press C to Clear, Press E to continue

3

Enter a new null level? 0.000
Mass rate = 23.2 tonnes/hour

1. At Menu Entry 6, press Enter to proceed.

2. Max Mass rate will latch on the highest mass rate value recorded automatically.

3. Key in the new Value as observed in menu no.2. Press Enter when the data is correct.

Note on selecting the null level : This entry is used to mask variations in mass rate caused by variations in the belt weight, caused by the belt splice etc. To select the null level, observe the mass rate shown over several belt revolutions with the belt running completely empty (ie no product or calibration weights).

Take note of the highest equivalent mass rate reached, and then enter a value slightly higher than this level eg if the mass rate was swinging from -20 to 0 to +20 select 22 as the null level. On a correctly installed and aligned weigher, this figure should be approximately 1% of capacity.

MENU ENTRY 7 – Auto Zero Tracking

This entry specifies the mass rate level below which automatic zero tracking occurs and the number of belt revolutions required before a new zero calibration value is established. Control of the Autozero Alarm relay is achieved from this menu. The auto zero mode will not be entered, or continue unless the mass rate remains below the specified level. The value is normally set at approximately 1.5% of capacity. A qualifying time delay period is also provided to ensure that the belt is completely free of material. Should it be necessary to clear the present auto zero value, then this can be done by entering Menu 3 (load zero calibration), then aborting after starting the test. A "z" will be displayed at the right hand side, bottom line, of the main mass rate/mass total display, when the auto zero conditions are met and the Masterweigh is collecting data for a possible new zero level. Note: The auto zero tracking procedure is inhibited under the following conditions:-

- ❄ Masterweigh not in the mass rate / mass total display mode
- ❄ Input tacho frequency less than 5Hz.

It may be required that the user wishes to know if the Autozero function is being forced to zero out, belt zero errors which could be considered as abnormal. This is achieved by setting a window around the signal from the load cell during any period that the belt is considered to be running empty by Masterweigh. The window is set in this menu at step 5 & 6. If the signal from the load cell falls outside these ‘user preset’ levels then the Autozero limit alarm relay will energise.

Under some circumstances it may be necessary to increase the tolerance at which Masterweigh flags in the display that a negative loadcell excursion has taken place which is greater than the level set in the Auto zero x 2.

The error is only flagged in the local display in the form of an "E" at the right hand side of the display where the "Z" is normally shown.

Step 7 allows the user to increase the tolerance before displaying the "E". At step 8 the user can toggle the above function on or off depending on preferences.

Note: Under normal running conditions negative loadcell excursions should not be occurring! Check the weigh area for abnormalities.

1

```
Menu Entry: 7
Zero Track if greater than 20.0 for 5 revs
```

2

```
Auto Zero Level = 20.0000 tonnes /hour
Enter New Level ? =  0.00000
```

3

```
Auto zeroing period = 5 revs
Enter new period?      0
```

4

```
Delay before auto zeroing = 60secs
Enter new Delay?       0
```

5

```
Auto Zero Low Limit – 0.000mV
Enter new level?
```

6

```
Auto Zero high Limit – 0.000mV
Enter new level?       0.000mV
```

7

```
Auto Zero Error Level = 2 times Auto Zero
Enter new value?  0
```

8

```
Autozero Error Display is: On
Press Clear to Change, Enter to accept
```

MENU ENTRY 7 – Auto Zero Tracking (Cont'd)

1. At Menu Entry 7, press Enter to proceed.

2. Enter the new autozero level in mass rate units and press the Enter key. If the Enter key is pressed with no data entry then the stored value remains unchanged.

3. Enter the period required (in belt revolutions) over which autozeroing occurs. Note that the number of belt revolutions should be chosen such that the total zeroing period is of the order of 5 minutes or more. This will ensure that accurate zero levels are produced. Note that the actual zero level used by the Masterweigh will not be updated until a zeroing period has been completed. If a new value is entered and the Enter key is pressed then that value is saved, otherwise no update occurs.

4. This step enables the qualifying delay time to be set. Choose a time that will ensure that all material is off the belt. The delay time commences when the mass rate falls below the minimum level set above.

5. Step five allows the user to enter the value in mV below which it may be considered that an invalid Autozero is taking place.

6. Step six allows the user to enter the value in mV above which it may be considered that an invalid Autozero is taking place.

7. Increase this factor if the letter "E" is being encountered in the main display.

8. The function of displaying the letter "E" can be switched on or off here by pressing the "C" button.

MENU ENTRY 8 – Load Cell Input (millivolts)

This entry displays the load cell input in millivolts. The displayed value is unaffected by the load zero, load calibration, and zero tracking functions. The entry also displays the excitation voltage as currently sensed by the Masterweigh. It is displayed to the nearest volt only, ie. 10V is in the range 9.501 to 10.5V. It is updated once every 3 minutes.

This display enables a user to confirm that the Masterweigh is correctly sensing the excitation voltage and thus that all links etc. are correctly installed. Incorrect excitation sensing will result in inaccurate and unstable mass rate measurements. Access is also available to the output of the voltage to frequency converters.

1

Menu Entry: 8 Loadcell = 16mV, (Extin. = 10V

2

V to F count = xxxxx Press Enter to continue

This facility is for technician's use only.

1. Menu Entry 8 displays the load-cell millivolt output and excitation voltage.

2. Press Enter to access the current V to F output.

3. Press Enter again to return to Menu Entry 8.

MENU ENTRY 9 – Tacho Frequency

This entry displays the current tacho frequency in hertz, (the input range is 5Hz to 1000Hz) and switches between software or hardware inputs.

1

Menu Entry 9 : Tacho Frequency = 250.005 Hertz

2

Tacho Source = Hardware Press Clear to change, Enter to accept

3

Tacho Source = Software Press Clear to change, Enter to accept

4

Tacho Source = Ext. Con Press Clear to change, Enter to accept

1. Press "E" to enter the menu to select the source of the tachometer signal.

2. Press "C" to change (or toggle) between the available pulse sources which are :

- Hardware – input signal to the system as generated by the speed sensor (magnetic pick-up or optical tachometer)
- Simulated – an internally generated 100Hz signal that is always on.
- Ext.Con – an internally generated signal that is only on when an external contact is closed between terminals “TG” and “T In” on terminal strip J8.

3. Press Enter to accept and return to the Menu Entry 9.

MENU ENTRY 10 – Print Parameters List

The data to be printed is output via the RS232 serial data port, which is provided on the Masterweigh. The communication parameters are as follows:

Baud Rate	19.2kB	Stop Bits	1
Data Bits	8	No Parity Check	

1

1. Press the Enter key at Menu Entry 10 to print the current stored values of the various weigh parameters.

Note that some versions of software have had this feature disabled. The menu will still be present, but pressing the Enter key will do nothing.

MENU ENTRY 11 – PID O/P Auto/Manual

The current operating mode of the PID output, "Auto" or ""Manual", is displayed at the bottom right corner of the display. Additionally, when the PID output is in manual mode an upper case "M" is displayed in the bottom right corner of the main "mass rate/mass total" menu.

1

Menu entry: 11 PID O/P Auto/Manual Mode = Auto

2

Rate = 286.472 S.P. = 300.0 O/P = 53% +/- controls O/P, Press Enter when done

3

PID O/P Mode = Auto Press Clear to change, Enter to accept

1. Press Enter key at Menu Entry 11. The current measured values of mass rate, PID setpoint and the manual mode PID output settings are displayed.

2. When operating in automatic mode, the PID output performs as previously, the output being based on the current mass rate, PID setpoint and PID constants. When operating in manual mode, the PID output is forced to the value displayed (for the manual mode PID output) as a percentage of 4-20mA. The value of the manual mode PID output can be increased or decreased by using the '+' or '-' keys. The keys increment/decrement the output in 0.5% steps, to take advantage of the maximum analog output resolution of the Masterweigh. The +/- keys are auto repeating if pressed for more than one second, to allow fast setting of the desired manual mode PID output value. Note that when manually entering PID values, the values can roll over eg. if the current value is 100% and the + key is pressed, the output will become 0%. If the current value is 0% and the - key is pressed, the output will become 100%. The PID value can also be set by 2-digit key entry ie a PID value of 56% can be entered by pressing the 5 and then the 6 digit keys. The range of the manual mode PID output is automatically limited to values between 0 and 100% (4-20mA). Press the Enter key to move to the next level.

