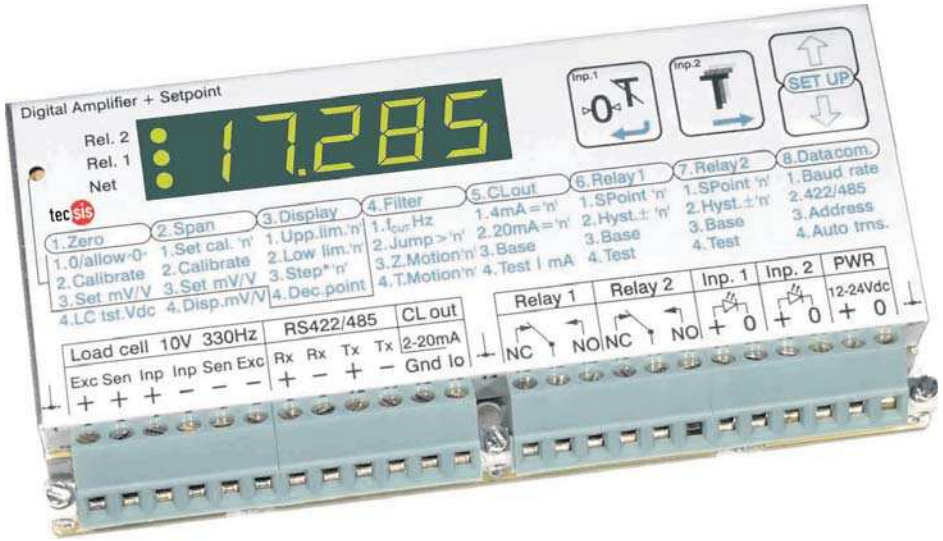
| Force | Pressure | Temperature | Switch | Service

Operating manual/Programmer`s manual



EZE30

Digital load cell ampilfier with analogue output and setpoints

ONE NAME. ALL SOLUTIONS.

tecsis

BE 948 a

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Recessed Enable Switch

(Enables changes to be made to important parameters. Must be pressed AFTER entering 'Set up' mode but before attempting to change parameters 1.1 to 1.3, 2.1 to 2.3 and 3.1 to 3.3)

Centre of Zero LED (±0.5d)

Minus Sign (>4 Digits ONLY)

Unit in Net Mode LED

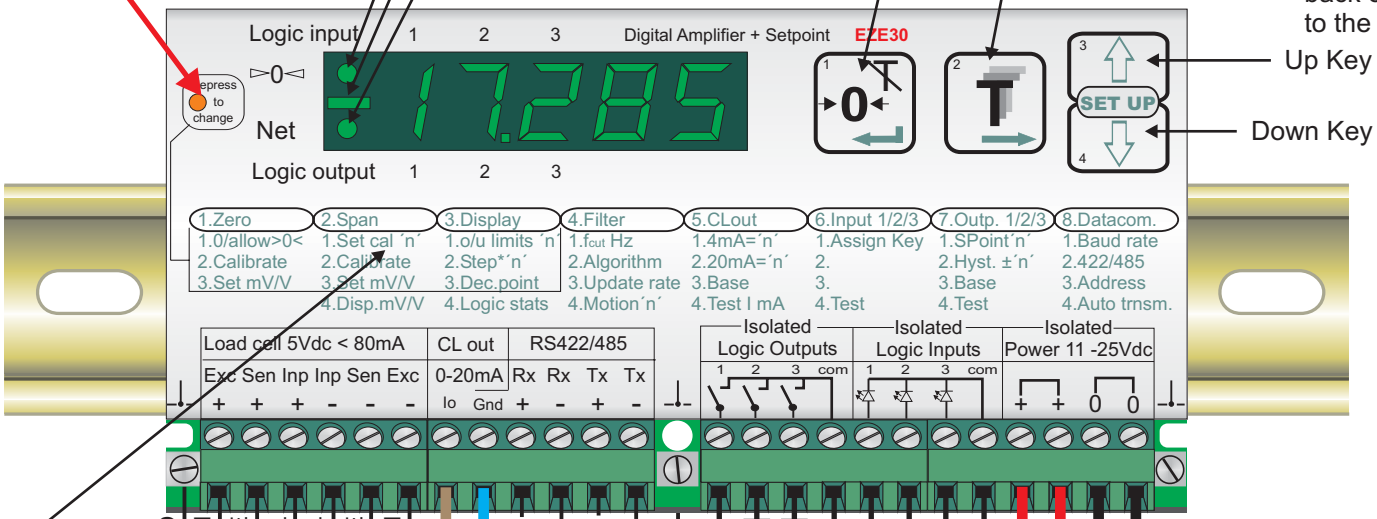
Zero Key - Sets new zero (if enabled). Reverts to calibrated zero if the button is held down for more than 3 seconds. Switches unit back to 'Gross' mode if a tare has been set. Acts as the 'Enter' key in the 'Set-up' Mode.

Tare Key - Puts unit into 'Net' mode. When inside 'Set-up' Menu this key moves the menu back one step. Also moves 'Digit Selected' to the right when inside sub menus.

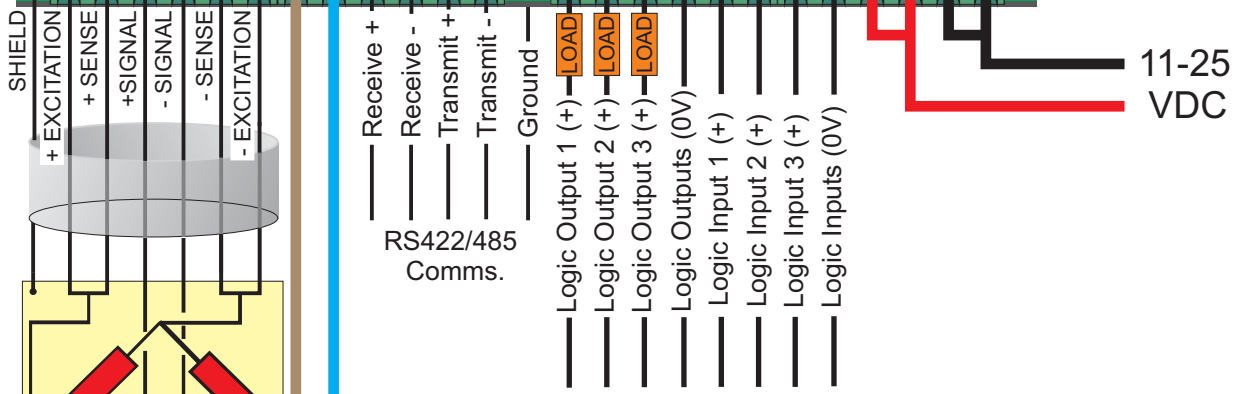
Up Key

Down Key

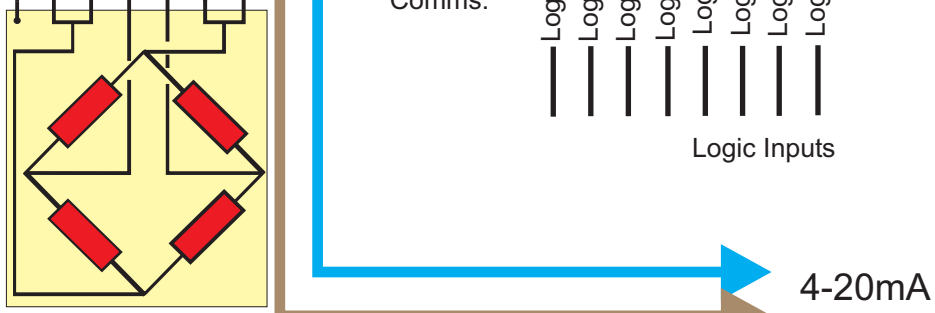
Press either Key for more than 3 seconds to enter the 'Set up' Mode



'Set-up' menu structure



*Please note that if you have a 4 wire cable from your junction box or load cell to the EZE30, you MUST put in additional links between the Exc+ and Sen+ terminals and between the Exc- and Sen- terminals. Otherwise the display will show Err 5 (faulty load cell connection)



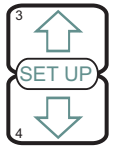
Load cell connections*

4-20mA Output

QUICK SET UP AND CALIBRATION USING WEIGHTS

(Also see calibration examples on page 22)

Enter the Setup menu



Press the UP or DOWN key for more than 3 seconds to enter the Set-up Menu

Please note that if you wish to change any values in these sections, you have to first press the recessed enable switch (top left corner of unit)

Set the Display Upper Limit

SET THE DISPLAY OVER RANGE LIMIT. (MAXIMUM VALUE +99,999)
Use this menu point to define the display maximum value. If the displayed weight exceeds this maximum, the display will then show over range (dashes at the top of the display). This can be useful to indicate when a weight value is outside a normal range. Use the UP/DOWN & MOVE RIGHT keys to set the maximum display value and store by pressing the enter key. Factory default value 10,000. Please note that the zero button is limited to ±2% of the display maximum value. See section 1.1 Zero Button Enable for more details

Set the Display Lower Limit

SET THE DISPLAY UNDER RANGE LIMIT. (MINIMUM VALUE -99,999).
Use this menu point to define the display minimum value. If the displayed weight drops below this minimum, the display will then show under range (dashes at the bottom of the display) This can be useful to indicate when a weight value is outside a normal range. Use the UP/DOWN & MOVE RIGHT keys to set the minimum display value and store by pressing the enter key. Factory default value -9,999.

Set the Display Step Size

SELECT THE DISPLAY STEP SIZE. (1, 2, 5, 10, 20, 50, 100, 200 or 500)
Use this menu point to select the display step size. The minimum display step size is 1 [Factory default] up to a maximum step size of 500. If for example you select a display step size of 50, the display will show 000, 050, 100, 150 etc as the weight value increases. Using higher step sizes will give a more stable weight display but with a lower resolution. Use the UP or DOWN key to select the required display step size. Press the enter key to store.

QUICK SET UP AND CALIBRATION USING WEIGHTS (Continues on the next page)

QUICK SET UP AND CALIBRATION USING WEIGHTS (Continued)

Set the Decimal Point position

SELECT THE DECIMAL POINT POSITION ON THE DISPLAY (0, 0.0, 0.00, 0.000 or 0.0000)

Use the UP or DOWN key to set the required decimal point position on the display. The factory default is no decimal place [0]. The maximum number of places after the decimal point is four [0.0000]. Please note that this parameter should be set before the span calibration value [menu 2.1] is entered. ***Setting or moving the decimal point position after calibration will not alter the display resolution***

Calibrate the Zero point

CALIBRATE OR ADJUST THE ZERO POINT (CONVENTIONAL WEIGHING SYSTEM)

Use this menu point to store a new calibration zero. The display will show the actual input signal in mV/V. Ensure that the weighing system is at zero or has no load on it. Pressing the Enter key will store the new zero.

Define the Span Calibration weight

DEFINE THE SPAN CALIBRATION WEIGHT

This menu point defines the span calibration value. If you intend to calibrate the span conventionally using weights, you need to enter the value of the span test weight you intend to apply here. Use the UP/DOWN & MOVE RIGHT keys to enter the span test weight. For example if you intend to calibrate with 3000 kg of weight (stepping in 1 kg steps with no decimal places) then enter 3000 here.

Calibrate the Span

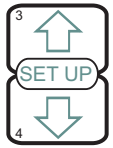
CALIBRATE THE SPAN (CONVENTIONAL WEIGHING SYSTEM)

Use this menu point to calibrate the span using weights. Apply the span test weight [the test weight value is defined in menu 2.1] to the weighing system. The display will show the actual signal from the weighing system in mV/V. Press the Enter key to store the new span value.

QUICK SET UP AND CALIBRATION USING THE LOAD CELL mV/V SENSITIVITY

(Also see calibration examples on page 23)

Enter the Setup menu



Press the UP or DOWN key for more than 3 seconds to enter the Set-up Menu

Please note that if you wish to change any values in these sections, you have to first press the recessed enable switch (top left corner of unit)

Set the Display Upper Limit

SET THE DISPLAY OVER RANGE LIMIT. (MAXIMUM VALUE +99,999)
Use this menu point to define the display maximum value. If the displayed weight exceeds this maximum, the display will then show over range (dashes at the top of the display). This can be useful to indicate when a weight value is outside a normal range. Use the UP/DOWN & MOVE RIGHT keys to set the maximum display value and store by pressing the enter key. Factory default value 10,000. Please note that the zero button is limited to ±2% of the display maximum value. See section 1.1 Zero Button Enable for more details

Set the Display Lower Limit

SET THE DISPLAY UNDER RANGE LIMIT. (MINIMUM VALUE -99,999).
Use this menu point to define the display minimum value. If the displayed weight drops below this minimum, the display will then show under range (dashes at the bottom of the display) This can be useful to indicate when a weight value is outside a normal range. Use the UP/DOWN & MOVE RIGHT keys to set the minimum display value and store by pressing the enter key. Factory default value -9,999.

Set the Display Step Size

SELECT THE DISPLAY STEP SIZE. (1, 2, 5, 10, 20, 50, 100, 200 or 500)
Use this menu point to select the display step size. The minimum display step size is 1 [Factory default] up to a maximum step size of 500. If for example you select a display step size of 50, the display will show 000, 050, 100, 150 etc as the weight value increases. Using higher step sizes will give a more stable weight display but with a lower resolution. Use the UP or DOWN key to select the required display step size. Press the enter key to store.

QUICK SET UP AND CALIBRATION USING LOAD CELL mV/V (Continues on the next page)

QUICK SET UP AND CALIBRATION USING LOAD CELL mV/V (Continued)

Set the Decimal Point position

SELECT THE DECIMAL POINT POSITION ON THE DISPLAY (0, 0.0, 0.00, 0.000 or 0.0000)

Use the UP or DOWN key to set the required decimal point position on the display. The factory default is no decimal place [0]. The maximum number of places after the decimal point is four [0.0000]. Please note that this parameter should be set before the span calibration value [menu 2.1] is entered. ***Setting or moving the decimal point position after calibration will not alter the display resolution***

Calibrate the Zero point

CALIBRATE OR ADJUST THE ZERO POINT.(CONVENTIONAL WEIGHING SYSTEM)

Use this menu point to store a new calibration zero. The display will show the actual input signal in mV/V. Ensure that the weighing system is at zero or has no load on it. Pressing the Enter key will store the new zero.

Enter the weighing system capacity

DEFINE THE SPAN CALIBRATION VALUE.

