WARNING

Product Improvement Policy

Ian Fellows Ltd operates a continuous product improvement policy. We are proud of the quality of our products and recognise that improvement is always possible. In our striving for perfection we reserve the right to implement changes to hardware, software and specifications.

For these reasons the contents of this manual are subject to change without notice.

All efforts have been made to ensure the accuracy of this manual. However, should any errors be detected, Ian Fellows Ltd. would greatly appreciate being informed of them.

The above notwithstanding, Ian Fellows Ltd. can assume no responsibility for any errors in this manual or their consequences.

Statement on Conformity

In ‘Trade’ mode, CPI configured with appropriate components, is able to conform to the Harmonised European Standard EN 45501. This standard is based on a worldwide accepted OIML Recommendation R76 ~ Non Automatic Weighing Instruments. In addition, it is built according to a strict ISO9001 Quality Assurance System and complies with ENS5022 (Emissions), EN45501 Annex B (Immunity), and both SI2328:1994 and SI3260:1994 Electrical Safety directives.

Certificates of conformity can be provided on request.

This Manual aims to describe normal, or default, operation. The actual functionality of the installed instrument may differ dependent on the parameters modified by the installation and set-up engineers. If in doubt consult supplier about specific functionality.

Visit website www.ianfellows.co.uk for manuals and application notes
## Software Version History

<table>
<thead>
<tr>
<th>Software Version</th>
<th>Changes</th>
<th>Known Issues (may also apply in earlier versions)</th>
</tr>
</thead>
</table>
| PO6_024          | - Remote tare operation fixed  
                  - EX serial response made single digit (0/1/2) to be Lucid compatible | Remote Tare could prevent subsequent cancel tare |
|                  | Alternative program compilations derived  
                  Baseboards 1155 rev C use PO6_02n  
                  Baseboards 1155 rev D on use PO6_12n | |
| PO6_025/125      | - Remote tare operation fixed  
                  - EX serial response made single digit (0/1/2) to be Lucid compatible | Use of ? chr for comms help, limits use in text strings |
|                  | - 126 prepared for 'Flash ETR' options  
                  - modified handling of ? chr in serial comms  
                  - Help dump changed from ?? to ?? | |
|                  | - DEAD acquire without clearing linearity adjust | |
| PO6_026/126      | - Programmable Mode Functions (FU) Introduced  
                  - Flash ETR implementation complete (PO6.127)  
                  - Fixed parity bug  
                  - Fixed Print bug for 'LinE'=1  
                  - Fixed Analogue gain adjust if 'nEt'=1  
                  - CTRF/HF default now 0 was 0C (Form Feed)  
                  - Serial FK response reverts to single digit  
                  - Changes to tare printing, SAT value now printed  
                  - New PM command for last printed SAT value | - Flash ETR s/w not finished  
                  - RX bug for serial parity check (CP01/02)  
                  - Print bug when 'LinE'=1 (continuous 1st line print)  
                  - Analogue gain only adjusts when 'nEt'=0 |

© Ian Fellows Ltd. 2004 – CPI Operation Manual  
Revision B - Page Issue 002 Software Release PO6_027/127
## CPI - Contents

1. **GETTING STARTED**  
   - 1.1 Panel Functions  
   - 1.2 Power Connection  
   - 1.3 Loadcell Connection  
   - 1.4 Control Outputs and Inputs  
   - 1.5 Switching On  
   - Page  

2. **CALIBRATION & ADJUSTMENT**  
   - 2.1 Calibration Sequence  
   - 2.2 Linearity adjustment  
   - 2.3 Virtual Calibration  
   - 2.4 Weight Filtering  
   - Page  

3. **MENU FUNCTIONS**  
   - 3.1 Set Up Menus  
   - 3.2 Access Levels - Passcode & Pushbutton Entry  
   - 3.3 Selecting Menus and Accessing Parameters  
   - 3.4 Editing Parameters  
   - 3.5 Permanent Parameter Storage  
   - 3.6 Special Editing Procedures  
   - 3.7 Setting The Real Time Clock - Time & Date  
   - 3.8 Special PLU Parameter – Product Code  
   - 3.9 MODE FUNCTIONS - Selecting a Function for the MODE button  
   - Page  

4. **ADVANCED FEATURES**  
   - 4.1 Using Tares (Net Weighing)  
   - 4.2 Preset Tares  
   - 4.3 Checkweighing and Setpoint Modes  
   - 4.4 Setpoint Mode Operation  
   - 4.5 Batchweighing - Setpoint Mode 01  
   - 4.6 Remote Operation (Control I/P assignment)  
   - 4.7 Control O/P and Printout Assignment  
   - 4.8 Part Counting  
   - 4.9 L I U E Animal Weighing  
   - 4.10 Conversion Mode  
   - 4.11 Analogue Output (Option)  
   - 4.12 Flow Rate Display/Output  
   - Page  

5. **SERIAL INTERFACING AND PRINTING**  
   - 5.1 Serial/Printer Installation  
   - 5.2 Serial Comms – S E r i a l Parameter Menu  
   - 5.3 Serial Interface Weight Data Format  
   - 5.4 Multi-drop Operation (RS 485 only)  
   - 5.5 Printer Config. – P r i n t . C F . Menu  
   - 5.6 Print Formatting – P r i n t . F o r . Menu  
   - 5.7 Remote Displays/Port Assignment  
   - Page  

6. **DIAGNOSTICS**  
   - Page  

7. **APPENDIX**  
   - 7.1 Specifications  
   - 7.2 Calibration Transfer  
   - 7.3 Replacing Legends  
   - 7.4 Dimensions  
   - Page  

8. **MENU TABLES**  
   - Page  

9. **BASEBOARD LAYOUT - REFERENCES**  
   - Page
1. GETTING STARTED

1.1 Panel Functions

The NET Wt. display is the GROSS Wt. - minus - the sum of any Preset Tare or Semi-Auto Tare.