3. Pressing the Clear key toggles the current PID output mode and the display will indicate any mode changes. Pressing the Enter key will accept the PID output mode currently displayed and return to Menu Entry 13.

MENU ENTRY 12 – PID Parameters

The Masterweigh includes a proportional/ Integral/Differential (PID) control loop for use in controlling mass flow rate. The PID variable for the controller is the current mass flow rate as displayed by the Masterweigh. The output from the controller is via a 4-20mA analog output (channel 2). The controller output is updated once per second, and would normally be used to control belt speed.

1

```
Menu entry :  12
PID parameters        PID action: forward
```

2

```
Local setpoint =  10.000 tonnes/hour
Enter new value?    0.000
```

3

```
Proportional term =    0.700
Enter new value?     0.000
```

4

```
Integral term =   0.050
Enter new value?   0.000
```

5

```
Integral lower limit =  -0.500
Enter new value?  0.000
```

6

```
Integral upper limit =    0.800
Enter new value?  0.000
```

7

```
Differential term =   0.000
Enter new value?   0.000
```

8

```
Output offset term =   0.000
 Enter new value?    0.000
```

1. Press Enter at Menu Entry 12.

2. Enter a new set point in mass units if required. This value will only be used in the control algorithm if the setpoint mode is set to "Local" in Menu 13. Pressing Enter without typing new data will move the display to the next entry without altering the stored data.

3. Enter a new proportional gain term if required, or press Enter only to leave data unchanged.

NOTE: The proportional term is "normalised" by the Masterweigh such that a gain of 1, an error of 100% full load capacity (as currently set in Menu 1), will cause a full scale (100%) out current.

4. Type in a new integral term, or Enter only to leave data unchanged.

NOTE: The integral term is "normalised" by the Masterweigh such that with an integral term of 0.01 and an error equal to the current capacity (as set in Menu 1), 1% will be added to the current output level each 0.5 second. (Or say 10% for an integral term of 0.1)

5. This entry allows the operator to prevent Masterweigh decrementing the integral term below a set value, thus preventing "wind-up".

6. This entry allows the operator to prevent Masterweigh incrementing the integral term above a set value, thus preventing `wind-up`.

7. Enter a new differential term, or press Enter to retain existing data. The differential (or derivative) term is normalised such that with a differential term of 1, a change in error equal to the current capacity in 1 second, will cause an instantaneous output of 100%.

8. Enter a new output offset term if required, or press Enter only to leave the current output unchanged.

Note: The output offset term is "normalised" by the Masterweigh such that, with an output offset term of 0.1, the normal PID controller output will have added to it a value equal to 10% of full-scale.

MENU ENTRY 12 – PID Parameters (Cont'd)

9

Feed forward term = 1.000 Enter new value? 0.000

10

PID action: Forward Enter new value? Forward = 1 Reverse = 2 0

11

Volumetric restart period = 5 sec Enter new value? (Max 20) 0 Sec

12

Volumetric restart threshold = 5,0 % Enter new value? (Max 50) 0.0%

13

To zero accumulated Integral press E Else press A

9. The feed-forward control component operates by multiplying the set point value by the entered feed-forward term and adding the result onto the PID control algorithm calculated output value.

Feed-forward control has a beneficial effect on controller response time and stability when the process being controlled has a long time delay. The feed-forward term can be set to zero for control applications where it is not required. Enter the new value for the feed-forward term. If no value for the feed-forward term is entered, then no change is made to the currently stored value.

10. This changes the PID action between forward and reverse, which will invert the PID output action from 4-20mA to 20-4mA

11. Enter the new Volumetric restart period, (maximum period allowed is 5 sec) and then press the Enter key. If the Enter key is pressed with no data entry then the stored value remains unchanged.

12. Enter the new Volumetric restart threshold, (maximum value allowed is 50%) and then press the Enter key. If the Enter key is pressed with no data entry then the stored value remains unchanged.

13. It may be desirable to zero an accumulated integral in the PID controller; for example, after the Masterweigh is left operating when the belt has been stationary for some time. At this stage pressing the Enter key will zero the accumulated integral. If abort is pressed instead, then the current accumulated integral will remain unchanged.

The **volumetric restart** feature works in the following way. When the belt stops (detected by the tacho input being less than 5Hz), the MW1 stores the PID output value 1 second before the belt stopped. When the belt is restarted, and the stored value is above the "Volumetric Restart Threshold", then the PID output is held at the stored value for the "Volumetric Restart Period". If the setpoint was changed while the belt was stopped, the PID output value will be set to a value of the stored value multiplied by the ratio of the current setpoint over the setpoint when the belt stopped. There is a divide-by-zero test in case the setpoint was set to 0 when the belt was stopped; in which case the output is not scaled.

The Volumetric Restart Threshold is used to prevent the system from oscillating, where if the PID goes low enough to stop the belt, and the belt is then restarted the output will be held at the previous value, which will stop the belt, etc, etc, etc. If the PID value recorded when the belt stopped is below the Volumetric Restart Threshold, a normal restart will occur, i.e. no Volumetric Restart action.

The Masterweigh can accept a feed rate setpoint from the keypad, by reading a current flowing in an external 4-20mA current loop, or by means of the optional serial communications boards (Note: The setpoint can also be set from the RS232 communications port.

If the remote signal input is enabled, the input signal is converted to a mass rate where 4mA represents 0 units and 20mA represents full scale belt capacity.

MENU ENTRY 13 – Remote Setpoint

The remote setpoint is displayed in Menu 13 in units of mass.

1

Menu Entry : 13 Remote Setpoint Mode = On

2

Remote Setpoint = On Press Clear to change, Enter to accept

3

WARNING: Calibration Data Do Not Modify – Press A to continue

4

Remote Setpoint 4mA Press Clear to calculate new calibration

5

Remote Setpoint 20mA Press Clear to calculate new calibration

At Menu Entry 13, press Enter to proceed.

1. The remote setpoint will be displayed as "On" or "Off" depending on whether remote setpoint operation has been enabled or not.

2. Pressing "C" (Clear) will toggle the remote setpoint operation either "On" or "Off".

3. The display drops through on pressing "E" to the above warning message. If you do not wish to calibrate the current loop input, press "A". To calibrate the input, press “E”, and perform the following steps to calibrate the remote setpoint.

4. Press "C" while injecting a 4mA signal from an external device.

5. Press "C" while injecting a 20mA signal from an external source as above.

The display will now revert back to Main Menu 13 heading displaying:

Menu Entry 13 Remote Setpoint Mode = ON

MENU ENTRY 14 – Setpoint

This menu displays the current setpoint value, and the setpoint mode, as below:

Menu Entry: 14 Setpoint = 10.334 tonnes/hr. Remote

If the setpoint is set to a value below the null level as set in menu 6 the PID 4-20mA output is set to 4 mA. The display will show Nulled as shown below.

This feature prevents the Masterweigh from starting the belt when the remote setpoint is used to stop the belt and noise on the 4-20mA signal may be interpreted as a signal.

Menu Entry : 14	Nulled
Setpoint = 0.074 tonnes/hr	Remote

MENU ENTRY 15 –Filter Factors

Filtering can be applied to the following functions:

- Displayed mass rate
- 4-20mA mass rate output
- Tacho input
- Remote Setpoint input
- Mass Rate output to PID Controller
- PID Controller output

The level of filtering is specified by a constant that may be in the range 1 second to 120 seconds. Time constants greater than 120 seconds have the same effect as a 120-second constant.

A time constant of 1 second is equivalent to no filtering. Time constants greater than 1 second introduce a delay in the rate of change of the filtered function.