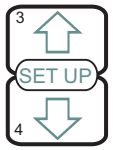
This menu point defines the span calibration value. If you intend to calibrate the span using the mV/V readings from the load cell certificates, you should enter the total load cell capacity here. So for example if you have a weighing system consisting of 3 off 2000 kg load cells you should enter 6000 (3 x 2000) here. Use the UP/DOWN & MOVE RIGHT keys to enter the total load cell capacity.

Enter the weighing system mV/V value

CALIBRATE THE SPAN FROM THE LOAD CELL mV/V READING

If you are calibrating the weighing system without weights, use this menu point to enter the mV/V value for the weighing system. The weighing system mV/V value can be derived from the load cell test data. Normally a test data certificate is provided with each load cell stating amongst other things, the Output at Rated Load (ORL) in mV/V. In single load cell applications the weighing system mV/V value will be the load cell ORL value. In applications using more than one load cell, the weighing system mV/V value will be the average of the individual load cells ORLs. Normally load cells used in multi-cell applications have matched or rationalized ORLs typically 2 or 3 mV/V for example. So if you have 4 load cells in your system, each 1000 kg capacity with ORLs of 2 mV/V then the weighing system capacity will be 4000 kg at 2 mV/V. Use the UP/DOWN & MOVE RIGHT keys to enter the weighing system ORL reading in mV/V. The reading should be in the format x.xxxx e.g 2.0000 if the ORL is 2 mV/V exactly. The corresponding weighing system capacity should be entered in menu point 2.1

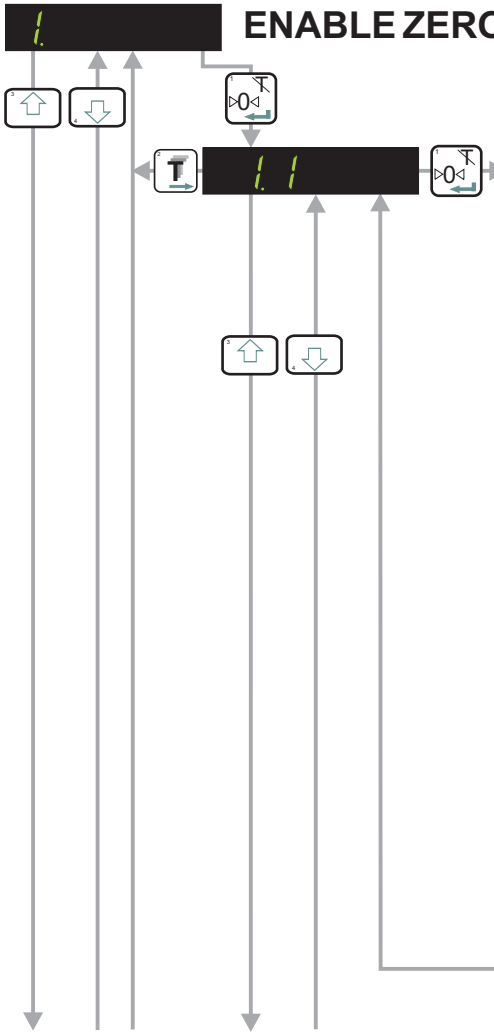
ENTERING THE SETUP MENU



Press the UP or DOWN key for more than 3 seconds to enter the Set-up Menu

If you wish to change any values in these sections, you have to first press the recessed enable switch (top left corner of unit)

ENABLE ZERO BUTTON / SET ZERO TRACK RANGE / CALIBRATE ZERO POINT



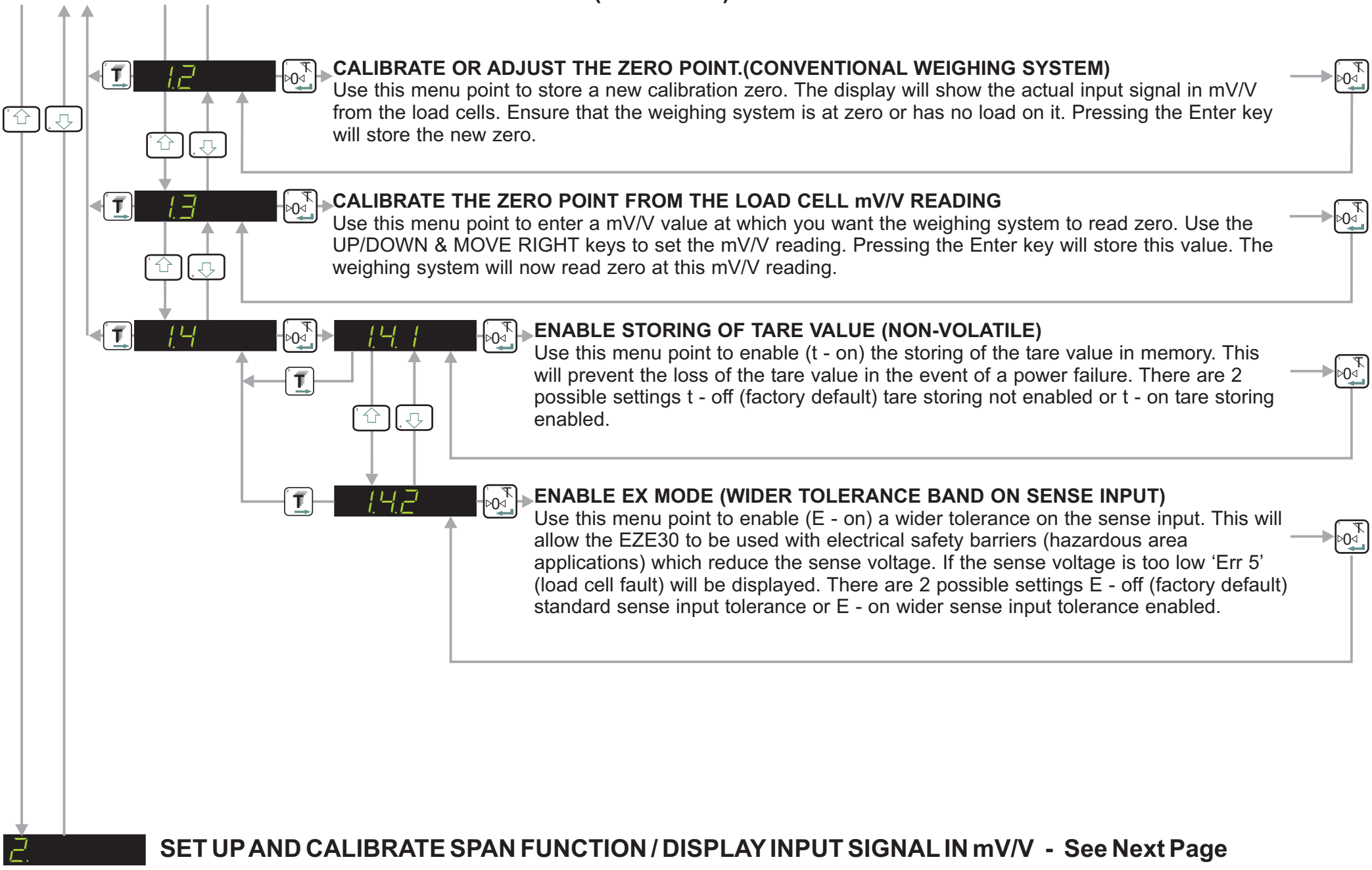
ZERO BUTTON ENABLE (± 20% of DISPLAY MAX) / ZERO TRACK RANGE (± 255 d).
Use this menu point to enable or disable the zero button and to set the zero track range. If this parameter is set to 0 then the zero button and the zero tracking will be disabled. If this parameter is set between 1 and 255, the zero button will be enabled and the zero track range will be equal to the number set. Use the UP/DOWN & MOVE RIGHT keys to set the zero track range and store by pressing the enter key. Factory default value 00001.

In the normal weighing mode, the zero button will set a new zero providing that the displayed weight value is less than ± 20% of the maximum display value (see Menu 3.1 o). So if for instance, the maximum display value is set to 10,000 [Factory Default] the maximum display value that can be set to zero using this button is ± 20% of 10,000 i.e. ± 2000 display counts. If you try to set a new zero which is greater than ± 20% of the display maximum you will see the error message 'Err 2' on the display. To overcome this problem you can either re-calibrate the zero using Menu 1.2 or 1.3 or you can increase the display maximum (Menu 3.1.o) to allow higher offsets to be corrected.

If this parameter is set between 1 and 255 (not 0) then the zero tracking will also be enabled. The value set will be equivalent to the zero track range (plus and minus around zero). The zero tracking will work on the no load or zero value of the weighing system to bring it back to exactly 0. If for instance the no load value or zero of the weighing system comes back to 5d when unloaded (due to product build up in the weigh hopper for instance), the zero tracking will automatically reduce this zero offset back to zero providing that the zero is stable (no motion) and is inside the zero track range. The no load output will be reduced at a fixed rate of 0.4 d/second until the value reaches 0. The value of d is equal to the display step size.

ENABLE ZERO BUTTON / CALIBRATE ZERO POINT (Continues on next page)

ENABLE ZERO BUTTON / CALIBRATE ZERO POINT (Continued)



CALIBRATE OR ADJUST THE ZERO POINT.(CONVENTIONAL WEIGHING SYSTEM)
Use this menu point to store a new calibration zero. The display will show the actual input signal in mV/V from the load cells. Ensure that the weighing system is at zero or has no load on it. Pressing the Enter key will store the new zero.

CALIBRATE THE ZERO POINT FROM THE LOAD CELL mV/V READING
Use this menu point to enter a mV/V value at which you want the weighing system to read zero. Use the UP/DOWN & MOVE RIGHT keys to set the mV/V reading. Pressing the Enter key will store this value. The weighing system will now read zero at this mV/V reading.

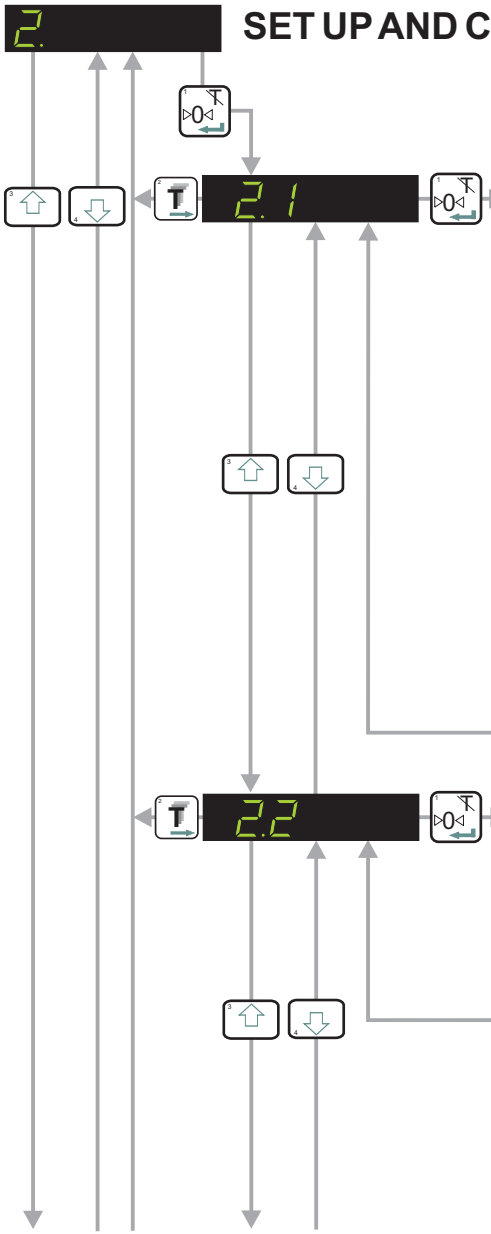
ENABLE STORING OF TARE VALUE (NON-VOLATILE)
Use this menu point to enable (t - on) the storing of the tare value in memory. This will prevent the loss of the tare value in the event of a power failure. There are 2 possible settings t - off (factory default) tare storing not enabled or t - on tare storing enabled.

ENABLE EX MODE (WIDER TOLERANCE BAND ON SENSE INPUT)
Use this menu point to enable (E - on) a wider tolerance on the sense input. This will allow the EZE30 to be used with electrical safety barriers (hazardous area applications) which reduce the sense voltage. If the sense voltage is too low ‘Err 5’ (load cell fault) will be displayed. There are 2 possible settings E - off (factory default) standard sense input tolerance or E - on wider sense input tolerance enabled.

SET UP AND CALIBRATE SPAN FUNCTION / DISPLAY INPUT SIGNAL IN mV/V - See Next Page

If you wish to change any values in these sections, you have to first press the recessed enable switch (top left corner of unit)