For more information on Preset Tares see section 4

The pushbuttons also have secondary functions ENTER used when displaying and editing parameters.
**Display status indicators**

The normal weighing units of measurement are legended on the front panel.

During normal operation - some status functions may be indicated by a flashing character in the left digit –

- **C** = Count mode
- **r** = Rate mode
- **U** = Converted mode, converted Units.
- **.** = command pending ~ awaiting stable weight
- **n** = Peak mode max value
- **U** = Peak mode min value
- **-** = Negative Sign (could over-ride status byte)

The following only display if enabled by parameter **ln o U** \( \text{SETD} = 1 \)

- **F** = Fail (Setpoint Mode \( \text{SETD} \) = 00)
- **H** = High (Setpoint Mode \( \text{SETD} \) = 02/04/05)
- **P** = Pass (Setpoint Mode \( \text{SETD} \) = 00/02/04/05) \( \text{SETD} \)
- **L** = Low (Setpoint Mode \( \text{SETD} \) = 02/04/05)
- **E** = Empty/Discharge (Batching mode \( \text{SETD} \) = 01)
- **d** = Dribble (Batching mode \( \text{SETD} \) = 01)
- **b** = Bulk (Batching mode \( \text{SETD} \) = 01)

Note: **GROSS** and **NET** indicators flash to indicate displayed Totals, Preset Tares and ‘Flash Alibi’ weights.
1.2 Power Connection

Power Connection

Power may be connected to any of the 'DC SUPPLY' terminals on P3 (+Vin/0V). The external supply should be fused at 3A 'slo-blo'. Internal protection offered via a 750mA resetable 'poly' fuse.

1.3 Loadcell Connection

Note: Loadcell Cabling should be run separately from other wiring; especially mains A.C. supply wires and any such wiring crossing, if necessary, only at right angles and as far apart as possible.

Use 6-wire screened multi-core cable between P1 (see above diagram), and Loadcell Junction Box. The screen must be connected to 'L/C SCREEN' on P1.

Maximum cable length between the indicator and loadcell junction box depends on the cross sectional area of the sense wires. Max length = 150m/mm²

6-wire Loadcell Cable Connection Schematic

Cable screen must be connected to loadcell cable screen ONLY

4-wire Loadcell Cable Connection Schematic

Cable screen must be connected to loadcell cable screen ONLY

It is essential that the 'sense' inputs are connected. Normally, 6 wires are taken to the loadcell junction box where the 'sense' wires are linked to the 'excitation' terminals. For direct 4 wire loadcell connection, the 'sense' inputs must be linked directly to the 'excitation' terminals inside the indicator.
1.4 Control Outputs and Inputs

The IO interface was updated and Revised at Baseboard Rev E.
Connection information is described below. Terminal locations are identified in section 9 - Baseboard Layout
References for both Rev C and Rev E are at rear of the manual. For operation of I/O see section 4

Outputs 1, 2, 3 IFE1131 Rev C Baseboard
Terminals marked for outputs 4 and 5 are never used

Recommended Interface
The recommended option is to use an external DC supply. Be sure to fit ‘commutation’ diodes across any inductive load such as a relay coil. Without it the indicator’s opto-isolator transistor may be destroyed. Use screened cable and connect screen to ’0V’ (as shown above). Do not connect screen at ‘load’ end of cable.
Each output load may draw up to 60mA (Load resistance >200Ω for 12v; >400Ω for 24v). The outputs consist of uncommitted darlington opto-isolators, capable of ‘sinking’ >60mA with a ‘drop’ of <1.5v when ‘on’, and will stand up to 30v without significant leakage when ‘off’. They are strictly DC, and the ‘OPn+’ must not go negative of ‘OP-COM’, or damage to the output device will occur. If an output fails to switch, check the external wiring carefully, and the user programming of, for example ‘OPAL’, to be sure they are supposed to be operating.

Recommended Interface - Common Positive Drive

Alternative Interfacing
Shown below is an alternative, non-preferred scheme. This uses the internal, unregulated supply ‘+VIN’. This is not recommended because it involves external connection to the internal supplies; in some situations a ‘noise’ hazard. However, if the distance is short; typically in the same panel; it may be done, with care. The actual voltage available at ‘+VOUT’ is variable. If the indicator is DC powered, it is nominally the DC supply voltage. However, if mains supplied, it will vary considerably, dependent on the number of display segments illuminated, and other load factors. On a 230v supply, it will vary between 22v and 32v, on 115v; it may drop as low as 18v. However, it should be compatible with most industrial 24v rated inputs.
VIN+ will supply typically up to 100mA (200mA if DAC option not fitted).

Alternative Interface - Common Positive Drive
Outputs 1, 2, 3 IFE1131 Rev D Baseboard

Recommended Interface
The recommended option is to use an external DC supply. Be sure to fit ‘commutation’ diodes across any inductive load such as a relay coil. Without it the indicator’s opto-isolator transistor may be destroyed. Use screened cable and connect screen to ‘0V’ (as shown above). Do not connect screen at ‘load’ end of cable.