1

Menu Entry: 15 To modify Filter factors press Enter

2

Display Time constant is	2 secs
Enter new Time constant	0

3

Rate O/P Time constant is	4secs
Enter new Time constant	

4

Cascade Time constant is	1 secs
Enter new time constant	

5

PID I/P Time constant is	1 secs
Enter new Time constant	0

6

PID O/P Time constant is	1 secs
Enter new Time constant	0

1. Press Enter to modify the display filter time constant.

2. The display mass rate filter time constant is shown. When a time constant of greater than 1 is selected, the main mass rate display is damped. A new value for the display filter constant may be entered.

3. The 4-20mA mass rate output filter time constant is now displayed. A new value for the mass rate output filter constant may be entered.

4. The time constant for cascade control to PID input filter is displayed. A time constant of greater than 1 will cause the cascade input signal to be damped before being applied to the PID control algorithm. A new value for the Cascade filter constant may be entered.

5. The PID controller input filter time constant is displayed. A time constant of greater than 1 will cause the mass rate signal, which is fed back to the PID input, to be damped before it is applied to the PID control algorithm.
A new value for the PID input filter constant may be entered.

1. The PID controller output filter time constant is displayed. A time constant of greater than 1 will cause the PID control algorithm output signal to be damped before it is output via the 4-20mA output. A new value for the PID output filter constants may be entered. Operation now returns to Menu Entry 15.

Note: At each step, pressing the Enter key will save the new value. If a new value has not been entered, then the current value is unchanged.

MENU ENTRY 16 –Displayed Units

The displayed units for mass rate and total may be selected from tonnes, lbs, tons or kgs. The displayed units for mass rate will be the same as those selected for mass total, ie. tonnes/hour, lbs/hour, tons/hour or kgs/hour.

1

Menu entry : 16 To modify display units, Press E

2

1 = tons	2 = lbs
3 = kgs	4 = tonnes

1. Pressing the Enter key will advance to select mass units.

2. At this stage the mass units which can be displayed are shown. To select the mass unit required press the number key associated with it, then press the Enter key. The units number selected will be shown in the lower right hand corner of the display. Numbers greater than 4 will not change the currently displayed mass total and mass rate units. Pressing the Enter key without entering a new unit number, or pressing Abort, will not change the currently displayed units.

3. Press Menu and Enter to save.

MENU ENTRY 17 – Belt Speed Indication

This entry displays the current belt speed in metres/second (or feet/minute if the mass rate unit is in tons or lbs) based on the total belt length in metres. This Menu does not need to be programmed, however it may be useful.

1

Menu entry: 17 Belt speed = 3.10 metre/second

2

Current belt total length = 200.000m Enter new belt total length 0.000m

3

Enter measured belt speed in metres/min 0.000 Press E for belt length

4

Calculated belt length = 0.000 metres Press E to save, otherwise Press A

1. This entry shows the current calculated belt speed. Press Enter once view the current belt loading.

2. The current value for the belt length is shown. If the belt length is known, enter it here.

3. If the belt length is not known, and an accurate belt speed has been physically measured from the belt itself, the Masterweigh can calculate the belt length. Enter the measured belt speed in the units shown, then press Enter to calculate the new belt length.

4. If you entered a belt speed, this value will be the calculated belt length. If it appears correct, Press enter to save the value, or abort to ignore the calculation. Note that if you entered a belt length in step 3 and not a belt speed in step 4, this value will be meaningless. Press Enter to continue.

MENU ENTRY 18 – Clearing Mass Total

Menu entry : 18 Press C, to clear Mass Total

1. When the mass total on the "Mass Rate/Mass Total" display (MRMT) is to be zeroed, press C at Menu Entry 18. All totalised figures are then cancelled by the integrator.

Press Menu, then Enter to return to the MRMT display.

RE-CONFIGURING MASTERWEIGH 7

Under some circumstances Masterweighs memory can be corrupted so that correct operation of the unit is not possible. This condition can occur if Masterweigh has been subjected to severe electrical noise or spikes.

This phenomena usually occurs on 240/110V AC power lines; however they can also appear on the load cell input cables as well as the tachometer cables. Masterweigh has been protected as far as possible; however, severe noise or spikes can get through.

Once any part of memory has been corrupted Masterweigh will detect it and automatically flag an error. If the corruption has only changed data, an error may not be detected and some erroneous results may occur. The only way to clear the memory of this data is by re-configuring.

Switching the power off and on will not clear the memory. The act of re-configuring causes all the calibration data to be lost and replaced by factory data. The calibration data specific to your application can easily be re-entered if you have kept a note of what was in the menus.

Menu 1 however, does have specific data that is logged on the main PCB under Calibration zero and Precision ref.

LOG ALL CALIBRATION DATA, AS YOU MAY NEED TO MANUALLY RE-ENTER IT AT A LATER DATE.

TO RE-CONFIGURE MASTERWEIGH 7 PROCEED AS FOLLOWS:

1. Switch off Masterweigh.

2. Simultaneously press the “Backlight” and “Abort” keys.

3. With both the above keys pressed switch Masterweigh on.

4. The display will now show the message:

Press C to Configure
Any other key to continue

5. Now press the C key and Masterweigh will return to normal running mode.

6. Masterweigh is now configured to factory defaults.

7. Press Menu to enter Menu entry 1, then press C to enter the calibration data section. The display will warn you not to continue. Press Enter to continue.

8. The display will request a new Calibration Zero to be entered. Enter the value that is engraved onto the right hand side of the main PCB under the label “Cal Zero”, then press E.

9. The display will request a new Precision Reference. Enter the value that is engraved onto the right hand side of the main PCB under the label “Prec. Ref.”, then press Enter.

10. Press M then E to return to normal running mode.

Remember: If MW7 is re-configured all calibration data is lost! Keep Notes.

FACILITIES AVAILABLE

Introduction

The Masterweigh is a precision microprocessor based instrument for accurate integration of mass totals in belt scale applications.

The "core" of the highly successful Masterweigh design has been in operation for many years and has been proven in the field and tested by the National Standards Authority of Australia. The tests on the core proved that the instrument is accurate to 0.1% over its operating range. The operating environment is based on a series of discrete Menus. Each menu allows the user to set up a working environment or calibrate the system.

For a detailed description of each menu, refer to **Section OP-3-OP** of the manual.

Note that detailed information relating to the keyboard operating command procedures is to be found earlier in this manual.

Load Cell Input and Excitation

The Masterweigh is designed to accept a load-cell millivolt signal in the range 0 to 32 millivolts with a resolution of approximately 4 microvolts.

An on-card voltage source provides excitation for the load cell. This source can provide excitation for up to four 350 ohm load-cells in parallel.

The excitation is not precisely controlled, but is maintained within approximately 1 percent of the set value. The Masterweigh monitors the excitation voltage and automatically compensates for any voltage change that may occur.

The excitation is adjustable over a wide range to enable optimum performance to be obtained from a wide variety of load cells and is normally set for 10.00V.

The Masterweigh is configured to provide a positive excitation voltage referenced to ground (unipolar). The positive voltage is continuously adjustable from +4 to +12 volts. The Masterweigh is factory set for a unipolar excitation of 10 volts.

Following adjustment of the excitation, allow a minimum of 30 seconds for the Masterweigh to update its internal excitation reading before proceeding with calibration functions.

The approximate value of the excitation voltage sensed by the Masterweigh is displayed in Menu 8. This should match the voltage sensed at terminals J9 pin 1 and 2. i (Allow 30 seconds for update of display after adjusting the excitation).

Incorrect configuration of excitation sensing will cause erratic mass rate readings.

The millivolt input accepts a differential millivolt signal, and will operate accurately over a common mode range of minus 8 to plus 8 volts. The input is overload protected to plus or minus 35 volts on either terminal with the Masterweigh energised, and plus or minus 20 volts on either terminal when not energised. Transient overload capacity is much higher than this continuous rating, and depends on the duration of the overload.

FACILITIES AVAILABLE (CONT'D)

Load cell Input and Excitation (Contd.)

The analogue to digital conversion is performed using voltage to frequency conversion techniques, thereby providing excellent rejection of signal noise over a wide frequency range.

With the exception of short periods allocated to self-calibration, the Masterweigh is continuously monitoring the load cell input rather than periodically sampling, as is the case for systems which use dual-slope integrating converters. This results in a more accurate measurement of the rapidly fluctuating input signal from the load cell.