SET UP AND CALIBRATE SPAN / DISPLAY INPUT SIGNAL IN mV/V



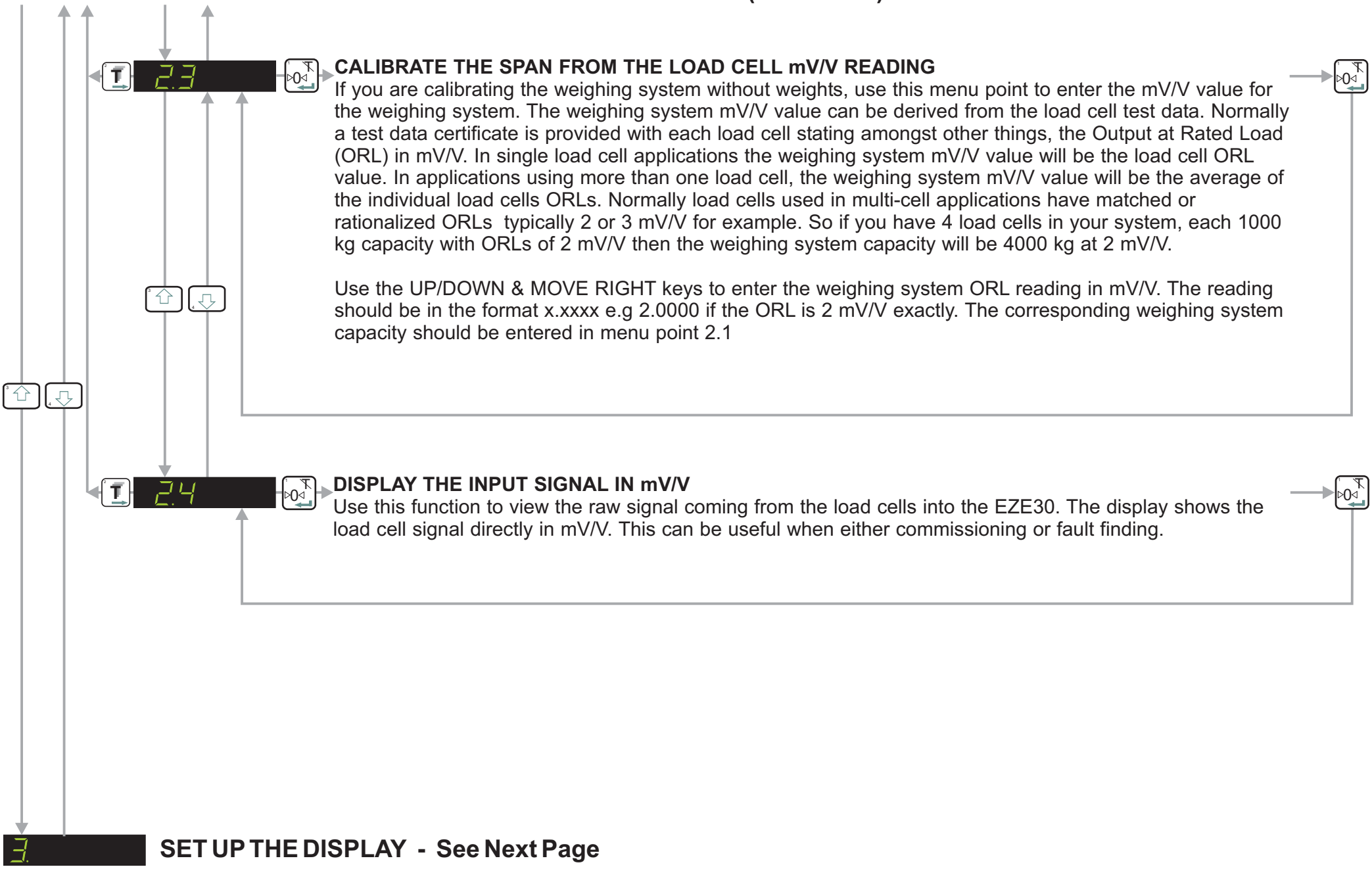
DEFINE THE SPAN CALIBRATION VALUE.
This menu point defines the span calibration value. If you intend to calibrate the span conventionally using weights, you need to enter the value of the span test weight you intend to apply here. Use the UP/DOWN & MOVE RIGHT keys to enter the span test weight. For example if you intend to calibrate with 3000 kg of weight (stepping in 1 kg steps with no decimal places) then enter 3000 here. If however, you intend to calibrate with 3000 kg and you want to step in 0.1 kg steps you must enter 30000 here. The decimal point can be added later in menu 3.3.

If you intend to calibrate the span using the mV/V readings from the load cell certificates, you should enter the total load cell capacity here. Use the UP/DOWN & MOVE RIGHT keys to enter the total load cell capacity. For example if you have a weighing system consisting of 3 off 2000 kg load cells and you want to display in 1 kg steps with no decimal places, you should enter 6000 (3 x 2000) here. If however you want to display 6000 kg in 0.1 kg steps you should enter 60000 here. The decimal point can be added later in menu 3.3.

CALIBRATE THE SPAN. (CONVENTIONAL WEIGHING SYSTEM)
Use this menu point to calibrate the span using weights. Apply the span test weight [the test weight value is defined in menu 2.1] to the weighing system. The display will show the actual signal from the weighing system in mV/V. Press the Enter key to store the new span value.

SET UP AND CALIBRATE SPAN /DISPLAY INPUT SIGNAL IN mV/V (Continues on next page)

SET UP AND CALIBRATE SPAN /DISPLAY INPUT SIGNAL IN mV/V (Continued)



CALIBRATE THE SPAN FROM THE LOAD CELL mV/V READING

If you are calibrating the weighing system without weights, use this menu point to enter the mV/V value for the weighing system. The weighing system mV/V value can be derived from the load cell test data. Normally a test data certificate is provided with each load cell stating amongst other things, the Output at Rated Load (ORL) in mV/V. In single load cell applications the weighing system mV/V value will be the load cell ORL value. In applications using more than one load cell, the weighing system mV/V value will be the average of the individual load cells ORLs. Normally load cells used in multi-cell applications have matched or rationalized ORLs typically 2 or 3 mV/V for example. So if you have 4 load cells in your system, each 1000 kg capacity with ORLs of 2 mV/V then the weighing system capacity will be 4000 kg at 2 mV/V.

Use the UP/DOWN & MOVE RIGHT keys to enter the weighing system ORL reading in mV/V. The reading should be in the format x.xxxx e.g 2.0000 if the ORL is 2 mV/V exactly. The corresponding weighing system capacity should be entered in menu point 2.1

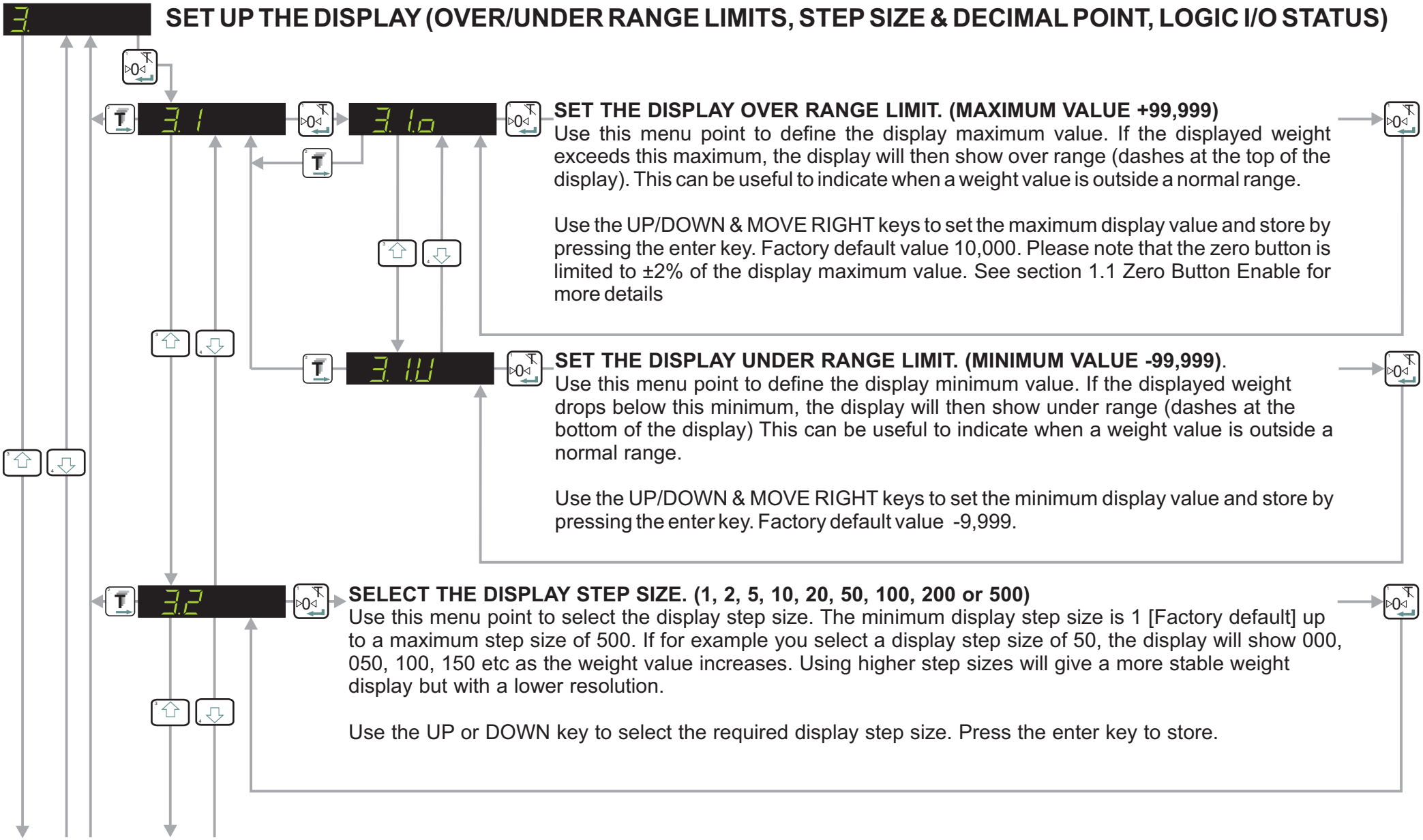
DISPLAY THE INPUT SIGNAL IN mV/V

Use this function to view the raw signal coming from the load cells into the EZE30. The display shows the load cell signal directly in mV/V. This can be useful when either commissioning or fault finding.

SET UP THE DISPLAY - See Next Page

If you wish to change any values in these sections, you have to first press the recessed enable switch (top left corner of unit)

SET UP THE DISPLAY (OVER/UNDER RANGE LIMITS, STEP SIZE & DECIMAL POINT, LOGIC I/O STATUS)



SET THE DISPLAY OVER RANGE LIMIT. (MAXIMUM VALUE +99,999)
Use this menu point to define the display maximum value. If the displayed weight exceeds this maximum, the display will then show over range (dashes at the top of the display). This can be useful to indicate when a weight value is outside a normal range.

Use the UP/DOWN & MOVE RIGHT keys to set the maximum display value and store by pressing the enter key. Factory default value 10,000. Please note that the zero button is limited to ±2% of the display maximum value. See section 1.1 Zero Button Enable for more details

SET THE DISPLAY UNDER RANGE LIMIT. (MINIMUM VALUE -99,999).
Use this menu point to define the display minimum value. If the displayed weight drops below this minimum, the display will then show under range (dashes at the bottom of the display) This can be useful to indicate when a weight value is outside a normal range.

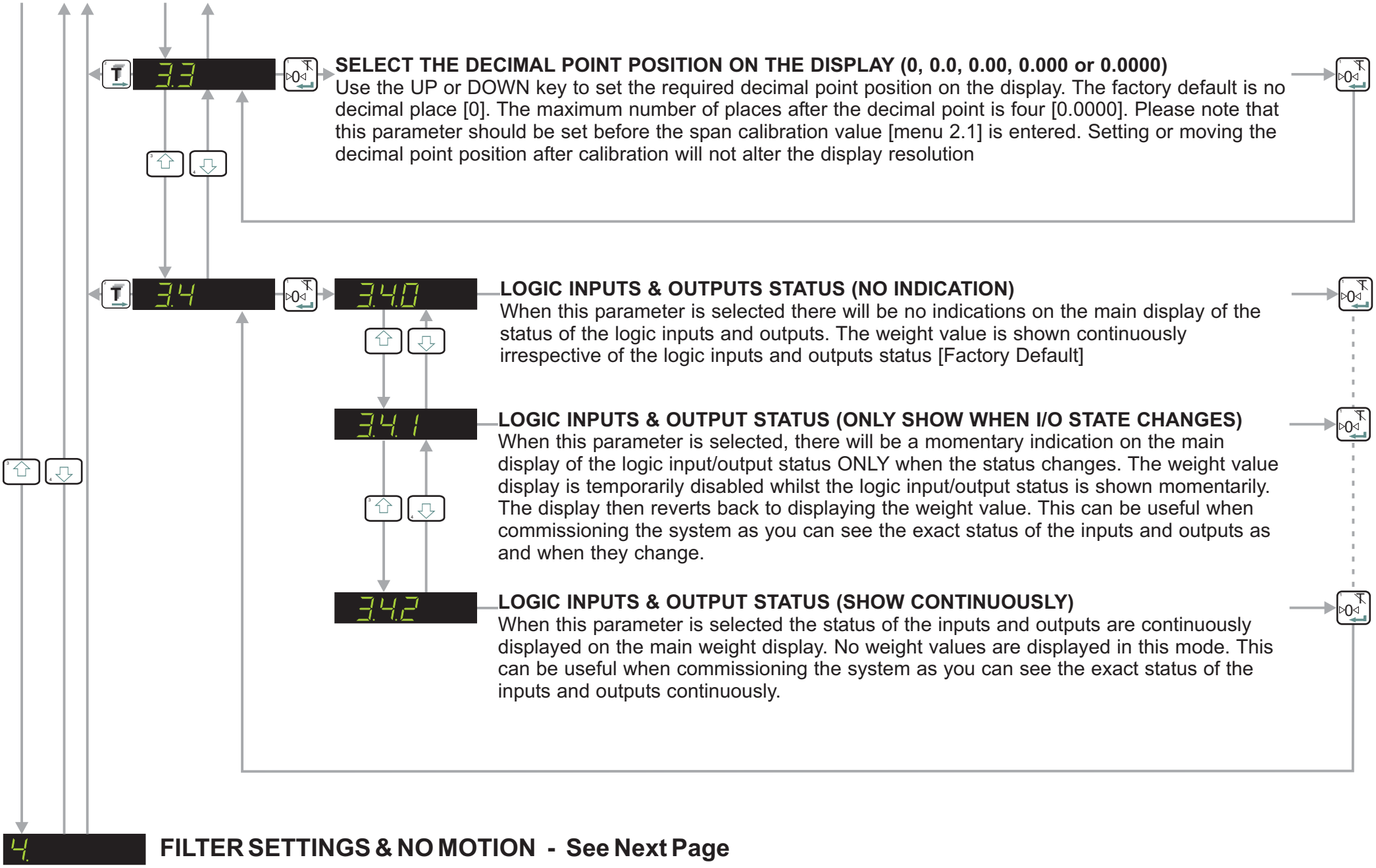
Use the UP/DOWN & MOVE RIGHT keys to set the minimum display value and store by pressing the enter key. Factory default value -9,999.

SELECT THE DISPLAY STEP SIZE. (1, 2, 5, 10, 20, 50, 100, 200 or 500)
Use this menu point to select the display step size. The minimum display step size is 1 [Factory default] up to a maximum step size of 500. If for example you select a display step size of 50, the display will show 000, 050, 100, 150 etc as the weight value increases. Using higher step sizes will give a more stable weight display but with a lower resolution.

Use the UP or DOWN key to select the required display step size. Press the enter key to store.