Each output load may draw up to 60mA (Load resistance >200Ω for 12v; >400Ω for 24v). The outputs consist of uncommitted darlington opto-isolators pairs, capable of ‘sinking’ or driving >60mA with a ‘drop’ of <1.5v when ‘on’, and will stand up to 30v without significant leakage when ‘off’. They are strictly DC, and the ‘OPn+’ must not go negative of ‘OPn-COM’, or damage to the output device will occur. Each common has a 100mA poly resettable fuse to provide protection. If an output fails to switch, check the external wiring carefully, and the user programming of, for example ‘OPAL’, to be sure they are supposed to be operating.

Recommended Interface - Common Positive Drive

Common Ground Drive

Alternative Interfacing
Shown below are the corresponding alternatives, non-preferred schemes. This uses the internal, unregulated supply ‘+VIN’. This is not recommended because it involves external connection to the internal supplies; in some situations a ‘noise’ hazard. However, if the distance is short; typically in the same panel; it may be done, with care. The actual voltage available at ‘+VOUT’ is variable. If the indicator is DC powered, it is nominally the DC supply voltage. However, if mains supplied, it will vary considerably, dependent on the number of display segments illuminated, and other load factors. On a 230v supply, it will vary between 22 and 32v, on 115v, it may drop as low as 18v. However, it should be compatible with most industrial 24v rated inputs. We recommend that the available VIN supply is checked to ensure suitability for your use.

VIN+ will supply typically up to 100mA (200mA if DAC option not fitted).

Alternative Interface - Common Positive Drive
Alternative Interface - Common Ground drive

Control Inputs 1 and 2 IFE1131 Rev C and Rev D Baseboard

Important Note: -
On Rev C baseboards Inputs are polarity dependent.
On Rev E baseboards Inputs are not Polarity dependent

The normal method for connecting to the control inputs is from an external 12-24V DC power source, via the controlling contact or transistor. The switching current is 5-12mA. The contact or transistor may be in series with either input (observe correct polarity for the switching transistor if solid-state output, as well as the indicator input if Rev C). As each input is fully isolated, they may be commoned to positive (where the external switching elements are commoned to ground – typically open collector NPN outputs), or to negative (eg open collector PNP outputs – like the example below). Special care should be taken with any relay contact selection, especially if 12v is used. Good quality, gold plated is recommended.

Recommended Interface - Switching to negative

Recommended Interface Switching to positive

Alternative Interfacing

As with the output examples previously, there is an alternative, non-preferred scheme. Two examples are shown for positive and negative switching. These both use the internal, unregulated ‘+VOUT’. This is un-recommended because it involves external connection to the internal supplies; in some situations a ‘noise’ hazard. However, if the distance is short; typically in the same panel; it may be done, with care. The actual voltage available at ‘+VOUT’ is variable. If the indicator is DC powered, it is nominally the DC supply voltage. However, if mains supplied, it will vary considerably, dependent on the number of display segments illuminated, and other load factors. On a 230v supply, it will vary between 22v and 32v, on 115v, it may drop as low as 18v. Whatever, it will reliably drive the control inputs, and will be compatible with most industrial 24v rated inputs.
Alternative Interface - Switching to negative

![Alternative Interface - Switching to negative diagram]

Alternative Interface - Switching to Positive

![Alternative Interface - Switching to Positive diagram]

Input/Output Cable Screens

It is recommended that screened multicore cables be used to connect to the various input contacts and output loads (use separate multicore cables for inputs and outputs). Connect the screens to '0V'. Because of the number of wires/screens that may need to be commoned at some of the necessarily tiny PCB connector terminals, the installer may need to provide extra, auxiliary terminals. It is very important that any unscreened interconnections are kept as short as possible to avoid electrical noise pick-up or radiation. This is particularly important when multicore cable screen connections are being made.
1.5 Switching On

At switch-on, a display segment test is followed by:

- Software Version number display e.g. PO6_022 (give this number in event of a query).
- Traceable Access Number display e.g. TAn 021
  (This number increments when changes are made to calibration – Requiring Access Level 2)
- Self testing of internal electronics; prom, eeprom, ram, a-d etc. will occur.
- Diagnostics indicate failures (see Section 6).
- The system should then show a live weight display ready for use.

A display of --20%-- or --4%-- indicates the weight signal is outside currently permitted zero limits. In this case remove weight from platform until within limits and an auto-zero takes place, or press SET ZERO for display referenced from last stored zero position.

Zero conditions at power on depend on current configuration.

Parameter `ENG_CFG PONZ [EP]` determines if the system applies zero conditions at power on.

0= checks for weight within zero conditions and then performs auto-zero
1= no restriction, powers on with weight displayed

Zero limits are determined by

Parameter `ENG_CFG CERT [EX]` Trade Mode

0= Non Trade Mode – zero limits at power-on are +/-10% band around calibrated zero point
  SET ZERO function then operates over +/- 10% band around the zero position set at power on
1/2= Trade Mode – zero limits at power-on are +/-10% band around calibrated zero point
  SET ZERO function then operates over +/- 2% band around the zero position set at power on

Parameter `confiG z2pc [Z2]` can modify the power-on zero range

0= +/- 10% range at power-on as above
1= +/- 2% range restriction at power on

TIP – A scale inadvertently loaded at power on, might auto-zero within the +/-10% range and when the weight is removed, drop below zero by more than the +/- 2% now permitted by the SET ZERO function. Powering on/off with the scale unloaded will rectify this situation, or it is also possible to press & hold SET ZERO and then at the same time press MODE.
## 2. CALIBRATION & ADJUSTMENT

If unfamiliar with general routines for accessing menus and editing parameters read section 3 first.