Careful design of the input circuitry ensures excellent rejection of common-mode signals both AC and DC.

Note: The excitation voltage regulators are overload and short-circuit protected, however, short circuiting of the excitation output will interfere with normal operation of analogue input circuitry and the RS232 interface.

Caution: Application of an external voltage source to the excitation terminals may cause serious damage to the Masterweigh.

No calibration or adjustment of the Masterweigh analogue inputs is required. Gain and zero are automatically adjusted by the reference. This automatic calibration is repeated once every 30 seconds, whenever the Masterweigh is energised.

After energising the Masterweigh, always allow a minimum of thirty (30) seconds for this automatic calibration to be performed before initiating a span or zero calibration sequence.

(Note: If Masterweigh has not been energised for some time, allow 3 minutes before initiating the above).

FACILITIES AVAILABLE (CONT'D)

Tacho Input and Supply
a) Electrical Characteristics

The tacho input is designed to accept a voltage input of 2.5 to 50 volts peak and so will accept either a TTL or sinusoidal voltage input. The input threshold voltage is +1.2 volts at the positive input with respect to the negative input.

The negative input is directly connected to the Masterweigh grounds. Avoid earthing this input in the field as it will create ground loops.

The tacho input will not accept frequencies in excess of 800 Hz (approx.).

A regulated +5 volt supply is provided for energising a digital pulse generator. This supply is rated at 200mA maximum, and is overload and short-circuit protected.

It may be necessary to briefly remove all load after removing a short circuit in order to reset the protection circuit. Short-circuiting of the tacho +5 volt supply will not affect the Masterweigh CPU operation.

Masterweigh is fitted with a potentiometer (RV2) to adjust the tachometer's 5V rail if required. (Normally only used when the tacho supply drops to a voltage where the tachometer ceases to work owing to significant voltage drop from long cable runs, IS barriers or the like.

CAUTION: Application of an external voltage source to the tacho supply terminals may cause damage to the Masterweigh.

b) Frequency Selection

The tacho generator should be selected and fitted to provide a frequency input to the Masterweigh within the range 5 to 1000 Hz, to ensure compatibility & accurate measurement. The tachometer is normally selected for the user by the factory. Selection depends on rotational speed of the pick up pulley, which in turn is supplied by the user.

Note that the tacho frequency has no affect on the rate at which the load cell signal is sampled.

Pulse Output

The Masterweigh provides a pulse output for external accumulation of the mass total. Masterweigh provides for three methods of indicating when an change in Masterweigh's total has occurred.

1) An Internally Generated + 5VDC Pulse
2) An Internally Generated + 24VDC Pulse
3) Contact closure from an internal relay (providing voltage free contacts).

Which of these options is used can be selected from links LK6, LK7, Lk8 and LK9 as shown in the USER CONFIGURATION section.

The pulse duration is adjustable in Menu 1. One pulse is output each time the least significant mass total digit displayed is incremented by 1 count. A minimum of 20 milliseconds is guaranteed between pulses, thereby providing a maximum pulse rate of 25 pulses per second. (20 milliseconds on, plus 20 milliseconds off).

The internal +5V supply is regulated to +5V. It is not isolated from ground. External load resistance should not be lower than 50 ohms.

FACILITIES AVAILABLE (CONT'D)

The internal +28V is unregulated and may vary over the range 25-35V. It is isolated from ground to allow configuration of a fully isolated pulse output. This +28V supply is shared with the 4-20mA analogue loop output, and is rated at 400mA continuous maximum current.

The contact closure is completely isolated and is rated at 32V maximum and 500mA maximum. It must not be used for 110V or 240V operation.

All pulse outputs are protected by 2 of 500mA fast blow fuses, F2 and F3.

Analogue Output

The Masterweigh provides one 4-20mA analogue output channel, with a resolution of better than 0.5%. It operates as a loop-powered configuration and therefore derives its operating power from the 4mA residual loop current. A minimum of 20 volts is required to operate with zero ohms load, rising by 1 volt for every 50 ohms of load, ie. 30 volt supply required for 500 ohm load.

An isolated 24VDC regulated supply is provided on the Masterweigh power supply board, which can be used to energise the analogue loop.

Links LK2 and LK3 on the bottom power supply board, select either the onboard supply or an external supply connected in series with the analogue loop.

Span calibration of the output is readily performed by accessing the analogue calibration in the Menu 1 set up.

There is no provision for zero adjustment on the analogue output.

Earthing

This is achieved by installing the shunt on LK1 (link) located on the lower pcb above the capacitors. Installing this link will connect the Masterweigh's digital and analogue grounds to power earth.

Display Backlighting

The liquid-crystal display used in the Masterweigh provides LED backlighting for improved readability under adverse light conditions. If the unmarked key has not been activated then the display will switch off if any key has not been used within 5 minutes.

System Output Status

A voltage free contact has been provided for remote monitoring of the Masterweigh autozero function. If the autozero function returns a value that is outside the "high and low" limits that were set in Menu 7, the relay will energise. It will remain energised until an operator initiated zero is performed in Menu 3.

USER CONFIGURATION

Power Supply PCB (Lower Board)

LK1 Grounding

When the shunt is in position Masterweigh is referenced to ground. When open Masterweigh is floating.

LK2, LK3 Current loop supply

These links select the power supply for the analogue output current loop. The supply can be an internally generated isolated 24VDC supply, or an external supply of 20 to 50VDC.

Set the links to select the appropriate power source as follows:

Internally generated:

LK2	LK3
A	A

Externally generated:

LK2	LK3
B	B

LK6, LK7 Totaliser Pulse Output

These links select whether the totaliser relay is potential free or switches the internal 24Vdc. Set the links to suit the external counter device.

Internally generated +24 VDC (Isolated):

LK6	LK7
A	A

Voltage free contacts:

LK6	LK7
B	B

POTENTIOMETER ADJUSTMENTS

Power Supply PCB (Bottom Board)

RV1: Used to adjust the load cell excitation used in conjunction with a digital meter.

RV2: Used to adjust the tachometer supply voltage. The voltage can be adjusted 5-23V and is set to 5V at the factory. The voltage can be adjusted when there is a voltage drop at the tachometer due to long cables, or Intrinsic Safety Barriers are used. If a Proximity switch is used the voltage can be adjusted to the correct supply voltage.

CPU PCB (Top Board)

VR1: Adjusts the LCD display viewing angle so that the display can be easily read.

VR2: Used to span the 4-20mA analogue output channel. Connect a digital current meter in series with the analogue output. Set the analogue output to 20mA (see Menu 1). Adjust the output using VR2 until the current meter shows 20.00

FIELD TERMINAL STRIPS

J3 – Power supply input

1. A	240VAC/110VAC	Active
2. N	240VAC/110VAC	Neutral
3. E	240VAC/110VAC	Earth

J5 – System Status Relay

1. COM	Common contact
2. NO	Normally open contact
3. NC	Normally closed contact

J6 – Pulse counter outputs

1. P+	Pulse Counter Output
2. P-	Pulse Counter Output
3. SLD	Screen

J7 – Auxiliary 24V DC output

1. GND	24V ground
2. 24V	24V

J8 – Tachometer inputs

1. TG	Tacho Ground
2. TIN	Tacho Signal In
3. TE	Tacho supply +5V
4. SLD	Screen

J9 – Load cell inputs

1. L+	Load cell signal output +ve
2. L-	Load cell signal output -ve
3. E+	Load cell excitation +ve
4. E-	Load cell excitation -ve
5. SLD	Load cell Shield