SET UP THE DISPLAY (Continues on next page)

SET UP THE DISPLAY (Continued)



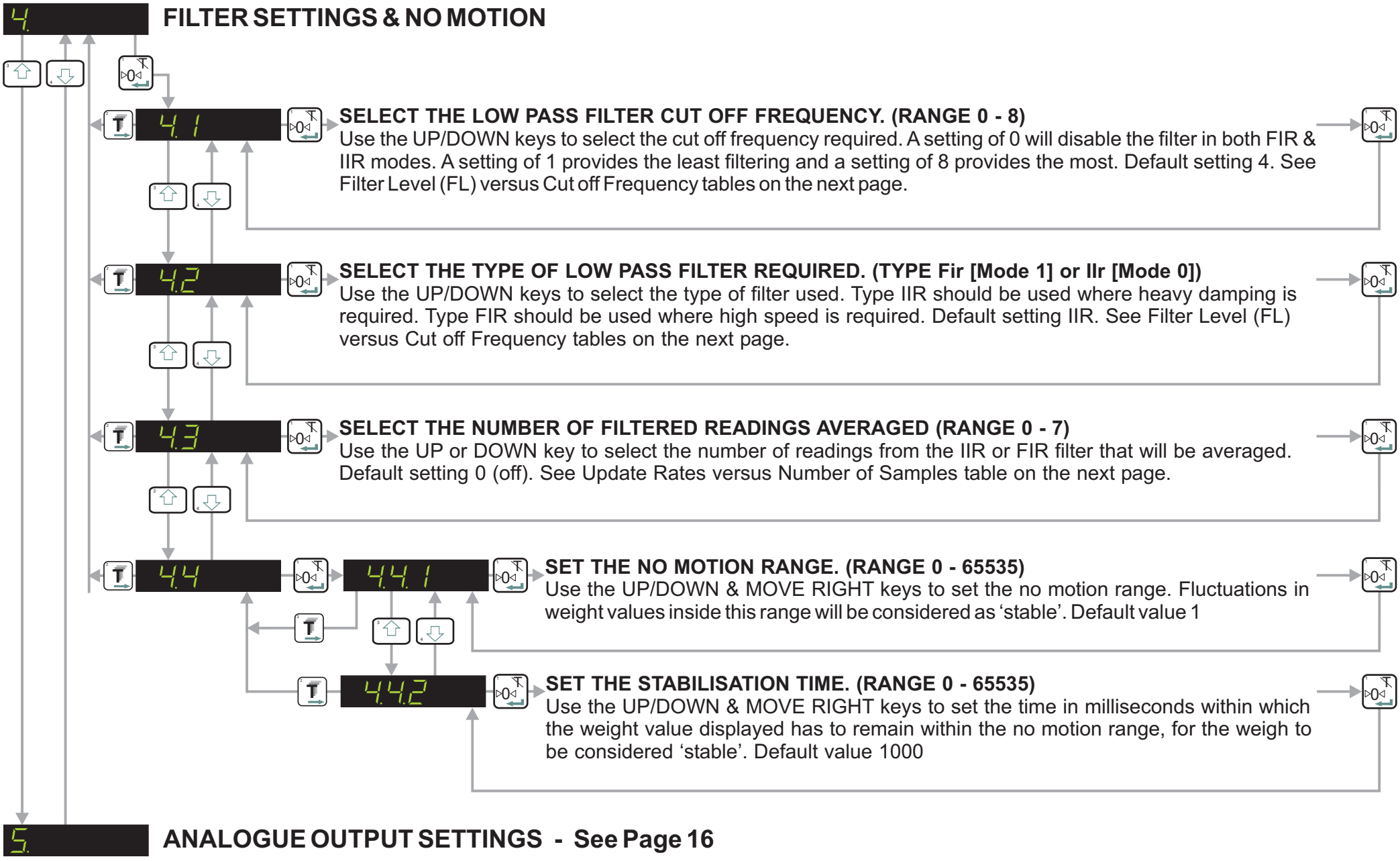
SELECT THE DECIMAL POINT POSITION ON THE DISPLAY (0, 0.0, 0.00, 0.000 or 0.0000)
Use the UP or DOWN key to set the required decimal point position on the display. The factory default is no decimal place [0]. The maximum number of places after the decimal point is four [0.0000]. Please note that this parameter should be set before the span calibration value [menu 2.1] is entered. Setting or moving the decimal point position after calibration will not alter the display resolution

LOGIC INPUTS & OUTPUTS STATUS (NO INDICATION)
When this parameter is selected there will be no indications on the main display of the status of the logic inputs and outputs. The weight value is shown continuously irrespective of the logic inputs and outputs status [Factory Default]

LOGIC INPUTS & OUTPUT STATUS (ONLY SHOW WHEN I/O STATE CHANGES)
When this parameter is selected, there will be a momentary indication on the main display of the logic input/output status ONLY when the status changes. The weight value display is temporarily disabled whilst the logic input/output status is shown momentarily. The display then reverts back to displaying the weight value. This can be useful when commissioning the system as you can see the exact status of the inputs and outputs as and when they change.

LOGIC INPUTS & OUTPUT STATUS (SHOW CONTINUOUSLY)
When this parameter is selected the status of the inputs and outputs are continuously displayed on the main weight display. No weight values are displayed in this mode. This can be useful when commissioning the system as you can see the exact status of the inputs and outputs continuously.

FILTER SETTINGS & NO MOTION - See Next Page


4.
FILTER SETTINGS & NO MOTION
4.1
SELECT THE LOW PASS FILTER CUT OFF FREQUENCY. (RANGE 0 - 8)
Use the UP/DOWN keys to select the cut off frequency required. A setting of 0 will disable the filter in both FIR & IIR modes. A setting of 1 provides the least filtering and a setting of 8 provides the most. Default setting 4. See Filter Level (FL) versus Cut off Frequency tables on the next page.
4.2
SELECT THE TYPE OF LOW PASS FILTER REQUIRED. (TYPE Fir [Mode 1] or Iir [Mode 0])
Use the UP/DOWN keys to select the type of filter used. Type IIR should be used where heavy damping is required. Type FIR should be used where high speed is required. Default setting IIR. See Filter Level (FL) versus Cut off Frequency tables on the next page.
4.3
SELECT THE NUMBER OF FILTERED READINGS AVERAGED (RANGE 0 - 7)
Use the UP or DOWN key to select the number of readings from the IIR or FIR filter that will be averaged. Default setting 0 (off). See Update Rates versus Number of Samples table on the next page.
4.4
4.4.1
SET THE NO MOTION RANGE. (RANGE 0 - 65535)
Use the UP/DOWN & MOVE RIGHT keys to set the no motion range. Fluctuations in weight values inside this range will be considered as 'stable'. Default value 1
4.4.2
SET THE STABILISATION TIME. (RANGE 0 - 65535)
Use the UP/DOWN & MOVE RIGHT keys to set the time in milliseconds within which the weight value displayed has to remain within the no motion range, for the weigh to be considered 'stable'. Default value 1000
5.
ANALOGUE OUTPUT SETTINGS - See Page 16

FILTER SETTINGS TABLES & UPDATE RATES (NUMBER OF READINGS AVERAGED)

MENU 4.1-4.2 FILTER TYPE IIR (MODE 0) SECOND ORDER GAUSSIAN LOW

Filter Setting	3dB Cut-off Frequency in Hz	Update Rate in Samples/sec.	Settling time to 0.1% in ms.	Damping in dB At 300Hz
1	18	600	55	57
2	8	600	122	78
3	4	600	242	96
4	3	600	322	104
5	2	600	482	114
6	1	600	963	132
7	0.5	600	1923	149
8	0.25	600	3847	164

This section refers to Menu points 4.1 - 4.3. Setting the filter level to 0 will disable the filters in either modes (0 or 1). The Gaussian filter type IIR (mode 0) filter level 4 is the factory default. This provides a slower response with a high level of damping. The FIR filter type provides better response where high speed is required. Both types of filter can be enhanced further by using the UR parameter Menu 4.3 to average between 1 (UR=0) and 128 (UR=7) measurements.

MENU 4.1- 4.2 FILTER TYPE FIR (MODE 1) COMBINATION LOW PASS

Filter Setting	3dB Cut-off Frequency in Hz	Update Rate in Samples/sec.	Settling time to 0.1% in ms.	20dB Damping @ frequency Hz	40dB Damping @ frequency Hz	Stopband in Hz	Damping in dB in Stopband
1	19.7	600	47	48	64	>80	>90
2	9.8	300	93	24	32	>40	>90
3	6.5	200	140	16	21	>26	>90
4	4.9	150	187	12	16	>20	>90
5	3.9	120	233	10	13	>16	>90
6	3.2	100	280	8	11	>13	>90
7	2.8	85.7	327	7	9	>11	>90
8	2.5	75	373	6	8	>10	>90

MENU 4.3 UPDATE RATE - DEFINES HOW MANY MEASUREMENTS ARE USED TO CALCULATE AN AVERAGE

Update Rates	0	1	2	3	4	5	6	7
No. of Samples	1	2	4	8	16	32	64	128

ANALOGUE OUTPUT (4-20 mA) SETTINGS

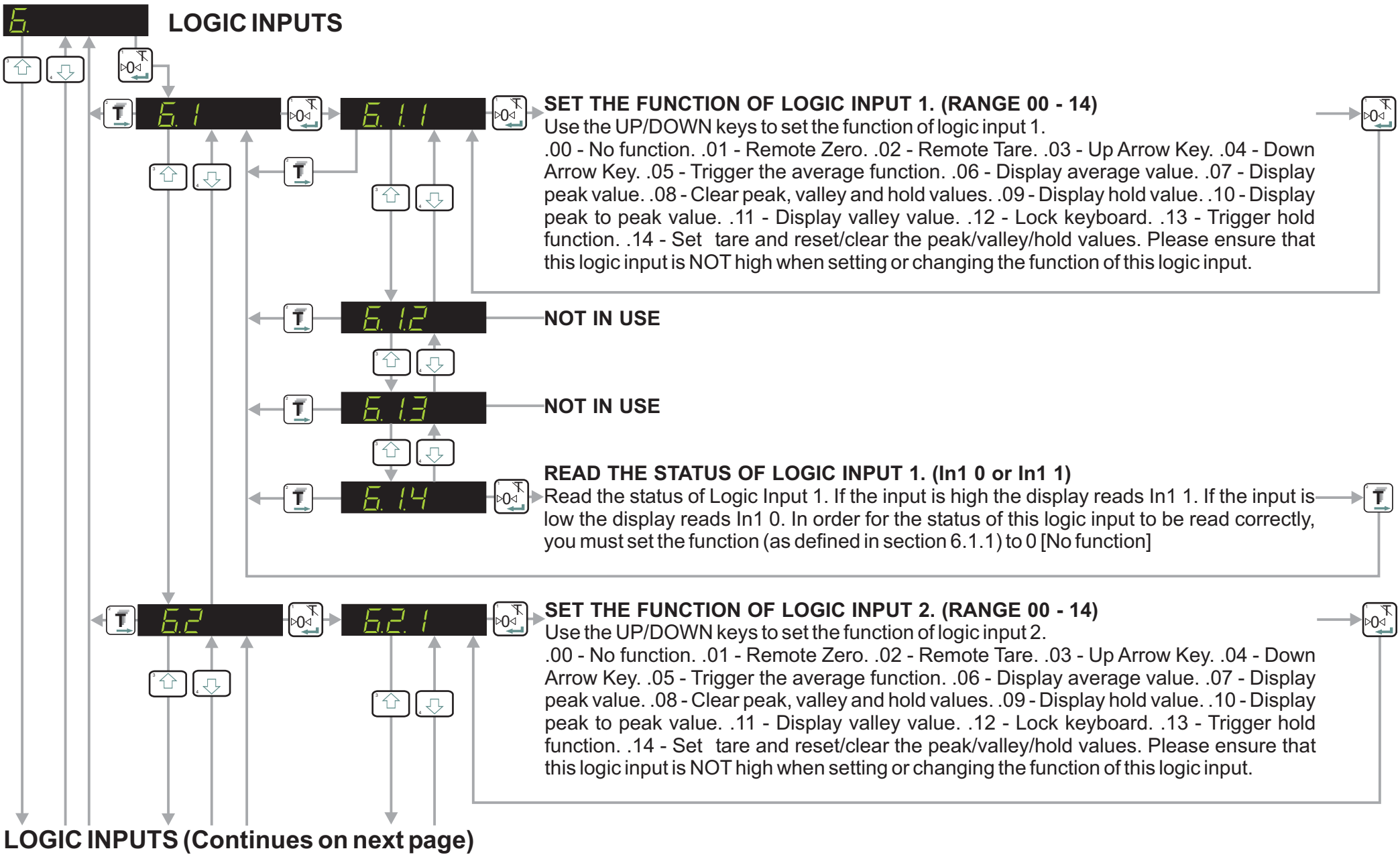
SET THE WEIGHT VALUE AT WHICH 4 mA IS SENT
Use the UP/DOWN & MOVE RIGHT keys to set the weight value at which 4 mA is sent. This typically will be set to zero, so that when the display reads zero weight, 4 mA will be sent down the analogue output. If you want the analogue output to run between 0 mA and 20 mA, you will need to calculate what the 4 mA value will be and store it here. To do this take the difference between the weight value at 20 mA and the weight value at 0 mA and divide it by the 20 and multiply by 4. For example if the analogue output is 0 - 20 mA for 0 - 1000 kg then the 4 mA value will be 1000/20*4 = 200.

SET THE WEIGHT VALUE AT WHICH 20 mA IS SENT.
Use the UP/DOWN & MOVE RIGHT keys to set the weight value at which 20 mA is sent. Typically this will be set to the weight value at which you want 20 mA to be sent down the analogue output.

SET THE ANALOGUE OUTPUT BASE (groS, nEt [Default], PEA, AUEr, HoLd, PP, UALL, dISP, oFF)
Use the UP or DOWN key to set which parameter the analogue output will follow : **groS** - the analogue output follows the Gross value: **nEt** - the analogue output follows the Net value : **PEA** - the analogue output follows the Peak value: **AUEr** - the analogue output follows the Average value: **HOLd** - the analogue output follows the Hold value: **PP** - the analogue output follows the Peak to Peak value: **UALL** - the analogue output follows the Valley value: **dISP** - the analogue output follows the value shown on the display: **oFF** - the analogue output is switched off.