The calibration facility allows full re-calibration from the front panel, checking of calibration validity without disturbing existing parameters, or is a valuable diagnostic tool for initial set-up and subsequent fault-finding.

Before initial calibration, decide what the scale range ($\text{Max/LiP}$) and increment ($\text{dISP}$) are to be. Selection is dependent on many factors and should be determined by experienced personnel. This is particularly critical for Trade Approved installations where compliance with Type Approval requirements is essential.

$\text{dISP}$ must be a sub-multiple of 1, 2 or 5, anywhere between 0.001 and 50.

### 2.1 Calibration Sequence

The calibration menu differs from other menus in that as each stage completes, it automatically steps to the next stage/item in the menu. A full calibration sequence would start at the first menu item ($\text{dISP}$) and progress through the sequence. However, if appropriate, stages can be skipped by simply using $\text{ñññ}$ keys to step through the menu.

From weight display mode

- Press $\text{MODE}$ for 1 second to display $\text{PASS}$. Obtain required Access Level using Passcode or pushbutton and proceed to MAIN MENU $\text{USER}_-$ Then $\text{ñññ}$ to select $\text{CALIB}_-$

- If Access Level is already 1 or 2 $\text{PASS}$ will not be displayed.
- At $\text{PASS}$ pressing internal pushbutton gains Access Level 2
- Passcode 1 $\text{ñ}$ $\text{ENTER}$ gains access level 1
- Passcode 900 $\text{ñññ}$$\text{ñ}$ $\text{ENTER}$ gains access level 2 if permitted

These are default passcodes and may be altered by installer.

- Level 2 Passcode access is permitted when $\text{ENG_CFG CERT} = 0/1$

- Press $\text{MODE}$ again to enter the calibration menu.

- Unless the SECURITY ACCESS LEVEL is already 2, the message $\text{PASS}$ (or $\text{PUSHBUT}$) will be displayed.
- This is a further request to key in the LEVEL 2 Password or press the calibration button on the main board
- If adjustment is not intended; press $\text{MODE}$ to skip this step. Items within the calibration menu can then be examined but not changed.

**$\text{dISP}$ – Display Increment and Decimal Point (‘e’)**

- Press $\text{MODE}$ to show ‘increment’ (scale interval) together with decimal point position, if applicable.

- Press $\text{ñññ}$ or $\text{ñññ}$ to step increment in sequence 1, 2, 5, 10, 20, 50, 1 ... etc.
- Press $\text{ñññ}$ to step decimal point left (max 3 dp)

In Non Trade mode extended 0 is shown in the LSD representing the resolution available with the x10 ‘TEST’ function

- Press $\text{ENTER}$ to set selection and move on …

**$\text{P aP}$ – Maximum Display Capacity (‘max’) **

- Press $\text{MODE}$ to show current value for MAX CAPACITY.

- Edit using the $\text{ñññ}$ keys

Note: The display will be maintained for 9 divisions (e) beyond this value. Having changed this value, full calibration MUST be carried out.

- Then press $\text{ENTER}$ to set selection and move on…

**$\text{FIl}$t – Filter Band Parameter**

- Shows current Filter Band Setting 00 - 05 or 10

- Press $\text{MODE}$ to edit using the $\text{ñññ}$ keys

If set to ‘00’ then the band will be automatically selected during calibration.

Alternatively may be set to ‘01’ light filter through ‘05’ heavy filter and will NOT be changed after Cal.

A setting of ‘10’ shows that the filter has been manually optimised using the filter coefficient set by the $\text{Filt}$ parameter in the $\text{CONF}$ menu

- Press $\text{ENTER}$ to set edited selection or $\text{ñññ}$ to step past and move on …
**Fast**  
**Fast Track Parameter**

- Fast Track feature modifies how the weighing filter is applied. See further information on Filtering later in this section. Press MODE to Edit using the \( \text{ } \) keys.
- \( 0 = \text{OFF}, \) Filt is always applied at a uniform rate  
  \( 1 = \text{ON}, \) Filter effect reduces when weight is ‘in motion’  
  Other settings 2+ reserved for future

Press ENTER to set edited selection or \( \text{ } \) to step past and move on….

**Freeze**  
**Display Freeze Parameter**

- Freeze feature latches on stable readings to prevent flicker. See further information on Filtering later in this section. Press MODE to Edit using the \( \text{ } \) keys.
- \( 0 = \text{OFF}, \) display tracks weight changes immediately  
  \( 1 = \text{ON}, \) stable readings will latch for up to \( \sim 0.5s \)

Press ENTER to set edited selection or \( \text{ } \) to step past and move on….

**Deadload**  
**Deadload Offset Calibrate**

- Press MODE to show approx millivolt per volt output from loadcell(s).
- Excitation is approx. 5 Volts  
  Ensure weigh platform is empty and stable, and the mV/V reading is as might be expected.

- Press ENTER to inititate automatic DEADLOAD acquisition. This will take several seconds.
- Zero Track and Set Zero are disabled until full calibration is completed  
  \* Deadload may be re-acquired without the need to re-acquire the span - exit via \( \text{ } \) to store the new value, for Verified Systems treat as re-calibration, unit will have to be re-verified.