J10 – Analogue Rate output

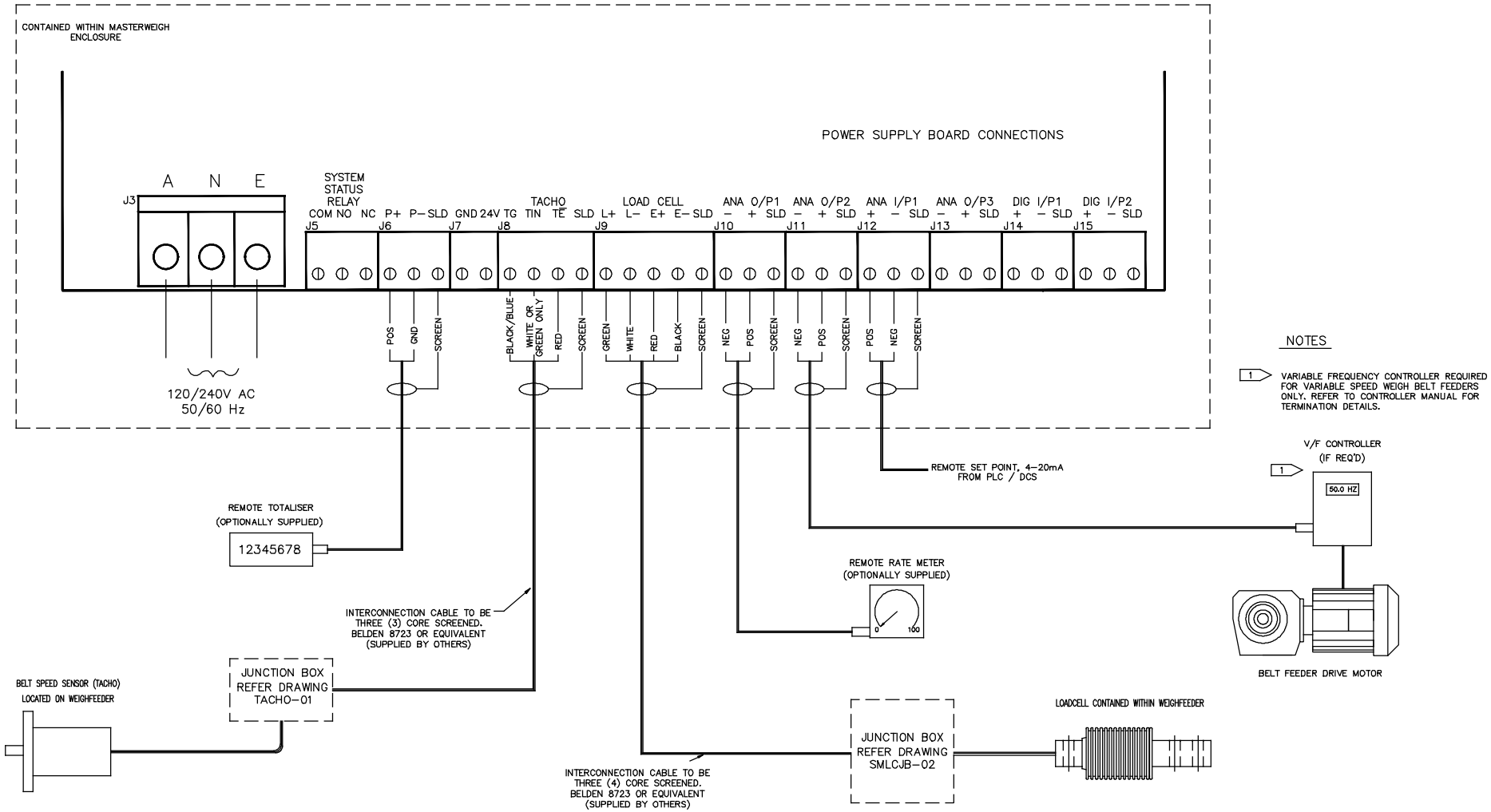
1. -	Analogue output -ve
2. +	Analogue output +ve
3. SLD	Screen

J11 – PID Analogue output

1. -	Analogue output -ve
2. +	Analogue output +ve
3. SLD	Screen

J12 – Analogue Set point input

1. +	Analogue input +ve
2. -	Analogue input -ve
3. SLD	Screen



REVISIONS

A: 16/08/2011 ORIGINAL ISSUE

CERTIFICATION

WEB−TECH AUSTRALIA PTY. LTD. CUSTOMER No.:

CUSTOMER CUSTOMER ORDER No.:

- ☐ RETURN OF APPROVAL NOT REQUIRED
- ☐ RETURN APPROVAL FOR RECORD
- ☐ BEFORE MANUFACTURING PROCEEDS

WEB−TECH AUSTRALIA PTY. LTD.

CERTIFIED BY: DATE / /

CUSTOMER APPROVAL DATE / /

- ☐ APPROVED FOR CONSTRUCTION
- ☐ APPROVED AS NOTED
- ☐ APPROVED AS NOTED − RESUBMIT

UNLESS OTHERWISE STATED UNTOLERANCED DIMENSIONS TO BE WITHIN THE LIMITS SHOWN

NOMINAL SIZE	UP TO 80	ABOVE 80, UP TO 150	ABOVE 150, UP TO 300	ABOVE 300, UP TO 1000	ABOVE 1000
MACHINING	± 0.1	± 0.2	± 0.3	± 0.5	± 1.0
FABRICATION	± 0.5	± 0.5	± 0.5	± 1.0	± 2.0
ASSEMBLIES	± 0.5	± 0.5	± 0.5	± 1.0	± 2.0

DRAWN	M. WILDE
CHECKED	
APPROVED	
DATE APP'D	
SCALE	N.T.S.

DO NOT SCALE IF IN DOUBT ASK

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SPECIFIED

WEB−TECH AUSTRALIA PTY. LTD.
A.C.N. 010 764 431
11 ELECTRONICS STREET EIGHT MILE PLAINS, QUEENSLAND, 4113, AUSTRALIA
P.O. BOX 4006 EIGHT MILE PLAINS, QUEENSLAND, 4113, AUSTRALIA
Phone +61−7−3841 2844 Fax +61−7−3841 0005

TITLE ELECTRICAL CONNECTION DIAGRAM FOR MASTERWEIGH 7

SIZE	DRAWING No. NUMBER	SHT.	REV.
A1	WTMW7	01	A

CONTRACT

PROJECT

CAD FILE WTMW7

REVISIONS			
	A	28/02/25	ORIGINAL ISSUE

UNLESS OTHERWISE STATED UNTOLERANCED DIMENSIONS TO BE WITHIN THE LIMITS SHOWN		NOMINAL SIZE	UP TO 99"	ADD'VE UP TO 150"	ADD'VE UP TO 300"	ADD'VE UP TO 1000"	ADD'VE 1000"
DRAWN	M.W.	MACHINING	±.01	±.015	±.03	±.05	±.10
CHECKED	M.W.	FABRICATION	±.05	±.15	±.05	±.10	±.20
APPROVED	M.W.	ASSEMBLIES	±.05	±.15	±.05	±.10	±.20
DATE APP'D	18/06/2003						
SCALE	N.T.S.						

DO NOT SCALE IF IN DOUBT ASK

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SPECIFIED

CONTRACT			
PROJECT			
CAD FILE			

TITLE: **LOADCELL JUNCTION BOX CONNECTION DIAGRAM**

WEB-TECH AUSTRALIA PTY. LTD.
UNIT 3, 8 LEFEBVRE STREET, CLIFTON HILL, VICTORIA, 3068, AUSTRALIA
PO BOX 4906, EAST MELBOURNE, VICTORIA, 8002, AUSTRALIA
Phone: +61-3-9417 2844 Fax: +61-3-9417 2822

SIZE	DRAWING No.		
	NUMBER	SHT.	REV.
A1	SWLCJB-02	1	B

LOADCELL JUNCTION BOX MOUNTED ON FEEDER

LOADCELL J-BOX TERMINATION BOARD

LOADCELL 1 / LOADCELL 2 / INDICATOR

	J1		J2		J3	
SIGNAL+	○	L+	○	L+	○	L+
SIGNAL−	○	L−	○	L−	○	L−
SCREEN	○	SCREEN	○	SCREEN	○	SCREEN
EXCITE+	○	E+	○	E+	○	E+
SENSE+	○	SENSE+	○	SENSE+	○	E−
EXCITE−	○	E−	○	E−	○	SENSE+
SENSE−	○	SENSE−	○	SENSE−	○	SENSE−