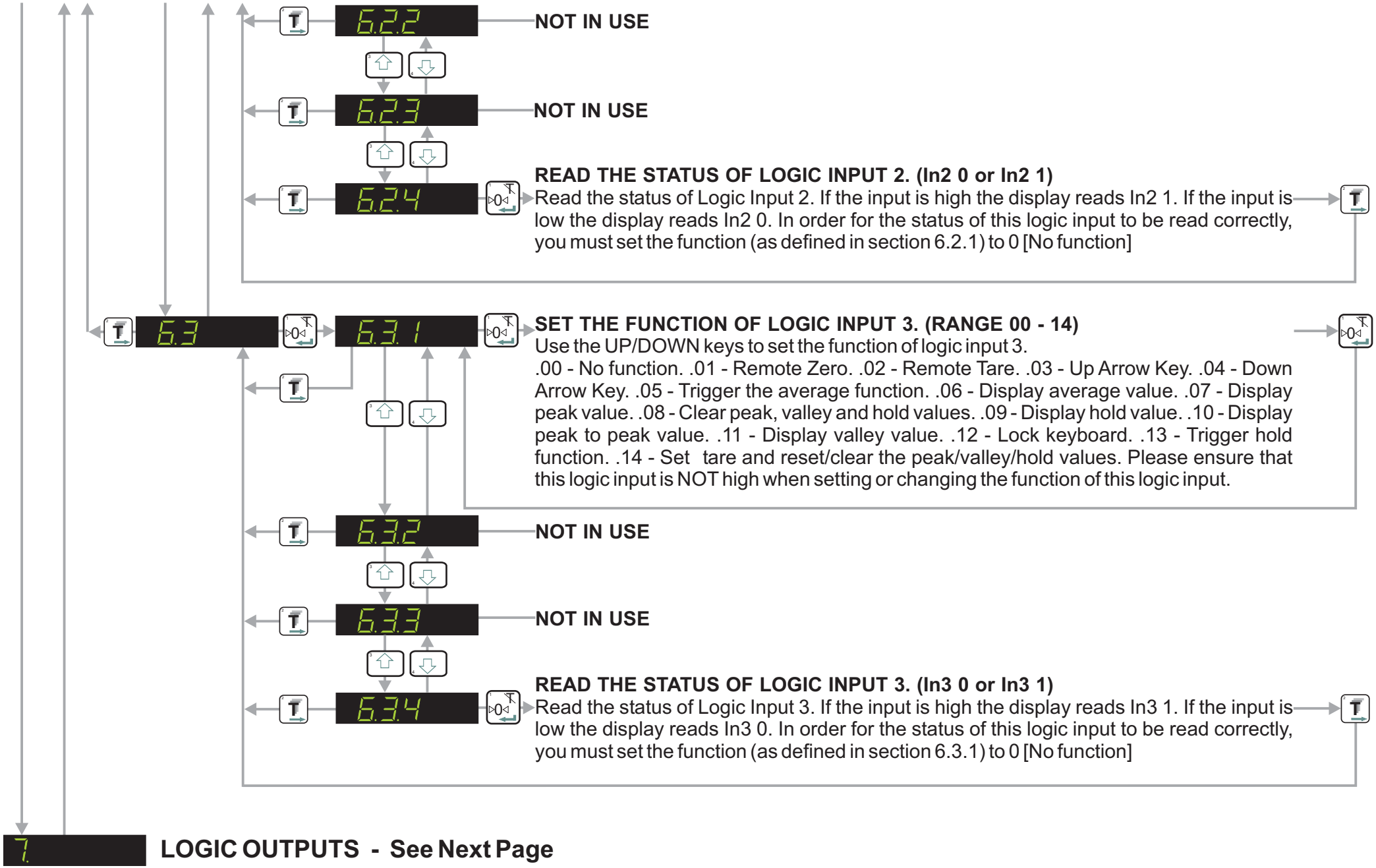
TEST MODE FOR THE CURRENT OUTPUT (Range 0mA - 21mA)
Use the UP or DOWN & MOVE RIGHT key to set a current value in mA, which will be sent down the analogue output, independent of the load applied to the weighting system. If values below 0mA are selected the DAS will send its minimum value (0mA) until a value within its normal range is selected. Similarly if values above 21mA are selected then the DAS will send its maximum value (21mA) until a value within its normal range is selected.

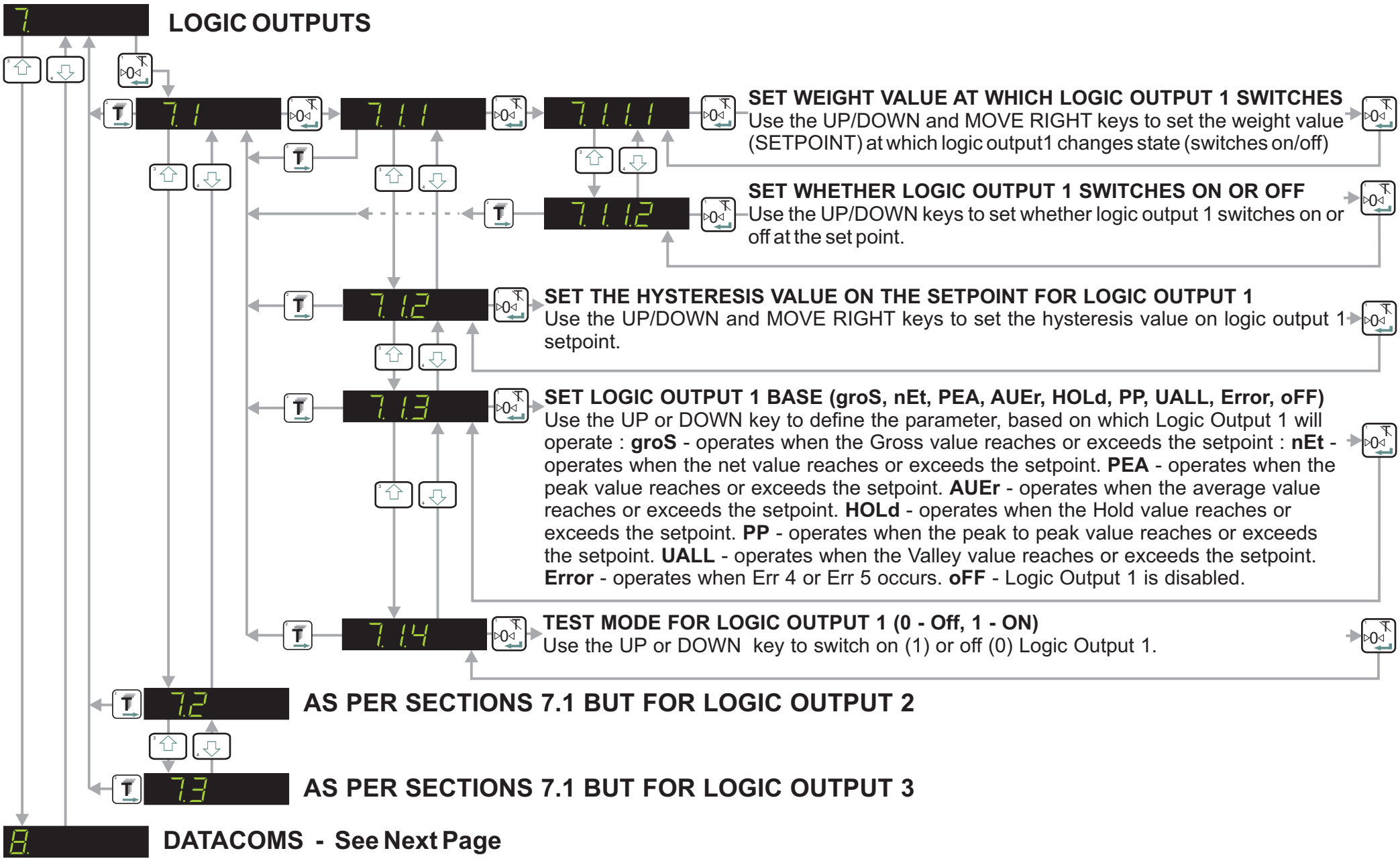
LOGIC INPUTS - See Next Page

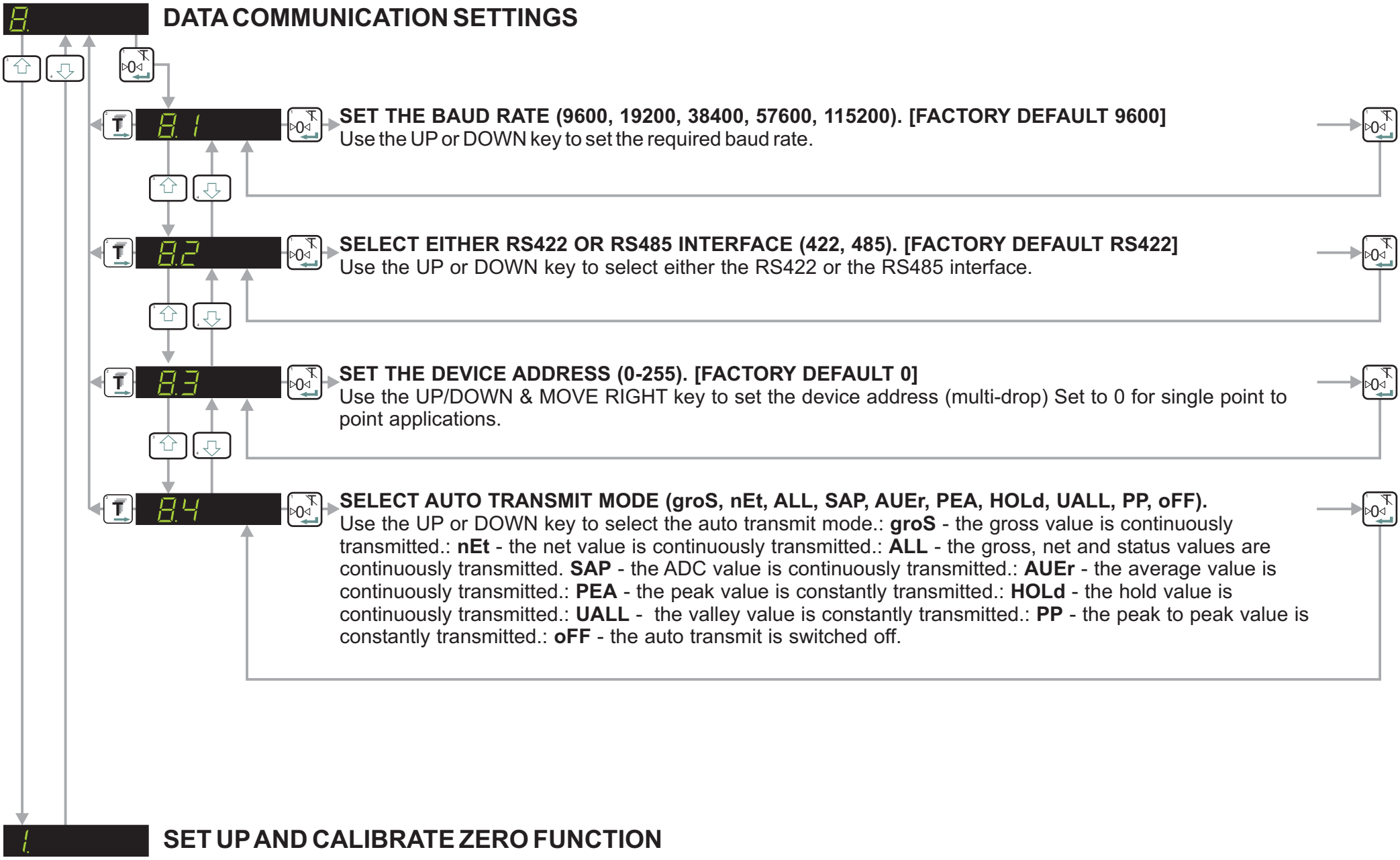


LOGIC INPUTS (Continues on next page)

LOGIC INPUTS (Continued)




7.
LOGIC OUTPUTS
7.1
7.1.1
7.1.1.1
SET WEIGHT VALUE AT WHICH LOGIC OUTPUT 1 SWITCHES
Use the UP/DOWN and MOVE RIGHT keys to set the weight value (SETPOINT) at which logic output1 changes state (switches on/off)
7.1.1.2
SET WHETHER LOGIC OUTPUT 1 SWITCHES ON OR OFF
Use the UP/DOWN keys to set whether logic output 1 switches on or off at the set point.
7.1.2
SET THE HYSTERESIS VALUE ON THE SETPOINT FOR LOGIC OUTPUT 1
Use the UP/DOWN and MOVE RIGHT keys to set the hysteresis value on logic output 1 setpoint.
7.1.3
SET LOGIC OUTPUT 1 BASE (groS, nEt, PEA, AUEr, HOLd, PP, UALL, Error, oFF)
Use the UP or DOWN key to define the parameter, based on which Logic Output 1 will operate : groS - operates when the Gross value reaches or exceeds the setpoint : nEt - operates when the net value reaches or exceeds the setpoint. PEA - operates when the peak value reaches or exceeds the setpoint. AUEr - operates when the average value reaches or exceeds the setpoint. HOLd - operates when the Hold value reaches or exceeds the setpoint. PP - operates when the peak to peak value reaches or exceeds the setpoint. UALL - operates when the Valley value reaches or exceeds the setpoint. Error - operates when Err 4 or Err 5 occurs. oFF - Logic Output 1 is disabled.
7.1.4
TEST MODE FOR LOGIC OUTPUT 1 (0 - Off, 1 - ON)
Use the UP or DOWN key to switch on (1) or off (0) Logic Output 1.
7.2
AS PER SECTIONS 7.1 BUT FOR LOGIC OUTPUT 2
7.3
AS PER SECTIONS 7.1 BUT FOR LOGIC OUTPUT 3
8.
DATACOMS - See Next Page



DATA COMMUNICATION SETTINGS

SET THE BAUD RATE (9600, 19200, 38400, 57600, 115200). [FACTORY DEFAULT 9600]
Use the UP or DOWN key to set the required baud rate.

SELECT EITHER RS422 OR RS485 INTERFACE (422, 485). [FACTORY DEFAULT RS422]
Use the UP or DOWN key to select either the RS422 or the RS485 interface.

SET THE DEVICE ADDRESS (0-255). [FACTORY DEFAULT 0]
Use the UP/DOWN & MOVE RIGHT key to set the device address (multi-drop) Set to 0 for single point to point applications.

SELECT AUTO TRANSMIT MODE (groS, nEt, ALL, SAP, AUEr, PEA, HOLd, UALL, PP, oFF).
Use the UP or DOWN key to select the auto transmit mode.: **groS** - the gross value is continuously transmitted.: **nEt** - the net value is continuously transmitted.: **ALL** - the gross, net and status values are continuously transmitted. **SAP** - the ADC value is continuously transmitted.: **AUEr** - the average value is continuously transmitted.: **PEA** - the peak value is constantly transmitted.: **HOLd** - the hold value is continuously transmitted.: **UALL** - the valley value is constantly transmitted.: **PP** - the peak to peak value is constantly transmitted.: **oFF** - the auto transmit is switched off.