Display will eventually show… or press \( \text{ } \) to skip Deadload Calibration and reach …

**Enter Span Calibration Weight**

- Press MODE to display currently defined Span Calibration Weight value.
- Press MODE to Edit using the \( \text{ } \) \( \text{ } \) keys.
- For non-trade applications see also below “virtual calibration”  
  \* Calibration weight may be between 12.5% (6.25 % when non-trade)  
  and 100% of the MAX (\( \text{TOP} \))

Press ENTER to set selection and move on …

**Span Calibrate**  
**CAL**

- Press MODE to show approx millivolt per volt output from loadcell(s) less the deadload offset  
  This is active output; i.e. 0mV/V is displayed if no calibration weight is loaded.

- Press ENTER to initiate automatic SPAN acquisition. This will take several seconds.
- For Trade mode, the loadcell signal must be \( \geq 1 \mu \text{V} \) for each division (e).

Display will eventually show…. Or press \( \text{ } \) to skip span Calibration…  
CAL may be skipped if it is only desired to re-acquire DEADLOAD on a previously calibrated system.

**TIP** - It is important that the millivolt/volt readings are close to expected values. A fault on the ‘SENSE’ signals from the loadcell may result in a millivolt reading 2~4 times higher than expected but give an otherwise, apparently ‘normal’ calibration. The result of setting up with a faulty ‘SENSE’ signal would be drifting and general instability of the weight reading.

\[
\text{Millivolt/volt reading} = \frac{\text{‘CAL’ weight}}{\text{Loadcell Capacity}} \times \frac{\text{Loadcell Sensitivity(output)}}{\text{No. of loadcells in weigher}}
\]

Load cell capacity(rating) and sensitivity(output) can be obtained from the loadcell manufacturers specifications/certificate.

E.G. Single 20kg, 2mV/V loadcell used in platform with 8kg ‘CAL’ weight.

\[
\text{Millivolt reading} = \frac{8}{20} \times \frac{2}{1} = 0.8\text{mV/V}.
\]
<table>
<thead>
<tr>
<th><strong>tESt ~ Display Wt x10 (Fine Trim)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pressing <strong>MODE</strong> puts into <strong>x10</strong> weight display mode with a flashing <strong>t</strong> in the display MSD, then:</td>
</tr>
<tr>
<td>• <strong>Enters a ‘SPAN TRIM’ mode (only if level 2), indicated by flashing <strong>t</strong> in MSD (with decimal point).</strong></td>
</tr>
<tr>
<td>• <strong>Nudges span calibration factor up by one tenth of a division.</strong></td>
</tr>
<tr>
<td>• <strong>Nudges span calibration factor down.</strong></td>
</tr>
<tr>
<td>• Each ‘nudge’ moves the indicated weight, wherever nudging is done. Thus if scale is calibrated and nudged at 33% of capacity then each nudge will represent a change of three tenths of a division at full scale.</td>
</tr>
<tr>
<td>• The limit of 12.5% of capacity applies so nudging is inhibited below this weight.</td>
</tr>
<tr>
<td>• <strong>ENTER</strong> or <strong>MODE</strong> ends the span trim procedure.</td>
</tr>
<tr>
<td>• Unless at ACCESS LEVEL 2, it is not possible to ‘fix’ any values obtained above.</td>
</tr>
<tr>
<td>• If in Trade mode, <strong>ENTER</strong> (except in <strong>tESt</strong>) will abort calibration at any stage, restoring previous values (with the exception of linearity parameters ~ see above). The display will show <strong>Abort?</strong> and pressing either again will cleanly abort leaving the old values intact. Pressing any other key will return operation to the calibration function just exited.</td>
</tr>
<tr>
<td>• In non trade mode – pressing the <strong>ENTER</strong> key will bring up the <strong>SURE?</strong> message and a second press of <strong>ENTER</strong> will store the new values. Pressing <strong>t</strong> instead of <strong>ENTER</strong> will bring up the <strong>Abort?</strong> message. A further press of the <strong>ENTER</strong> key or the <strong>t</strong> key will restore the old values.</td>
</tr>
<tr>
<td>• See Section 7.3 for details of recording established calibration values for future use if service is required and calibration transfer has to be implemented.</td>
</tr>
<tr>
<td>• After calibration the Display interval can be altered without the need for full re-calibration. <strong>dISP</strong> located in the <strong>CALibn</strong> menu can set a “pseudo” Display interval value - with the constraints that the decimal point cannot be moved.</td>
</tr>
</tbody>
</table>

Once back at the **CALibn** - menu heading, other menus may then be accessed, or the weight indication resumed by pressing **ENTER** (closing access level) or **t** keeping the access level active for subsequent return to menus.

### 2.2 Linearity adjustment

In the **En9CF9** menu a 5 slope 6 point linearity adjust can be made at 20% **Lin2**, 40% **Lin4**, 60% **Lin6** and 80% **Lin8** of capacity.

To adjust take reading at 20/40/60/80 of capacity and note error in weight (e/10). If error was +8.2kg then at LRN2 enter −8.2kg to adjust.

Note: adjustment only affected between previous and next breakpoint e.g. in stated example between 0 and 40%

### 2.3 Virtual Calibration

Pressing **t** when showing **tESt** in non trade mode enables Calibration via entry of the cell mV/V rating as an alternative to conventional calibration. Displays **SPRn** and the value can be entered in units of 0.001mV/V.

If an accurate estimation of the active loadcell output in mV/V is available, this can be entered as a **SPRn** parameter. A deadload step (without a subsequent **CAL** step) must have been performed previously; an **Error** display or serial ‘?F’ error will be generated otherwise.