TO ELECTRONICS: SIGNAL +, SIGNAL −, EXCITATION +, EXCITATION −, SCREEN

NOTES

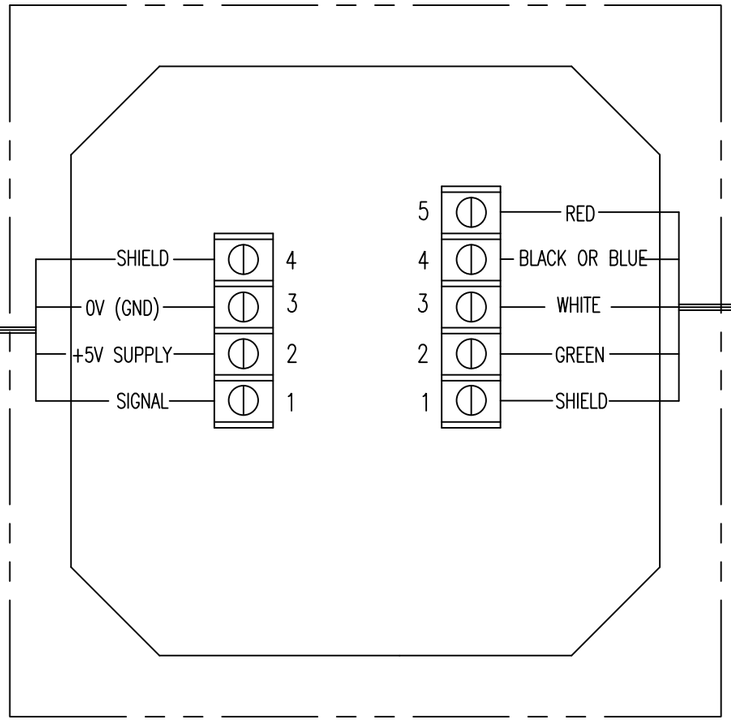
1. DEPENDING ON THE MODEL OF BELTSCALE/FEEDER 1 OR 2 LOAD CELLS MAY NEED TO BE CONNECTED
2. WIRNG FROM BELTSCALE/FEEDER TO LOCAL JBOX
3. BELDON 8732 OR EQUIVALENT. SUPPLY & WIRING BY OTHERS.

NOTES

1. SOME LOADCELLS DON'T HAVE SENSE WIRES IF THE LOAD CELL HAS SENSE WIRING TERMINATE AS SHOWN MW1/MW5/OPTIMUS DO NOT REQUIRE SENSE WIRING.

TYPE	L+	L−	E+	E−	SENSE+	SENSE−
TEDEA	RED	WHITE	GREEN	BLACK	BLUE	BROWN
RLHBB	WHITE	RED	BLUE	BLACK	GREEN	GREY
LPX	GREEN	WHITE	RED	BLACK	N/C	N/C
RL30DD9	GREEN	WHITE	RED	BLACK	N/C	N/C
WTD-132	GREEN	WHITE	RED	BLACK	N/C	N/C
ML30DD	GREEN	WHITE	RED	BLACK	N/C	N/C

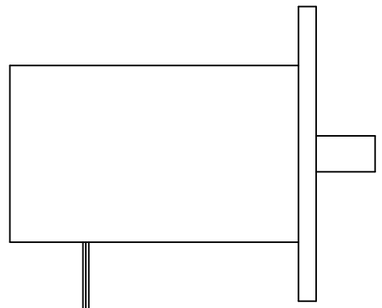
SPEED SENSOR (TACHO) JUNCTION BOX



CABLE SUPPLIED BY CUSTOMER. CABLE TO BE BELDEN 3 CORE PART No. 8770 OR EQUIVALENT

CABLE INTEGRAL TO TACHO

SPEED SENSOR (TACHO)



TO MASTERWEIGH 6/7 ELECTRONICS

J8 TERM. "SLD"	SCREEN
J8 TERM. "TG"	0V (GND)
J8 TERM. "TE"	+5V SUPPLY
J8 TERM. "TIN"	SIGNAL

REVISIONS

A: 26/10/98 ORIGINAL ISSUE

DRAWN	L.HARTLEY
CHECKED	L.HARTLEY
APPROVED	L.HARTLEY
DATE APP'D	26/10/98
SCALE	N.T.S
	DO NOT SCALE IF IN DOUBT ASK

WEB-TECH AUSTRALIA PTY. LTD.
A.C.N. 010 764 431
11 ELECTRONICS STREET EIGHT MILE PLAINS, QUEENSLAND, 4113, AUSTRALIA
P.O. BOX 4005 EIGHT MILE PLAINS, QUEENSLAND, 4113, AUSTRALIA
Phone +61-7-3841 2844 Fax +61-7-3841 0005

SIZE A1 | DRAWING No. NUMBER JB010014-67 REV. A

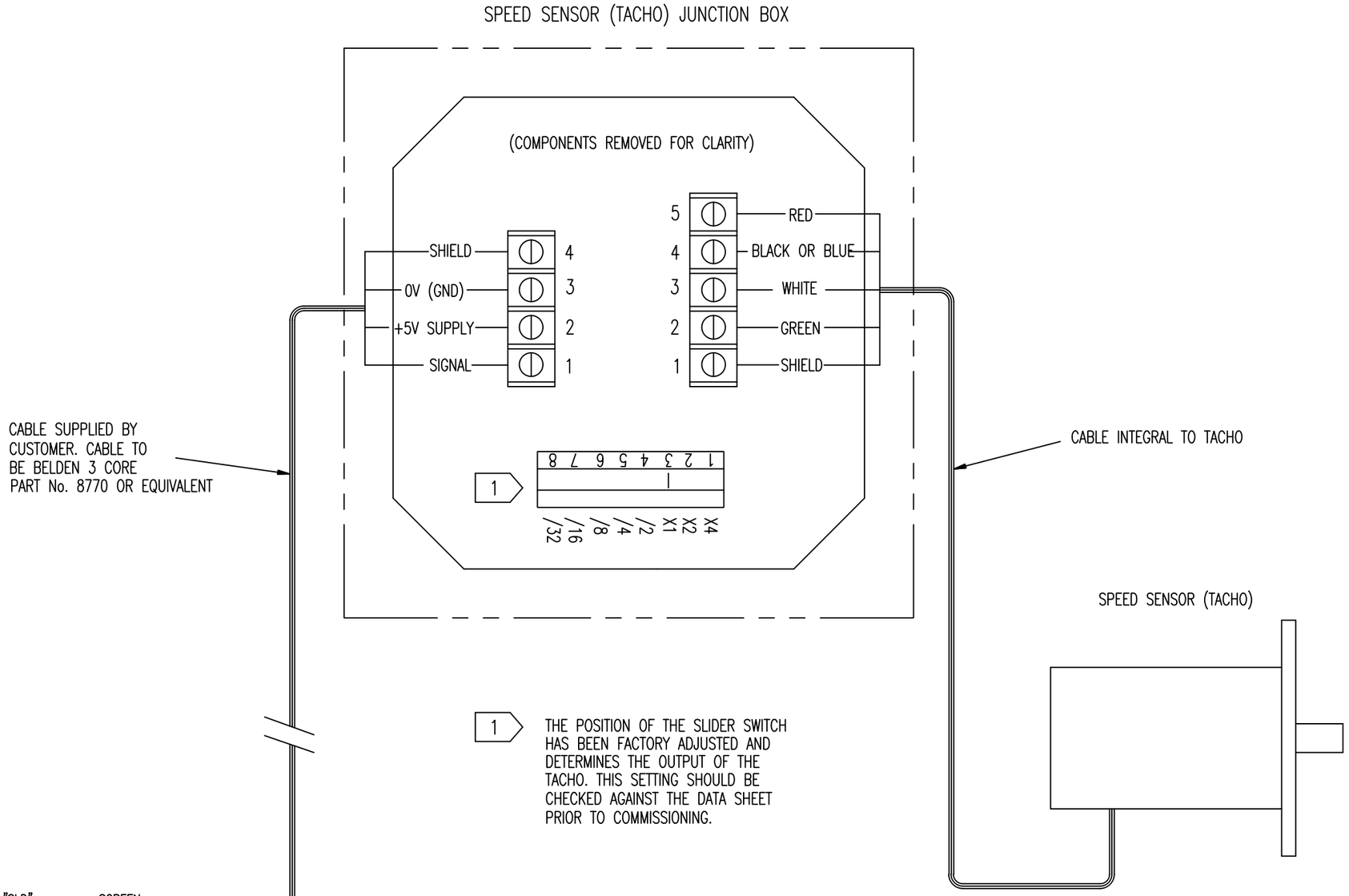
TITLE: TACHO (S/S) JUNCTION BOX WIRING (WITHOUT MULTIPLICATION) MASTERWEIGH 6/7 INTEGRATOR

CUSTOMER

PROJECT

CAD FILE JB010014

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SPECIFIED



1 THE POSITION OF THE SLIDER SWITCH HAS BEEN FACTORY ADJUSTED AND DETERMINES THE OUTPUT OF THE TACHO. THIS SETTING SHOULD BE CHECKED AGAINST THE DATA SHEET PRIOR TO COMMISSIONING.