SET UP AND CALIBRATE ZERO FUNCTION

ERROR CODES

The zero key is not enabled (See menu 1.1)

Set final zero out of range. (You are trying to set a zero which is greater than ±20% of the Upper Display Limit menu 3.1o)

Excessive sensitivity requested. (The input signal is being divided into too many divisions i.e the size of each division is less than 0.5uV)

The input signal is in excess of ± 3.2 mV/V

Faulty load cell connection (Open circuit / Short Circuit / Wire disconnected / Sense wires not connected or shorted to Exc terminals)

You are trying to enter a value which is not valid (Outside the acceptable parameter range)

Display overload (Display value exceeds the upper limit set in Menu 3.1o)

Display underload (Display value is more negative than the lower limit set in Menu 3.1U)

If when trying to set a new zero or tare, you see a series of dashes through the middle of the display, this indicates that the weight value is changing too much over a short period of time. In other words the 'No motion' parameters as set in Menu 4.4 have been exceeded. To correct this you can increase the 'no-motion' range (Menu 4.4.1) or decrease the 'Stabilisation time' (Menu 4.4.2). You can also increase the filter strength (Menu 4.1) to make the weight readings more stable. Please note that instability may be indicative of another problem which should be resolved as opposed to masked by adjusting the no-motion or filter parameters.

If you need to return the EZE30 to the factory settings simply press and hold the recessed enable switch whilst powering up the unit. All parameters will then revert to the factory settings

COMMUNICATION PROTOCOL AND COMMANDS

ASCII protocol format:

Baudrate	9600/19200/38400/115200
Data bits	8-bits
Stop bits	1-bit
Parity	NONE

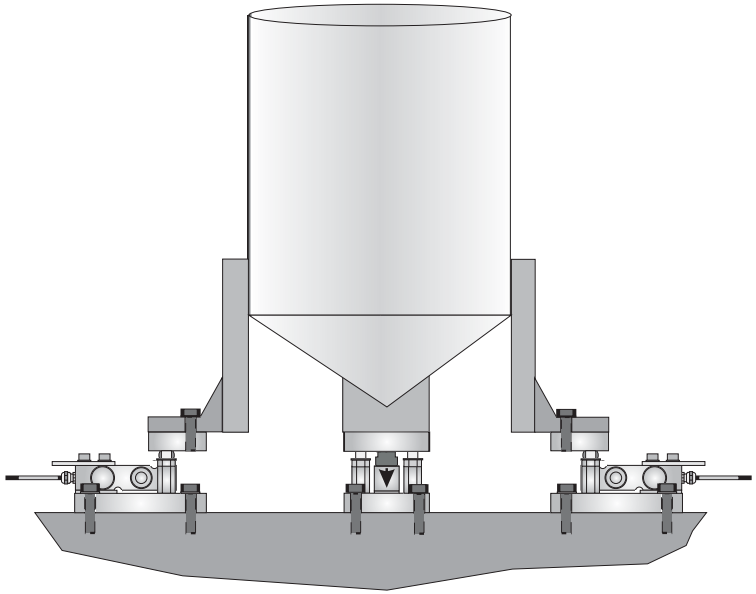
ASCII protocol commands:

Single shot commands

Command	**Response strings**	**Operation**
OP <XXX><CR>	OK<CR>/ERR<CR>	Open connection to channel XXX
CL<CR>		Close channel connection
IV<CR>	V:XXXX<CR>	Returns Software Version Number (XXXX)
ID<CR>	D:DAS<CR>	Returns Device Identity (DAS)
IS<CR>	S:XXXYYY<CR>	Returns Device Status (XXXYYY)
SZ<CR>	OK<CR>/ERR<CR>	Set a new Zero value
RZ<CR>	OK<CR>/ERR<CR>	Revert to original calibration Zero
ST<CR>	OK<CR>/ERR<CR>	Set a new Tare value
RT<CR>	OK<CR>/ERR<CR>	Revert to Gross mode
GG<CR>	G 00000<CR>	Get the Gross value
GN<CR>	N 00000<CR>	Get the Net value
SG<CR>	G 00000<CR>	Send the Gross value continuously
SN<CR>	N 00000<CR>	Send the Net value continuously
IM<CR>	IM:XXXX<CR>	Input Mask - Disable push button functions
IN<CR>	IN:XXXX<CR>	Read Inputs Status
OM<CR>	OM:XXXX<CR>	Output Mask - Disable Setpoint outputs
IO<CR>	IO:XXXX<CR>	Read / Modify Output Status
LI<CR>		Lists all menu values

CALIBRATION PROCEDURE USING WEIGHTS

Example:
3 leg tank or silo fitted with 3 off 1000Kg 2mV/V load cells
Dead load 500Kg, Live range 2000Kg in 1 Kg steps



It is assumed that the load cell system is connected to the EZE30 and the power is on. The maximum and minimum display values, display increment size and decimal point position should be defined prior to carrying out the calibration (See Menu 3). For this example the display maximum is define as 2009, the display minimum is -200, the display step size is 1 and there is no decimal point.

Remember that all parameters under sections 1.1 - 1.3, 2.1 - 2.3 and 3.1 - 3.3 can only be accessed or changed after the Recessed Enable Switch has been pressed.

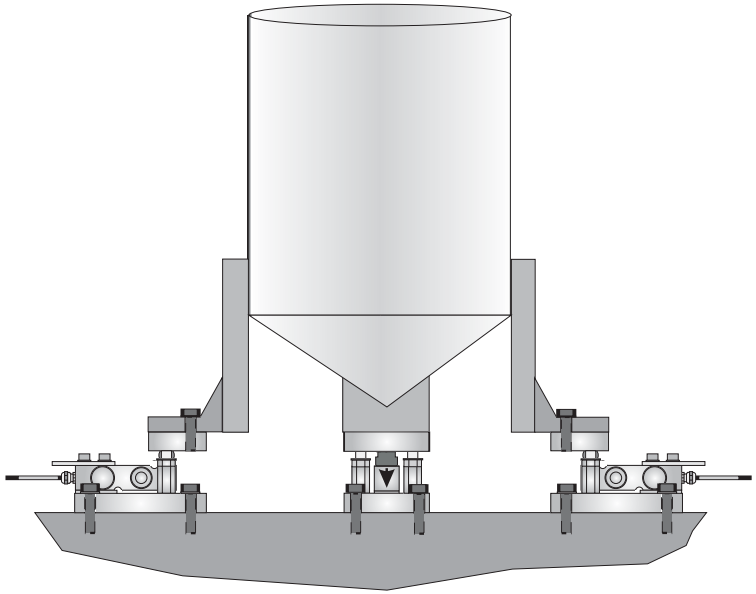
a) Go to Menu 1.2 and using the UP/DOWN and RIGHT keys set the display to read 0000.Make sure that the weighing system is empty or at the point where you want the display to read zero. Press the 0 [Enter] key. This defines the actual zero calibration point.
b) Go to Menu 2.1 and using the UP/DOWN and RIGHT keys set the display to read the value of the calibration weight(s) which will be applied. For this example if the calibration load applied which will be applied is 2000 kg, set the display to read 2000. Press the 0 [Enter] key. This defines the calibration weight.
c) Go to Menu 2.2. Apply the calibration weight(s) to the weighing system. Press the 0 [Enter] key. The display will show the actual input signal in mV/V. Press the 0 [Enter] key. This defines the actual span calibration point. The display will now show 2.2. Press the right arrow key twice and the DAS will be back in weighing mode.
d) If required the zero can be re-calibrated without affecting the span. To do this make sure that the weighing system is empty or at the point where you want the display to read zero. Goto Menu 1.2. Press the 0 [Enter] key. The display shows the actual input signal in mV/V. Press the 0 [Enter] key. Press the right arrow key twice and the DAS will be back in weighting mode.

Calibration is now complete

CALIBRATION PROCEDURE USING KNOWN LOAD CELL MV/V SENSITIVITY

MULTIPLE ACTIVE LOAD CELLS

Example:
3 leg tank or silo fitted with 3 off 1000Kg 2mV/V load cells
Dead load 500Kg, Live range 2000Kg in 1 Kg steps



It is assumed that the load cell system is connected to the EZE30 and the power is on. The maximum and minimum display values, display increment size and decimal point position should be defined prior to carrying out the calibration (See Menu 3). For this example the display maximum is define as 2009, the display minimum is -200, the display step size is 1 and there is no decimal point.

Remember that all parameters under sections 1.1 - 1.3, 2.1 - 2.3 and 3.1 - 3.3 can only be accessed or changed after the Recessed Enable Switch has been pressed.

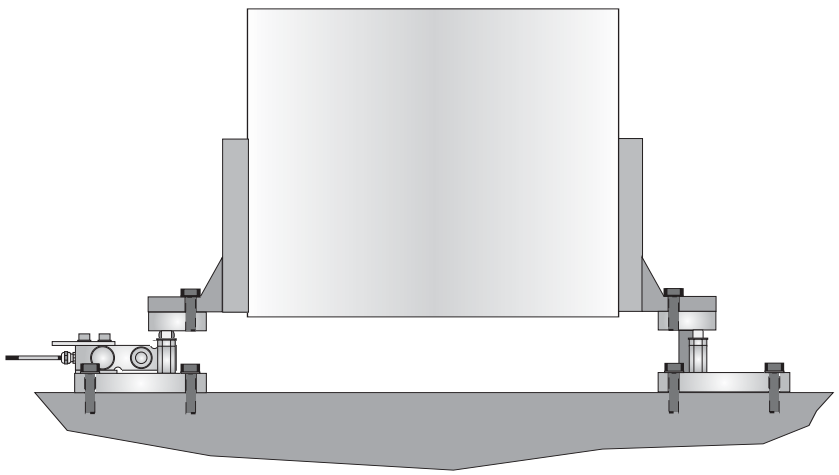
a) Go to Menu 1.2. Press the 0 [Enter] key. The display will read the input signal in mV/V. Make sure that the weighing system is empty or at the point where you want the display to read zero. Press the 0 [Enter] key. This defines the actual zero calibration point.
b) Go to Menu 2.1 and using the UP/DOWN and RIGHT keys set the display to read the capacity of the load cell system or the weight value at which the sensitivity is known. For this example the load cell capacity is 3 x 1000Kg = 3000Kg @ 2mV/V. Set the display to read 3000. Press the 0 [Enter] key. This defines the theoretical calibration weight (equivalent to 2mV/V in this example).
c) Go to Menu 2.3. Press the 0 [Enter] key. Use the UP/DOWN and RIGHT keys set the display to read the mV/V sensitivity of the load cell system you are using. For this example the load cell sensitivity or Output at Rated Load is 2.000mV/V. In multiple load cell installations (load cells wired in parallel) the sensitivity is the average of all the load cells connected. Press the 0 [Enter] key. This defines the theoretical span calibration point.
d) If required the zero can be re-calibrated without affecting the span. To do this make sure that the weighing system is empty or at the point where you want the display to read zero. Goto Menu 1.2. Press the 0 [Enter] key. The display shows the actual input signal in mV/V. Press the 0 [Enter] key. Press the right arrow key twice and the DAS will be back in weighting mode.

Calibration is now complete

CALIBRATION PROCEDURE USING KNOWN LOAD CELL MV/V SENSITIVITY

SINGLE ACTIVE LOAD CELL PLUS HINGE PIVOT

Example:
A rectangular tank fitted with 1 off 2000Kg 2mV/V load cell central on the left hand side and a pivot (hinge) along the complete opposite face .
Dead load 500Kg, Live range 2000Kg in 1 Kg steps



It is assumed that the load cell system is connected to the EZE30 and the power is on. The maximum and minimum display values, display increment size and decimal point position should be defined prior to carrying out the calibration (See Menu 3). For this example the display maximum is define as 2009, the display minimum is -200, the display step size is 1 and there is no decimal point.

Remember that all parameters under sections 1.1 - 1.3, 2.1 - 2.3 and 3.1 - 3.3 can only be accessed or changed after the Recessed Enable Switch has been pressed.

a) Go to Menu 1.2. Press the 0 [Enter] key. The display will read the input signal in mV/V. Make sure that the weighing system is empty or at the point where you want the display to read zero. Press the 0 [Enter] key. This defines the actual zero calibration point.
b) Go to Menu 2.1 and using the UP/DOWN and RIGHT keys set the display to read the capacity of the load cell system or the weight value at which the sensitivity is known. For this example the load cell capacity is 2000Kg @ 2mV/V. But the hinge pivot on the opposite side of the tank carries half the load (if the centre of gravity is in the middle of the tank). Therefore when there is 4000Kg in the tank equally split between the load cell and the hinge the output from the load cell will be 2 mV/V. The system is therefore 4000Kg @2mV/V. Set the display to read 4000. Press the 0 [Enter] key. This defines the theoretical calibration weight (equivalent to 2mV/V in this example).
c) Go to Menu 2.3 and using the UP/DOWN and RIGHT keys set the display to read the mV/V sensitivity of the load cell system you are using. For this example the load cell sensitivity or Output at Rated Load is 2.000mV/V. In multiple load cell installations (load cells wired in parallel) the sensitivity is the average of all the load cells connected. Press the 0 [Enter] key. This defines the theoretical span calibration point.
d) If required the zero can be re-calibrated without affecting the span. To do this make sure that the weighing system is empty or at the point where you want the display to read zero. Goto Menu 1.2. Press the 0 [Enter] key. The display shows the actual input signal in mV/V. Press the 0 [Enter] key. Press the right arrow key twice and the DAS will be back in weighting mode.

PLEASE NOTE THAT IF THE LOAD IS NOT EQUALLY SHARED BY THE LOAD CELL AND PIVOT THE CALIBRATION WILL BE INACCURATE.

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2. COMMUNICATIONS & GETTING STARTED Page 2

3. COMMAND PROTOCOL - LONG DESCRIPTIONS Page 6

4. COMMAND PROTOCOL - SHORT DESCRIPTIONS Page 23

1. INTRODUCTION

The EZE30 digital amplifier is a high performance device that can form weighing systems intended for industrial applications. The device feature full multi-drop communications capability and can be controlled via a straightforward ASCII command set.

2. COMMUNICATIONS & GETTING STARTED

Communicating with the EZE30 digital amplifier is performed via the RS422/RS485 port.
The data format is the familiar 8/N/1 structure (8 data bits, no parity, 1 stop bit)

Available data rates are:

9600
19200
38400
57600
115200

Point-to-point or multi-drop connections are supported.

Protocol Summary

The EZE30 digital amplifier are intended for use with standard PC or PLC systems, and require no special interfacing hardware and no special software adapters.
The command set is based on a simple ASCII format, as per the example below:

Master (PC or PLC) sends:	OP 1	(Open the device # 1)
Slave (EZE30) sends:	OK	(acknowledging device #1 active)
Master sends:	GG	(Get the gross weight result)
Slave sends:	G+123.45	(the gross weight with sign and decimal point information)

Note: The complete list of available commands is printed on the page 19 of this manual.