The calculation is relatively straightforward.

\[
SPRn \text{ value} = \frac{\text{Loadcell sensitivity x System Maximum Capacity}}{\text{No. of Loadcells x Individual Loadcell Capacity}}
\]

Loadcell Sensitivity is in Millivolts per volt (mV/V).
The System Maximum Capacity is the gross weight it is designed to weigh, deadload is ignored.

If a single 2mV/V 100kg cell is used in the bottomworks of a 60kg system, the active output of the cell (for maximum capacity) will be:

\[
2 \times 60 = 1.2 \text{ mV/V}. \quad \text{Enter 1.200 to set the span.}
\]

Rather than using the loadcell manufacturers catalogue quoted nominal sensitivity, it is best to use the exact figures provided by the individual test certificate. In multiple cell applications, average the sensitivities of the cells.
The limitations of this technique are:

- The indicator's ADC internal gain varies slightly from device to device. An average millivolt conversion factor (determined from factory production test figures) is pre-programmed into the indicator. A worst case error might be around a quarter of a percent of full scale.
- The loadcell manufacturer's sensitivity figure may be wrong or may be affected by other cell summing/cornering devices.
- Because no proper test weighing takes place, obvious bottomworks problems such as binding are not exposed - the full load may not be reaching the loadcell.

An Error display means the sensitivity is too low.

Performing a normal CAL test weighing forces the SPAn parameter to 0. It is not possible to read back a meaningful value if a conventional span calibration is performed.

### 2.4 Weight Filtering

(See also LIVE ANIMAL WEIGHING (4.9))

CPI provides five powerful features for optimising weighing performance and display appearance to suit individual applications.

- **Filter** – see FILT & FLTC – adjusts the level of damping applied to the weight signal.
- **Fast Track** – see FAST – enables fast track of large weight changes.
- **Display Freeze** – see FREE2 – holds a stable reading from unnecessary flicker.
- **Motion Band** – see MBND – affects the system conditions required for STABLE weight.
- **Motion Delay** – see MDLY – delays action pending multiple stable integrations.
- **Display Update** – see UPDT – alters how often the display is refreshed.

**FILT** & **FLTC** parameters found in the CONF19 Menu adjust the level of damping applied to the load cell signal. Inevitably more damping makes for slower reaction time to change in weight.

From the CONF19 menu these parameters can be altered at Level 1 Access. The Filter Band (FILT) is also in the calibration menu where level 2 Access is required to affect any change.

FILT can be set from 01 for light damping to 05 for extremely heavy damping. A setting of 02 is likely to suit most applications.

Normally only FILT (The Filter Band) will need to be altered, this automatically sets a value for FLTC (The Filter Coefficient) as shown in the table below:

<table>
<thead>
<tr>
<th>Filter Band</th>
<th>FILT</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter Coefficient FLTC</td>
<td>08</td>
<td>07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A Filter Band setting of 10 indicates a non-standard setting of the Filter Coefficient. A setting of 00 might be used during calibration, to allow the filter to self-adjust.

**FAST** parameter, found in the CONF19 (level 1 Access) and CALIBn (Level 2 Access) menus can be used to speed up large changes in weight.

The Fast Track setting reduces damping while the signal is in motion, allowing faster weight change, then applies the current filter setting once weight has stabilised.

Fast Track must be set to suit the particular application or the way in which the scale is to be used.

- 0 = OFF, Filter is always applied at a uniform rate
- 01= ON, Filter effect reduces when weight is 'in motion'
- Other settings 2+ are reserved for future development

**FREE2** parameter is used to turn on the Display Freeze feature. When the Display Freeze is active, a stable reading will be frozen to prevent unnecessary flicker. The Freeze is released after motion persists for ~ 0.5 sec.

Any application that requires instant response to weight change will need the freeze turned off by setting FREE2 to 0.
Typical Fast/Freeze combinations

<table>
<thead>
<tr>
<th>FAST</th>
<th>Frozen</th>
<th>TYPICAL APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Fast Track ON</td>
<td>1 = Display Freeze ON</td>
<td>Catch Weight, Parcel Weighing</td>
</tr>
<tr>
<td>0 = Fast Track OFF</td>
<td>0 = Display Freeze OFF</td>
<td>Load then adjust into tolerance. May also suit heavily damped scales such as weighbridges</td>
</tr>
</tbody>
</table>

0 = Fast Track OFF
1-8 = Display Freeze ON
0 = Display Freeze OFF

Note: CPI Filling mode (SET d 01) automatically handles the way in which the filter is applied during fill. However FAST & Frozen settings will affect the behaviour before and after fill. For example if weight might need manual top up after fill set FAST = 0 (Off)

\( \Xi \text{bd} \) parameter, found in the ConFIg menu (level 2 Access) can be used to relax the conditions defining stability.

By default \( \Xi \text{bd} = 0 \) and can only be changed at Level 2 Access. This is designed to ensure that the weight signal is truly stable before operations such as Print or Tare are performed.

Less stringent conditions may suit some applications. Increasing \( \Xi \text{bd} \) (range 1-7) relaxes the conditions for stability such that dependent functions will act quicker though the weight might still be changing. Thus a Print could occur before the final weight is reached. A Legal for Trade application would use \( \Xi \text{bd} = 0 \).

\( \Xi \text{dl} \) parameter, found in the ConFIg menu (level 2 Access) can be used to further condition actions that depend on stability.