REVISIONS
A: 26/10/98 ORIGINAL ISSUE

DRAWN	L.HARTLEY
CHECKED	L.HARTLEY
APPROVED	L.HARTLEY
DATE APP'D	26/10/98
SCALE	N.T.S
	DO NOT SCALE IF IN DOUBT ASK

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SIZE A1 | DRAWING No. NUMBER JB010015-67 REV. A

TITLE: TACHO (S/S) JUNCTION BOX WIRING (WITH MULTIPLICATION) MASTERWEIGH 6/7 INTEGRATOR

CUSTOMER

PROJECT

CAD FILE JB010015-67

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SPECIFIED

REVISIONS		
A:	29.02.96	ORIGINAL ISSUE
B:	15.03.04	ORIGINAL ISSUE

UNLESS OTHERWISE STATED UNTOLERANCED DIMENSIONS TO BE WITHIN THE LIMITS SHOWN	NOMINAL SIZE	up to 90	over 90 up to 315	over 315 up to 1000	over 1000
	ASSEMBLIES	±0.5	±0.5	±1.5	±2.0
	FABRICATION	±0.5	±0.5	±1.5	±2.0
	MACHINING	±0.1	±0.2	±1.3	±1.5
					±3.0
DRAWN	M.W.				
CHECKED	M.W.				
APPROVED	M.W.				
DATE APP'D	24/10/2003				
SCALE	N.T.S.				
DO NOT SCALE IF IN DOUBT	ABK				

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE SPECIFIED

TITLE	LOADCELL J-BOX (LARGE) CONNECTION DIAGRAM FOR VARIOUS TYPE LOADCELLS	CONTRACT
		PROJECT
		CAD FILE

WEB-TECH AUSTRALIA PTY. LTD.
11 DESTINATION STREET COMO WEST PERTH, WESTERN AUSTRALIA
PO BOX 486 COMO EAST MDC PERTH, DESTINATION, 6152 AUSTRALIA
Phone +61-7-3849 8844 Fax +61-7-3849 8805

SIZE	DRAWING No.		
A1	NUMBER SWLCJB-04	SHT. 1	REV. B

UNLESS OTHERWISE SPECIFIED
SOME LOADCELLS DON'T HAVE SENSE WIRES IF THE LOAD CELL HAS SENSE WIRING TERMINATE AS SHOWN OPTIMUS DOES NOT REQUIRE SENSE WIRING.

TYPE	L+	L–	E+	E–	SENSE+	SENSE–
TEDEA	RED	WHITE	GREEN	BLACK	BLUE	BROWN
RLHBB	WHITE	RED	BLUE	BLACK	GREEN	GREY
LPX	GREEN	WHITE	RED	BLACK	N/C	N/C
RL30000	GREEN	WHITE	RED	BLACK	N/C	N/C
WTD-132	GREEN	WHITE	RED	BLACK	N/C	N/C

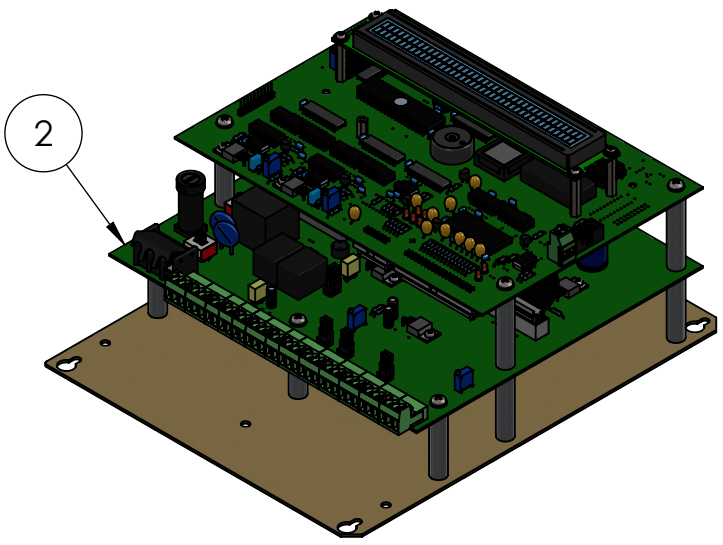
WIRING & SUPPLY BY OTHERS.
CABLE BELDON 8723 OR EQUIVALENT

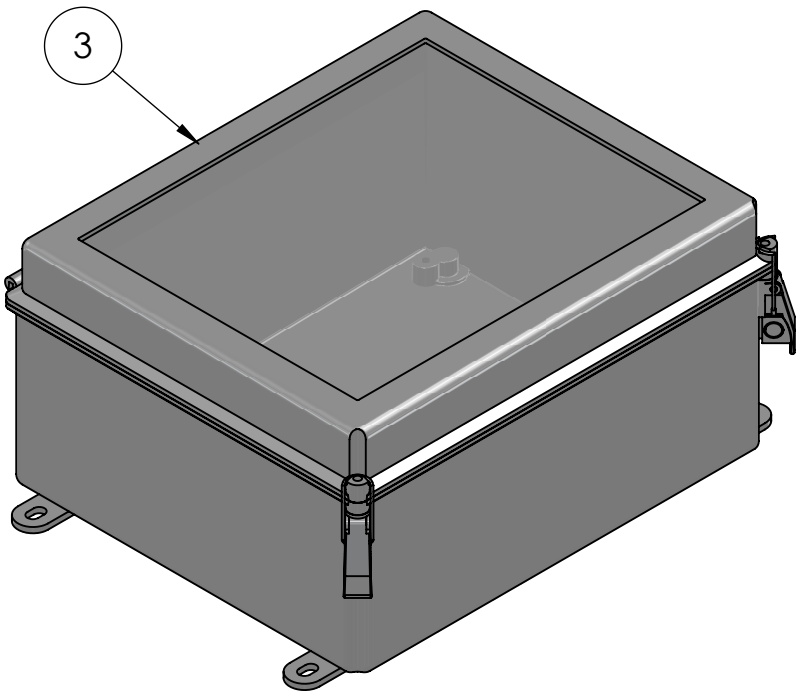
TO ELECTRONICS
SIGNAL +
SIGNAL –
EXCITATION +
EXCITATION –
SCREEN