This protocol is standard across the whole range of the instrumentation, so it is possible to mix different types of devices on the same bus.

Multi-Drop Support

A connection to the required device is opened by sending the OP xxx command, where xxx is the address of the relevant slave device, in decimal notation. The relevant device responds by acknowledging that it is active, and will then respond to any other command sent along the bus, until another OP xxx with a different address value is detected, or until a “Close Connection” command (CL) is detected.

Baudrate Settings

In configuration mode it is possible from the front panel to set the baudrate.
The default factory setting is 9600.

RS422/485 Setting

In configuration mode it is possible from the front panel to switch between RS422 and RS485 mode. In RS485 mode the instrument will turn its transmitter off after sending data allowing other devices to use the bus. In RS422 mode, the transmitter will remain on.
The default factory setting is RS422.

Address Settings

In configuration mode it is possible from the front panel to set the network address of the instrument to any address between 0 and 255. Setting the address to 0 will set continuously active mode, where the instrument becomes permanently active, and will listen and respond to any command on the bus, without the need for an OP xxx command. The default factory setting is 0.

Auto transmit Settings

In configuration mode it is possible from the front panel to enable auto transmission after power on without sending any commands. The default factory setting is off.

Getting Started

You will require having available:

- PC or PLC with either a RS422 or RS485 communication port;
- RS232 to RS422/485 converter - necessary if it is intended to use communication driven from the master which has only a RS232 port available;
- Interconnecting cabling - confirm that all of the relevant pins are in use - check against the wiring diagram that follows this section;
- A load cell with test weights, OR a load cell simulator;
- A DC power supply capable of delivering 12-24 VDC. Current capacity dependent on the number of device and the number of load cells to be connected. (One device plus one load cell requires less than 250 mA);
- One or more EZE30;
- A suitable ASCII communication software (HyperTerminal etc)

3. COMMAND PROTOCOL – LONG DESCRIPTIONS

For ease of interpretation, the commands have been grouped together and will be described in the following sequence:

3.1 System Diagnostics Commands
3.2 Weigh Control Commands
3.3 Output Commands
3.4 Auto-Transmit Commands
3.5 Remote I/O Commands
3.6 Calibration Commands
3.7 Motion Detection Commands
3.8 Filter Setting Commands
3.9 Set-point Commands
3.10 Communication Set-up Commands
3.11 Analogue Output Commands
3.12 Save Set-up Commands

3.1 SYSTEM DIAGNOSTICS COMMANDS – ID, IV, IS, SR, LI

The following five commands provide a means of interrogating the device to confirm the type of device present, the software version of that device and the status.
The commands require no parameters and are used as follows:

ID Determine the device ID code - this is a code, which identifies the type of device, which is currently open for communications. Issuing the ID command, which has no parameters, will return the code **D:7210** This code is useful when mixed devices may be present on the bus.

IV Determines the device software version - this identifies the release of software that is installed in the device. This is useful when determining the availability of special commands or features that may have been requested for special applications. Issuing the IV command, which has no parameters, will return the software identification code in the format **V:0201**

IS Determine the device status - Issuing the ID command, which has no parameters, will return a result in the format **S:000000**. This result comprises two 3-digit decimal values, which can be decoded according to the table below:

Leftmost 3-digit value:		Rightmost 3-digit value:	
1	Signal stable	1	not used
2	Zero action performed	2	not used
4	Tare active	4	not used
8	Not used	8	not used
16	Not used	16	not used
32	Output 1 on	32	not used
64	Output 2 on	64	not used
128	Output 3 on	128	not used

Therefore, the example result **S:001000** decodes as signal stable (no-motion) no zero action, no tare and all outputs off.
The unsupported bits are reserved for use on other members of our instrument family and in the case of the EZE30 are always set at zero.

SR Software Reset – this command will respond with 'OK' and after maximum 400ms perform a complete reset of the EZE30.

LI List settings - dump the complete EZE30 setup formatted as lines of ASCII characters to the serial channel. The output refers to the front panel schematic columns 1 to 8.

3.2 WEIGHER CONTROL COMMANDS – SZ, RZ, ST, RT

The following commands provide the means to control the setting and resetting of the zero and tare points. The availability of net weighing depends on these functions.
The zero point which is set at calibration time, remains the "true" zero, but the "current" zero will be the basis for the output result. Remember that the "current" zero can be influenced by the "zero tracking" function, and this should be taken into account when designing the application. A basic system control is the disabling of the "set zero „and "set tare"functions whenever the weighing signal is not stable, as defined by the
"no-motion" function. Furthermore, the zero point cannot be reset if it has moved more than 20% away from the original calibration zero point, with respect to the maximum allowable display value.

SZ Set the system zero - this command will create a "current" zero point which will become the basis for all weighed operation, until further updated by the zero tracking function, or another SZ command or the "reset zero" command (RZ). As previously stated, any attempt to zero a drift of more than +/- 20% of the maximum allowable display value will result in the SZ command being rejected (**ERR**). The SZ command is also rejected if the weighing signal is fluctuating, as defined by the "zero no-motion" function. The "zero signal stable" bit in the responses to the "info status" (IS) command must therefore be active before a SZ command can be accepted. Issuing the SZ command, which has no parameters, will return the **OK** or **ERR** response. If **OK** is returned, then the "zero action performed" bit in the response to the "info status" (IS) command will be activated.

RZ Reset the zero point to the "calibration" zero - this command will return the zero point to that which was stored during the calibration procedure. Issuing the RZ command, which has no parameters, will return the **OK** or **ERR** response. If **OK** is returned, then the "zero action performed" bit in the response to the "info status" (IS) command will be de-activated.

ST Set the tare point - this command will activate the net weighing function, by storing the current weighing signal output value as a tare value. The ST command is rejected if the weighing signal is fluctuating, as defined by the “tare no-motion” function. The “tare signal stable” bit in the “info status” return must therefore be active before a ST command can be accepted. Issuing the ST command, which has no parameters, will return the **OK** or **ERR** response. If **OK** is returned, then the “tare active” bit in the response to the “info status” (IS) command will be activated.

RT Reset the tare - this command cancels the net weighing mode, and restores the current zero. The weighing signal output returns to the gross mode. Issuing the RT command, which has no parameters, will return the **OK** or **ERR** response. If **OK** is
returned, then the “tare active” bit in the response to the “info status” (IS) command will be activated.

3.3 OUTPUT COMMANDS – GG, GN, GT, GS, GW

The following commands provide the means of obtaining an output results from the device.

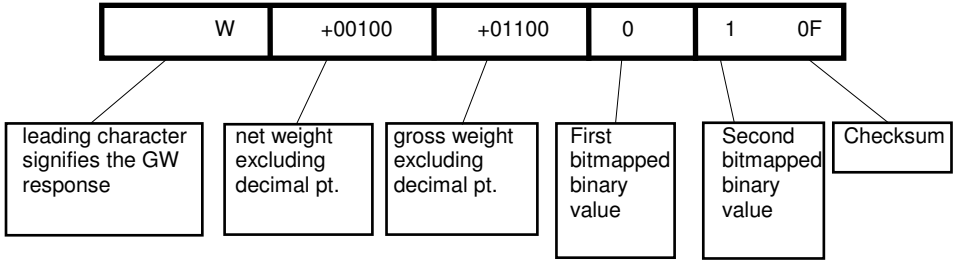
GG Get the gross value - returns the current gross weight value. Issuing the GG command, which has no parameters, will return the gross weight value in the format **G+01.100** .

GN Get the net value - returns the current net weight value. Issuing the GN command, which has no parameters, will return the net weight value in the format **N+01.100** .

GT Get the tare value - returns the current tare weight value. Issuing the GT command, which has no parameters, will return the tare weight value in the format **T+01.100** .

GS Get the A/D sample value – returns the current output result of the A/D converter (ADC). This facility is useful when developing the application, or when calibrating the system, as it allows a check to be made of the operating range of the ADC. Issuing the GS command, which has no parameters, will return the ADC output value in the format
S+100000.

GW Get the “long” weight values - returns the current net, gross and status values. Issuing the GW command, which has no parameters, will return the net weight, the gross weight, the status and the checksum values, all combined into one single string in the format **W+00100+01100010F** . The first two sections of the return string comprise the net weight and gross weight results, followed by two hexadecimal characters, which represent two bitmapped status indicators. The last two hexadecimal characters represent the checksum, which is the inverse of the sum of all the ASCII values of the string, not including the checksum characters. (see following)



The bitmapped characters are:

First Bit value description	Second Bit value description
1 Not used. 2 Output 1 active. 4 Output 2 active. 8 Output 3 active.	1 No motion. 2 Zero action performed. 4 Tare active. 8 Not used.

The checksum is derived as follows:

a. Add the ASCII values (in hex) of all the 15 characters in the string
b. Invert the hexadecimal value
c. Add one to the value
d. Use only the last two digits
e. Convert the hexadecimal value to characters

3.4 AUTO-TRANSMIT COMMANDS – SG, SN, SW

The following command provide the means to output the weight results in a continuous stream, which starts upon the issue of the relevant command, and ends upon the issue of any other command.

SG Auto-transmit the gross weight value - continually returns the current gross weight value. Issuing the SG command, which has no parameters, will continually return the gross weight value in the format **G+01.100** , until interrupted by any other command.

SN Auto-transmit the "long" weight value - continually returns the current net weight value. Issuing the SN command, which has no parameters, will continually return the net weight value in the format **N+01.100** , until interrupted by any other command.

SW Auto-transmit the net weight value - continually returns the current net weight, the gross and status values. Issuing the SW command, which has no parameters, will continually return the net weight, the gross weight, the status and the checksum values, all combined into one single string in the format: **W+00100+01100010F** until interrupted by any other command. The decode of the string is exactly as per the "long" weight command GW, listed in section 3.3, "OUTPUT COMMANDS". Note that decimal point information is not transmitted.

3.5 REMOTE I/O COMMANDS – IN, IO, OM

The EZE30 includes 3 independent logic input channels and 3 solid-state relay outputs. The inputs can be read directly by the host application, allowing for such uses as machine status indication or can be used as remote control inputs for the zero and tare pushbuttons.
The relay outputs can be used with the set-points or can be remote controlled by the host.
The following group of commands provides control of the logic I/O.

IN Read the status of the three input channels - returns the status in the form of a bitmapped four-digit value where 0 corresponds to “false” and 1 corresponds to “true” (inputs are active “high”). Issuing the IN command, which has no parameters, returns the input status in the form **IN:0001**, where Input 1 status is given by the Least Significant Digit (in this example 1) and so on.

OM Output mask - disable the set-point function of the relay outputs when used as host controlled logic outputs. A logic 1 will disable the corresponding set-point function. Issuing the command without any parameters returns the current OM value in the form **OM:0010**. Value after reset / power on: **0000**.

IO Read/Modify the status of the three output channels - returns the status in the form of a bitmapped four-digit value where 0 corresponds to “false” and 1 corresponds to “true” and modifies that status if enabled by the OM command. Issuing the command without any parameters returns the output status in the form **IO:0010**, where Output 1 status is given by the Least Significant Digit and so on. Value after reset / power on: **0000**.

3.6 CALIBRATION COMMANDS – CE, CM, CI, DS, DP, CZ, AZ, CG, AG, ZT, FD, CS

CE Set the calibration functions to the enabled state. This command must be issued PRIOR to any attempt to set the calibration parameters CM, CI, DS, DP, CZ, AZ, CG, AG, ZT, FD or CS. Issuing the command without any parameters results in the response **E+XXXXX** where **XXXXX** is the Traceable Access Code (TAC). This is an internal code that is used to record any changes in the calibration settings of the device.

CM Set the maximum allowable output value. Lower limit 1, upper limit 99999. Issuing the command without any parameters returns the current CM value. This value will determine the point at which the output will change to **oooooo**, signifying over-range. To set a new value for CM, the command must be preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. The new CM value required is then input as a parameter of CM, in the format **CM 4010**. Factory default setting: 10000.

CI Set the minimum allowable output value. Lower limit -99999, upper limit 0. Issuing the command without any parameters returns the current CI value. This value will determine the point at which the output will change to **uuuuuu**, signifying under-range. To set a new value for CI, the command must be preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. The new CI value required is then input as a parameter of CI, in the format **CI 4010**. Factory default setting: -9000.

DS Set the display step size - this allows the output to step up or down by a unit other than 1. Permitted values are 1, 2, 5, 10, 20, 50, 100, 200 or 500. To set a new value for DS, the command must be preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. The new DS value required is then input as a parameter of DS, in the format **DS 100**. Factory default setting: 1.

DP Set the decimal point position - this allows the decimal point to be positioned anywhere between leftmost and rightmost digits of the 5-digit output result. Permitted values are 0 for the rightmost position, and 5 for the leftmost position. To set a new value for DP, the command must be preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. The new DP value required is then input as a parameter of DP, in the format **DP 2**. Factory default setting: 0.

CZ Set the calibration zero point - this is the reference point for all weight calculations, and is subject to TAC control. The command returns **ERR** and has no action unless it is preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. Confirmation of action is provided by the return **OK**. Factory default setting: 0mV/V input.

AZ Absolute zero point calibration - this is the reference point for all weight calculations, and is subject to TAC control. The command returns **ERR** and has no action unless it is preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. The zero value required (in mV/V, without decimal point) is input as a parameter of AZ, in the format **AZ 500**. Factory default setting: 0mV/V input.

CG Set the calibration gain (span) value - this is the reference point for the calibration under load, and is subject to TAC control. The lower limit for CG is 1, the upper limit is 99999. The weight signal used for calibration should be as close as possible to the maximum allowable display value (CM) so as to ensure optimum calibration accuracy. A feature provided is the ability to recall the value of the calibration weight used for the current calibration by the issue of a CG command without any parameters. This is useful information for future calibration purposes or for diagnostics. When calibrating the span, the actual value of the calibration weight must be entered as a parameter of the CG command, for example if the output 25000 is required for the weight placed on the load cell, then the calibration command becomes **CG 25000**. The command return "**ERR**" and has no updating action unless it is preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. **If the load applied to calibrate the span is less than 1% of full scale (2mV/V), the gain calibration will fail and 'ERR' will be returned.** Factory default setting: 10000 at 2mV/V input.

AG Absolute gain calibration. The command returns **ERR** and has no action unless it is preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. The gain value (in mV/V, without decimal point) is input as a parameter of AG followed by the required number of increments as a second parameter, in the format **AG 20000 10000**. Factory default setting: 10000 at 2mV/V input.