<table>
<thead>
<tr>
<th>( \Xi \text{dl} )</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Tare/Print operations perform regardless of motion</td>
</tr>
<tr>
<td>1</td>
<td>Default - Tare/Print operations will perform on seeing a single stable weight integration as determined by motion band and filter settings</td>
</tr>
<tr>
<td>2-9</td>
<td>Motion will continue to be flagged until 1-9 successive ADC stable cycles have been recorded (each cycle is 20ms) TIP – helps prevent premature tare/print especially when using heavy filters or when motion band is not zero</td>
</tr>
</tbody>
</table>

\( \text{UPDT} \) parameter, found in the ConFIg menu (level 1 Access) sets the rate at which the display (and serial interface transmission) is refreshed. It does not otherwise affect the speed of operation (ie setpoints, printing etc.)

<table>
<thead>
<tr>
<th>( \text{UPDT} )</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Non Trade Only</td>
</tr>
<tr>
<td>01</td>
<td>0.02</td>
</tr>
<tr>
<td>02</td>
<td>0.1</td>
</tr>
<tr>
<td>03</td>
<td>0.04</td>
</tr>
<tr>
<td>04</td>
<td>0.3</td>
</tr>
<tr>
<td>05</td>
<td>0.4</td>
</tr>
<tr>
<td>06</td>
<td>0.5</td>
</tr>
<tr>
<td>07</td>
<td>0.6</td>
</tr>
<tr>
<td>08</td>
<td>0.7</td>
</tr>
<tr>
<td>09</td>
<td>0.8</td>
</tr>
<tr>
<td>10</td>
<td>0.9</td>
</tr>
</tbody>
</table>

The display rate should be chosen for the application. Most platform and bench scales would use the default 03 whereas a weighbridge may suit a slower rate such as 06. Manual dosing applications benefit from faster rate (01). Very fast rates (00 & 02) demand a lot of processing time and should be avoided except for diagnostic purposes.
3. MENU FUNCTIONS

3.1 Set Up Menus

The basic operator functions and displays are illustrated in section 1.1 and section 4 gives information on quick access functions that can be configured on the MODE key. Many additional functions and features are accessed using ‘Set Up Menus’.

To access the menus, press and hold MODE for 1 second - the display shows PASS

A pass code or use of the internal pushbutton switch will now determine the access level (permissions) to be granted.

Once within the menu system, the five front panel buttons will operate according to their secondary functions

MODE ENTER ⇔ ò

3.2 Access Levels - Passcode & Pushbutton Entry

Parameters within the menus are protected by different ACCESS LEVELS - Most parameters can be read at any access level, but may only be edited at the specified access level or higher.

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Class</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>General User Parameters eg Time/Date, Product Code…</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Installer/Supervisor eg Most configuration parameters, totals clear…</td>
<td>Level 1 code - At PASS prompt enter code Default = 1 ⇔ ò ENTER or serial command PW1</td>
</tr>
<tr>
<td>2</td>
<td>Installer/Engineer eg calibration and other restricted configuration parameters</td>
<td>Internal pushbutton if ( E\text{n}_9.C\text{F}_9 \ E\text{e}_r\text{f}=2 \ E\text{e}_r\text{f}=0 ) Level 2 code if ( E\text{n}_9.C\text{F}_9 \ E\text{e}_r\text{f}=0 ) At PASS or PShbUt prompt, press internal pushbutton or enter code if permitted, Default = 900 ⇔ ò ò ò ò ò ò ò ò ò ò ò ò ENTER or serial command PW900</td>
</tr>
<tr>
<td>3</td>
<td>Factory only (some can be edited at level 2 by holding internal pushbutton when pressing ENTER)</td>
<td></td>
</tr>
</tbody>
</table>

If higher access is not required, PShbUt and PASS can be skipped by pressing MODE or ENTER without other entry.

Pushbutton

The internal pushbutton for level 2 (S1) is located on the baseboard inside the unit and can be accessed through a small hole in the rear panel.

Pass codes

- Codes are up to 4 digits long and are entered using the ⇔ ò keys and the ENTER button.
- Codes are entered from right to left, the actual digits are not displayed, a dot shows as each digit is set.
- Each digit can be cycled up 0-1-2… or down 0 -9-8… using ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò ò
Once an access level is obtained it remains effective so long as the system remains in menu mode.

Return to weighing mode using the ENTER key, keeps the access level effective.

This allows the effect of changes to be investigated before returning into the menus without having to re-apply passcode/pushbutton. After 4 minutes in weighing mode, without operation of any function or at power off, access will reset to level 0 automatically.

Return to weighing mode using the ENTER key immediately resets access to level 0

**3.3 Selecting Menus and Accessing Parameters**

- On initial entry to the menus the first menu title **USER** is displayed.

- Step up or down through the available menu titles using the keys.

- At access level 0, only a subset of the available menus are displayed.

- At access level 1 and above the full menu set becomes available.

- Two special menus **ANALOG** and **FLASH** only appear when these options have been enabled.

- The figure opposite gives a brief explanation of the features found in each menu. Full details of the parameters within each menu will be found in the diagrams at the back of this manual.

- With the desired menu group selected, press MODE to access the parameters in the menu. (Depending on current access level, **PASS** and **PUSH** may also be prompted at entry to the **CALIB** and **CFG** menus.)

- The parameters within a menu are stepped through with keys.

- The parameter name may be displayed, along with a one or two digit value. If its value is more than two digits long, MODE must be pressed to display & edit it.
3.4 Editing Parameters

After selecting the parameter required, press **MODE** to edit.