LOADCELL 2
LOADCELL 1

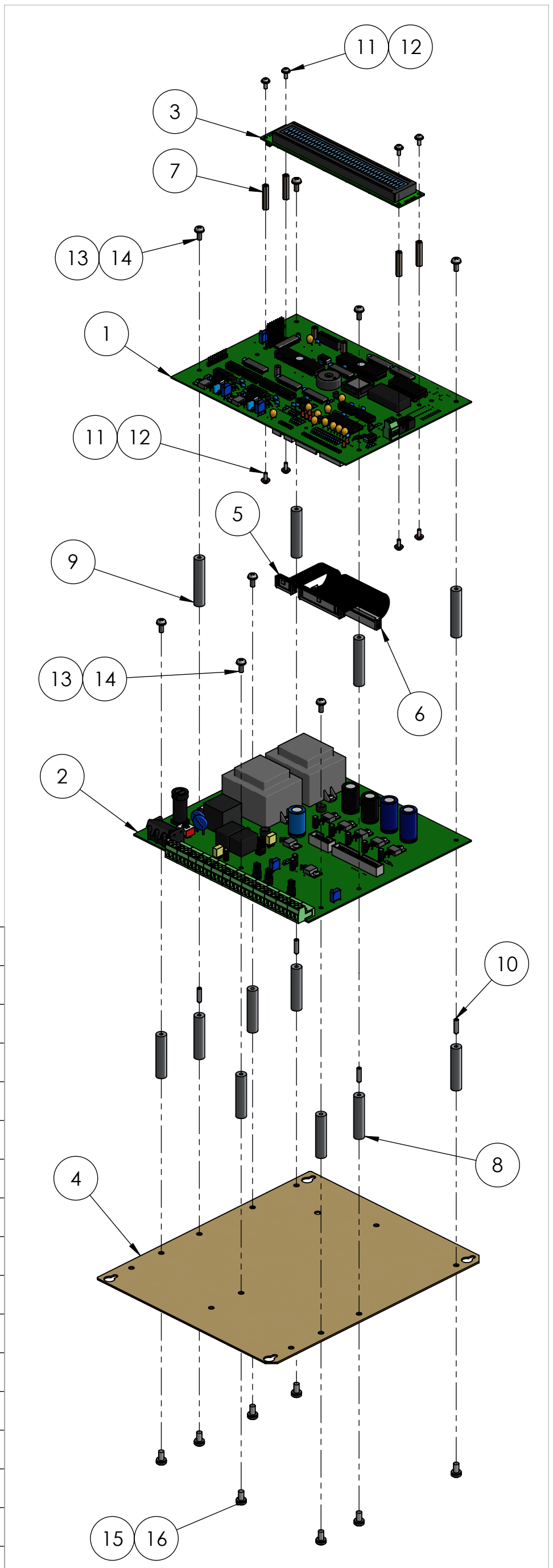
LOADCELL JUNCTION BOX
LOADCELL J-BOX TERMINATION BOARD

LOADCELL 1: J1 — L+ SIGNAL+; L– SIGNAL–; SCREEN SCREEN; E+ EXCITE+; E– EXCITE–; SENSE+ SENSE+; SENSE– SENSE–
LOADCELL 2: J2 — L+ SIGNAL+; L– SIGNAL–; SCREEN SCREEN; E+ EXCITE+; E– EXCITE–; SENSE+ SENSE+; SENSE– SENSE–
LOADCELL 3: J3 — SIGNAL+ WHITE; SIGNAL– RED; SCREEN – SCREEN; EXCITE+ BLUE; EXCITE– BLACK; SENSE+ GREEN; SENSE– GREY
LOADCELL 4: J4 — SIGNAL+ WHITE; SIGNAL– RED; SCREEN – SCREEN; EXCITE+ BLUE; EXCITE– BLACK; SENSE+ GREEN; SENSE– GREY
INDICATOR: J3 — L+ SIGNAL+; L– SIGNAL–; SCREEN SCREEN; E+ EXCITE+; E– EXCITE–; SENSE+ SENSE+; SENSE– SENSE–





ITEM NO.	QTY.	PartNo	DESCRIPTION
1	1	MW7-05-01	MASTERWEIGH 7 KEYPAD OVERLAY
2	1	MW7-20-01	MASTERWEIGH 7 INTEGRATOR STACK
3	1	MW6-80-01	MASTERWEIGH 6/7 HOFFMAN ENCLOSURE



ITEM NO.	QTY.	PartNo	DESCRIPTION
1	1	MW7-01-01	MASTERWEIGH 7 MAIN CPU BOARD
2	1	MW6-02-01	MASTERWEIGH 6/7 POWER SUPPLY BOARD
3	1	MW6-04-01	MASTERWEIGH 6/7 LCD DISPLAY
4	1	MW5-PLATE	HARDWARE MOUNTING PLATE
5	1	067-08-01	14-WAY RIBBON INTERCONNECTOR
6	1	067-09-01	40-WAY RIBBON INTERCONNECTOR
7	4	606-00	METAL HEX SPACER-5x25LG-M3
8	8	611-00	STANDOFF-10x45LG-M5/M4
9	4	612-00	STANDOFF-10x50LG-M4
10	4		Screw-Grub-M4x16LG-SS
11	8		WASHER - RED FIBRE - 1/8"x5/16"x1/32'
12	8		Screw-PH-Phillips-M3x8-SS
13	8		Washer-Flat-M4-SS
14	8		Screw-PH-Phillips-M4x10-SS
15	8		WASHER-SPRING-M5-SS
16	8		Screw-PH-Phillips-M5x10-SS

MW7 DATA SHEET					
Customer:			Conveyor Designation:		
Model:			Date:		
Load Cell Cap/Type:			Data by:		
Tare:	Serial No:		Material:		
Contract No.			Order No:		
Software version No:			Board S/N:		
Tacho:	Ppr. Type:		Multiplier :	Internal/External	

Menu	MASTERWEIGH 7 DATA				
1	Parameter Setup			Pulse Width:	ms
	Capacity	Inc	Zero ref: mV	Precision ref:	mV
2	Pulses:	Per Belt Rev.		No. of Belt Revs:	
3	Zero Calibration:		mV.	Z Track:	mV.
4	Fixed Weight Calibration		Calibration Weights :		
	Span:	Target Weight:		From Chains or Live Load Test	
5	Empirical Span:				
6	Null Level:	This value should be no more than 1 to 2% of design capacity.			
7	Autozero Tracking				
	Zero Track if < 0	For	Revs.	Delay Time:	secs
8	Load Cell Output				
	Static (No Load):	mV.	Static (with Weights):		mV.
	Dynamic (No Load):	mV.	Dynamic (with Weights):		mV.
9	Tacho Frequency:	Hz.	@ Motor frequency =		Hz.
10					
11	PID: Auto				
12	PID Parameters				
	Local Setpoint:				
	Prop Term:		Integral Term:		
	Integral Lower Limit:		Integral Upper Limit:		
	Differential Term:		Output Offset Term:		
	Feed Forward Term:				
13	Remote:				
14	Setpoint:	Mode:			
15	Filter Factors				
	Display:	secs.	Rate O/P: secs.	Cascade I/P :	secs.
	PID I/P:	secs.	PID O/P: secs.		
16	Displayed Units:	Kgs / Hr	Belt Serial Number :		
17	Belt Speed:	m/s	@ Motor freq. = Hz.	Belt Length :	m
	Resets =	Cleared to 1.	Configures =	Cleared to 1.	

WEB-TECH WEIGHFEEDER DESIGN DATA SHEET

CLIENT : **DATE :**

DESIGNATION : _____ **MODEL :**

CALIBRATION METHOD :

CALIBRATION BAR(S)

1. CALIBRATION BAR QTY AND TOTAL WEIGHT _____ = _____ **kg**
2. IDLER PITCH _____
3. TOTAL WEIGH AREA _____ **metres**
4. EQUIVALENT LOADING/m WITH CAL BAR(S) (Item 1 / Item 3) = _____ **kg/m**
5. BELT SPEED _____ **m/s**
6. SIMULATED MASS RATE (Item 4 x Item 5 x 60) _____ **kg/min**
=
7. BELT LENGTH _____ **metres**
8. No. OF BELT REVOLUTIONS FOR TEST _____
9. **TARGET WEIGHT (Item 4 x Item 7 x Item 8) =** _____
10. **TARGET WEIGHT after material tests =** _____

CALIBRATION CHAIN

1. WEIGHT OF CALIBRATION CHAIN PER STRAND **kg/m**
2. No. OF STRANDS
3. TOTAL WEIGHT OF CALIBRATION CHAIN (Item 1 x Item 2) **kg/m**
4. BELT LENGTH **m**
5. No. OF BELT REVOLUTIONS FOR TEST
6. **TARGET WEIGHT (Item 3 x Item 4 x Item 5) = kg**
7. **TARGET WEIGHT after material tests =**

SETTINGS

1. SHEARGATE OPENING (@ CENTRE) _____ mm
2. MIN. FREQUENCY ON VVVF DRIVE _____ Hz
2. MAX. FREQUENCY ON VVVF DRIVE _____ Hz