ZTZero tracking - this command enables or disables the zero tracking. Parameter = 0 disables the zero tracking and parameter = 1 enables the zero tracking. Issuing the command without any parameters returns the current ZT value. The command returns **ERR** and has no updating action unless it is preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC. Zero tracking will be performed only on results less than +/-0.5d at a rate of 0.4 d/sec where d = display step size (see DS command). The zero can only be tracked to +/- 20% of max (see CM command). Factory default setting: 0.

FD Factory default settings – this command put the EZE30 back to a known state. The data will be written to the EEPROM and the TAC will be incremented by 1.
NOTE: All calibration and set-up information will be lost by issuing this command.
The command returns **ERR** and has no updating action unless it is preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC.

CS Save the calibration values - this command results in the calibration values being saved to EEPROM, and causes the TAC to be incremented by 1. The CS command saves all of the calibration group values, as set by CZ, AZ, CG, AG, CM, CI, DS, DP and ZT. The command returns **ERR** and has no updating action unless it is preceded by the **CE XXXXX** command, where **XXXXX** is the current TAC.

3.7 MOTION DETECTION COMMANDS – NR, NT

The Motion Detection facility provides a means of disabling certain functions whenever a condition of instability, or “motion”, is detected. The “no-motion”, or “stable” condition is achieved whenever the signal is steady for the period of time set by NT, during which it cannot fluctuate by more than NR increments. The stable condition activates the relevant bit of responses to “Info Status” (IS - see section 3.1, “SYSTEM DIAGNOSTICS COMMANDS”).
The functions which are disabled whenever motion is detected are “Calibrate Zero” (CZ) “Calibrate Gain” (CG) “Set zero” (SZ) and “Set tare” (ST).

NR Set the “no-motion” range - this is the range within which the weighing signal is allowed to fluctuate and still be considered as “stable”. Issuing the NR command without any parameter will return the current value. Set a new value by issuing the NR command followed by the desired value, in the format **NR 5**. Permitted values are between the lower limit of 0 and the upper limit of 65535. Factory default setting: 1.

NT Set the stabilisation time for the “in motion” band. This is the time parameter that defines the period during which the output must not fluctuate more than NR increments in order to be considered “stable”. Set a new value by issuing the NT command followed by the desired value in milliseconds, in the format **NT 1000**. Permitted values are between the lower limit of 0 and the upper limit of 65535. Factory default setting: 1000.

3.8 FILTER SETTING COMMANDS – FL, FM, UR

The facility exists for the setting of a digital filter via the command parameters FL, FM, and UR. This filter can be adjusted to eliminate most unwanted disturbances. Note that this filter is positioned immediately after the A/D Converter, and will therefore have an effect on all aspects of weighing operation.

FLSet the filter cut off frequency - permitted values are between 0 and 8, see tables below. A setting of 0 will disable the filter in both mode 0 and 1. Issuing the FL command without any parameters will return the current filter value. Set a new value by issuing the FL command followed by the desired value, in the format **FL 4**. Factory default setting: 3.

NOTE: Remember to store the setting using the **WP** command before turning off the power.

FM Set the filter mode - permitted values are between 0 and 1, see tables below. Mode 0 uses a 2.order low pass Gaussian IIR filter and mode 1 uses a combination of FIR filters. Issuing the FM command without any parameters will return the current filter mode. Set a new value by issuing the FM command followed by the desired value, in the format **FM 1**. Factory default setting: 0.

NOTE: Remember to store the setting using the **WP** command before turning off the power.

Mode 0 characteristics:

FL	Settling time to 0.1% in ms.	3dB Cut-off frequency in Hz.	Damping in dB at 300Hz.	Update-rate in samples/sec.
1	55	18	57	600
2	122	8	78	600
3	242	4	96	600
4	322	3	104	600
5	482	2	114	600
6	963	1	132	600
7	1923	0.5	149	600
8	3847	0.25	164	600

Mode 1 characteristics:

FL	Settling time to 0.1% in ms.	3dB Cut-off frequency in Hz.	20dB damping at frequency in Hz.	40dB damping at frequency in Hz.	Damping in dB in the stopband	Stopband in Hz.	Update-rate in samples/sec.
1	47	19.7	48	64	>90	>80	600
2	93	9.8	24	32	>90	>40	300
3	140	6.5	16	21	>90	>26	200
4	187	4.9	12	16	>90	>20	150
5	233	3.9	10	13	>90	>16	120
6	280	3.2	8	11	>90	>13	100
7	327	2.8	7	9	>90	>11	85.7
8	373	2.5	6	8	>90	>10	75

UR Set the update-rate. This command will define over how many measurements, from the preceding IIR or FIR filter, an average will be calculated. Permitted values are between 0 and 7, see table below. Issuing the UR command without any parameters will return the current update rate. Set a new value by issuing the UR command followed by the desired value, in the format **UR 2**. Factory default setting: 0.

NOTE: Remember to store the setting using the **WP** command before turning off the power.

Update rates:

UR	0	1	2	3	4	5	6	7
Number of samples	1	2	4	8	16	32	64	128

3.9 SETPOINT COMMANDS – Sn, Hn, An

S1 (S2, S3) Set the setpoint value for channel 1 (2, 3) – sets the value which will trigger the required action of the output channel transistor, in conjunction with the settings of the other controls H1 (H2, H3) and A1 (A2, A3). Issuing the S1 (S2, S3) command without any parameters will return the current value in the form **S1:+00200.**, signifying that setpoint number 1 is set to trigger at value +200, and in so doing will set output 1 "ON". The source to be monitored for the purpose of setpoint action is determined by the setpoint ACTION command A1 (A2, A3). After the setpoint has been reached, the action of the setpoint, and the status of the relevant output channel, is dependent on the setting of the HYSTERESIS command H1 (H2, H3).

H1 (H2, H3) Set the hysteresis value for channel 1 (2, 3) – sets the value and polarity by which the output value must change in order to release the setpoint. Issuing the H1 (H2, H3) command without any parameters will return the current value in the form **H1:+00100.** , signifying that setpoint 1 must hold it's "ON" status until the source value drops by 100. If H1 returns a negative value, then this signifies that the source value must increase beyond 100, after which point the setpoint will release, and the relevant output channel will change to the "OFF" condition. This command therefore allows the setpoint to be inverted.

A1 (A2, A3) Set the action for channel 1 (2, 3) – sets the source for the value which will trigger the required action of the output channel relay, according to the settings of the other controls S1 (S2, S3) and H1 (H2, H3). Issuing the A1 (A2, A3) command without any parameters returns the current value in the form **A1:+00001**.

An = 0	Gross weight as setpoint source
An = 1	Net weight as setpoint source

NOTE: Remember to store the settings using the **SS** command before turning off the power.

3.10 COMMUNICATION SET-UP COMMANDS – AD, BR, DX

AD Set the address of the EZE30 for networking (0-255). Setting the device address to 0 will set the continuously active mode, where the device becomes permanently active, and will listen and respond to any command on the bus, without the need for an **OP** xxx command. Issuing the AD command without any parameters will return the current address. Factory default setting: 0.

NOTE: this setting will take effect after power on reset (remember to store the setting using the **WP** command before turning off the power).

BR Set the EZE30 baud rate. Issuing the **BR** command without any parameters will return the current baud rate. Set a new value by issuing the **BR** command followed by the desired value, in the format **BR 115200**. Factory default setting: 9600.

NOTE: this setting will take effect after power on reset (remember to store the setting using the **WP** command before turning off the power).

DX Half or full duplex – this command select half or full duplex communication.
Parameter = 0 select half duplex communication and parameter = 1 select full duplex
Communication - use half duplex setting when using two wire RS485.

3.11 ANALOGUE OUTPUT SET-UP COMMANDS – AL, AH, AA

AL Set the analogue low level. This command defines the weight value for 4mA analogue output. Issuing the AL command without any parameters will return the current low level value in the form **L+00000.** Factory default setting: 0.

AH Set the analogue high level. This command defines the weight value for 20mA analogue output. Issuing the AH command without any parameters will return the current high level value in the form **H+10000.** Factory default setting: 10000.

AA Sets the source which will be used by the analogue output. Issuing the AA command without any parameters returns the current value in the form **A+00001.**
Factory default setting: 1.

An = 0	Gross weight as analogue output source
An = 1	Net weight as analogue output source

NOTE: Remember to store the settings using the **AS** command before turning off the power.

3.12 SAVE SET-UP PARAMETERS COMMAND – WP, SS, AS

The configuration parameters can be considered as four distinct groups, namely:

- Calibration Parameters (CZ, AZ, CG, AG, CM, CI, DS, DP, ZT);
- Indicator Parameters (FL, FM, UR, NR, NT, BR, AD, DX);
- Set-point Parameters (S1, S2, S3, H1, H2, H3, A1, A2, A3);
- Analog Parameters (AL, AH, AA);

The alteration and amendment of the calibration parameters is subject to the control procedure that is described in section 3.6. This procedure includes the use of the “Calibration Save” (CS) command. All other settings can be saved using the save commands WP, SS and AS.

WP Save the “indicator” set-up parameters - saves the settings of the “Filter” (FL, FM, UR), the “No-Motion” settings (NR, NT) and the communication settings (AD, BR, DX) in the EEPROM.

SS Save the “setpoint” set-up parameters - saves the settings of the setpoints (S1, S2 and S3), the “Setpoint Hysteresis” settings (H1, H2 and H3) and the “Setpoint Action” settings (A1, A2 and A3). Issuing the SS command, which has no parameters, will return OK or ERR response. The OK response signifies the “setpoint” parameters group settings have been saved to EEPROM

AS Save the “analogue” set-up parameters - saves the settings of the analogue output (AL, AH, AA) in the EEPROM

4. COMMAND PROTOCOL – SHORT DESCRIPTIONS

Command	Short Description	Usage	Parameter Values	Typical Response
OP	Open connection	Open device XXX	0 to 255	O:002/OK
CL	Close all connections	Close all devices (OP XXX implies CL)	none	none
ID	Inform. device ID	Information - device identification	none	D:7210
IV	Inform. version number	Information - software version number	none	V:0204
IS	Inform. on device status	Information - motion, zero and tare status	none	S:000000
SR	Software reset	Restart the DAS	none	OK
LI	List settings	Information - list settings as ASCII lines	none	List of lines
SZ	Set system zero	Set system zero point	none	OK/ERR
RZ	Reset system zero	Restores the calibration zero point	none	OK/ERR
ST	Set tare	Set tare point	none	OK/ERR
RT	Reset tare	Restores current zero point	none	OK/ERR
GG	Get gross value	Get gross value	none	G+01100
GN	Get net value	Get net value	none	N+00000
GT	Get tare value	Get tare value	none	T+00000
GS	Get sample	Get data from A/D Converter	none	S+000000
GW	Get long weight information	Get long weight information	none	W+00100+01100010F
SG	Start auto-transmit gross	Start auto-transmitting gross weight result	none	G+01100
SN	Start auto-transmit net	Start auto-transmitting net weight result	none	N+00000
SW	Start auto-transmit weight	Start auto-transmitting long weight result	none	W+00100+011005109
IN	Read input status	Read input status	none	IN:0011
OM	Output mask	Disable setpoint outputs	0000 through 0111	OM:0010
IO	Read/Modify output status	Read/Modify output status	0000 through 0111	IO:0011
CE	Calibrate enable	Open legal parameters (CE 'TAC')	0 through 65535	E+00001/OK/ERR
CM	Calibrate max (TAC protected)	Read/modify max	0 through 99999	M+30000/OK/ERR
CI	Calibrate min (TAC protected)	Read/modify min	0 through -99999	I-09000/OK/ERR
DS	Display step size (TAC protect)	Read/modify the display step size	1,2,5,10,20,50,100,200,500	S+00001/OK/ERR
DP	Decimal point (TAC protected)	Read/modify decimal point position	0 through 5	P+00005/OK/ERR
CZ	Calibrate zero (TAC protected)	Calibrate zero - no load on platform	none	OK/ERR
AZ	Absolute zero calibrate (TAC protected)	Calbrate zero using absolute zero in mV/V (without decimal point)	-32000 through 32000	OK/ERR
CG	Calibrate gain (TAC protected)	Calibrate gain at some load >> zero	0 through 99999	G+20000/OK/ERR
AG	Absolute gain calibrate (TAC protected)	Calbrate gain using absolute sensitivity in mV/V (without dp)	+/-32000; 0 through 99999	G+2.0000/OK/ERR
ZT	Zerotrack (TAC protected)	Zerotrack off (0) or zerotrack on (1)	0 through 1	Z:001/OK/ERR

FD	Factory default (TAC protected)	Load factory defaults into EEPROM	none	OK/ERR
CS	Calibrate save (TAC protected)	Save CM,CZ,AZ,CG,AG,DS,DP,ZT to EEPROM	none	OK/ERR
NR	No-motion range	No-motion range	0 through 65535	R+00010/OK/ERR
NT	No-motion time	No-motion time in milliseconds	0 through 65535	T+00500/OK/ERR
FL	Filter setting	Read/modify filter setting	0 through 8	F+00008/OK/ERR
FM	Filter mode	Read/modify filter mode setting	0 through 1	M+00001/OK/ERR
UR	Update rate	Read/modify update rate setting	0 through 7	U+00000/OK/ERR
Sn	Get/set setpoint n	Setpoint 1, 2 or 3	-99999 through 99999	Sn:+00000/OK/ERR
Hn	Get/set setpoint n hysteresis	Setpoint hysteresis 1, 2 or 3	-99999 through 99999	Hn:+00000/OK/ERR
An	Get/set setpoint n action	Setpoint action 1, 2 or 3	0 through 1	An:+00000/OK/ERR
AD	Network address	Read/modify network address	0 through 255	A:014/OK/ERR
BR	Baudrate	Read/modify baudrate setting	9600 through 115200	B 9600
DX	Duplex	Select half (0) or full (1) duplex	0 through 1	X:001/OK/ERR
AL	Get/set analog low	Analog low calibration point	-99999 through 99999	L+00000/OK/ERR
AH	Get/set analog high	Analog high calibration point	-99999 through 99999	H+10000/OK/ERR
AA	Get/set analog action	Analog action	0 through 1	A+00000/OK/ERR
WP	Save set-up parameters	Save FL, FM, UR, NR, NT, AD, BR, DX to EEPROM	none	OK/ERR
SS	Save setpoint parameters	Save S1, S2, S3, H1, H2, H3, A1, A2, A3 to EEPROM	none	OK/ERR
AS	Save analog output parameters	Save AL, AH, AA to EEPROM	none	OK/ERR

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