- If the value is already shown then one digit will flash to show that it may be edited using the øò keys.
- If only the parameter name is displayed, then pressing **MODE** will reveal the value with one digit flashing ready to edit.
- If the ø or ó key is held depressed, an auto-increment mode begins after a short wait.
- ø steps to the digit which flashes for editing (steps back to start when end reached).
- If ô key is held depressed for 2 seconds, the displayed value is cleared to zeroes.
- **ENTER** sets the new value. A noPASS or other diagnostic message may be displayed if entry is not permitted or unsuitable.
- **MODE** toggles out of edit mode, but does not store the value. (Changes will be lost if stepped to another parameter)
- Some parameters requiring a simple ON/OFF setting or command to action, use a single digit ON/GO (1) or OFF/STOP (0). When in EDIT mode, ø or ó will ‘flip’ a 0 to a 1 or back.

### Summary of Menu Navigation

| AT MAIN MENU TITLES | øø step through the choice of MENUS
| | ENTER or çreturn to WEIGHING MODE
| | Having selected the required menu, pressing **MODE** steps to the first parameter in that menu or in some cases may first prompt for passcode or pushbutton operation.

| AT PARAMETER DISPLAY | øø step through the PARAMETERS
| | **ENTER** returns to MAIN MENU title, çreturns to WEIGHING MODE
| | Having selected the Parameter of interest, pressing **MODE** allows the display of any parameter value longer than 2 characters, and editing, if permitted. Edit mode is indicated by a flashing character.

| EDITING PARAMETERS | **MODE** permits display/edit of parameter
| | øø modify the value
| | **ENTER** ‘fixes’ new displayed value (if allowed)
| | **MODE** toggles between display/edit but does not ‘fix’ the value.
| | Always finish EDIT with **ENTER** to store value

3.5 Permanent Parameter Storage

Most updated parameters are written to a non-volatile parameter store (EEPROM) on pressing **ENTER** after editing (message: StorEd will briefly appear). The calibration parameters are written ‘en bloc’ on successful completion of the CALIBRATION procedure. Once written, they are unaffected by loss of power.
3.6 Special Editing Procedures

Negative Number Entry
Occasionally a parameter requires a negative value entry (e.g., inflight and some engineering parameters). To set the negative sign, step to the most significant digit (left most character). This digit only, steps through the numbers and then the '-' sign, allowing this to be set. N.B. Setpoints cannot be entered in negative format.

Hexa-decimal data
'Hexa-decimal' characters are simply an extension of the normal 0-9 numbering system giving 16 options, rather than 10 and go from 0-through-9, then A, B, C, D, E & F. Entry is as for normal numbers; the software automatically recognises when the selected parameter is in hex format and allows the 0-9 keys to step through all 16 'digits'.

Hexa-decimal data is used mainly for Print Formatting and the ADC Configuration parameters found in the **EngCFg** Menu.

Alpha-numeric data entry
Where a parameter requires an alpha-numeric entry the procedure is slightly modified ~

- To make entry easier, text strings are entered from the left instead of from the right as with numeric and hexa-decimal values.
- If the key is held pressed for 2 secs, alpha strings clear to spaces.
- The increment/decrement sequence is 0-9, A-Z using UP, or a-z going DOWN, 'Esc' (18h), 'EOS' code (1Fh), 'space' code (20h).
- Alpha characters are represented by a 'stylised' 7 segment character set (see note below).
- Lower case characters are indicated by the presence of a steady '.' (decimal point). To enter a lower case 'a' use the up arrow 11 times (to step to 'B') then step back using the down arrow key to 'A'. Approaching any letter from above makes it lower case, going up to a letter makes it upper case. Watch the d.p, turning ON and OFF.
- Non-printing control characters (special entry routine; see below) are displayed as '¯'.
- The 'EOS' code (ascii 1Fh ~ looks like '    ') is an optional 'end-of-string' terminator (any following characters, including any in 'StxA' if 'EOS' appears in 'StxA', will not be printed).

NOTE: The 7-segment display uses a stylised alphabet. Most letters are obvious but the following are cryptic:

\[
\begin{align*}
J &= J \\
H &= k \\
G &= M \\
F &= t \\
E &= U \\
D &= V \\
C &= W \\
B &= X \\
A &= 'Esc' \\
\bar{A} &= 'EOS'
\end{align*}
\]

Printer control character entry
It is possible to include printer control characters in the ascii text strings. They are selected, either via the serial link or, by using this special entry mode from the front panel buttons ~

- Select the appropriate text string ('StxA/B' etc.) in the **Pr_For** menu.
- Select PARAMETER EDIT MODE. Any previously selected control characters will appear as '¯'.
- Use the key to select the character to be edited.
- Press both 0 and 9 keys at the same time.
- The MOTION indicator will flash to indicate special entry mode and the character will appear in a 'cryptic' binary display format.
- The special entry mode will remain on until the next character is selected.
- The value of the control character is worked out as follows ~

Each segment has the 'hexa-decimal value' shown below, left. By adding the lit segment values, the control character value in hex is given. A table of ASCII codes will give values for each control character. An understanding of binary and hexadecimal notation is assumed in order to use this facility. The factory can give specific help, if required. (Avoid entering value ODh; this is 'carriage return').
3.7 Setting The Real Time Clock - Time & Date

CPI contains a Real Time Clock - time and date can be adjusted by using parameters in the USER Menu.

- 
  Format is HHMMSS – Use arrow keys to select the digits to change and to alter the display. Clock will start running on pressing ENTER.

- 
  Format is ddmmyy – Adjust as needed, press ENTER.

3.8 Special PLU Parameter – Product Code

Some parameters in a menu may have different values depending on the Product Code (PLU) currently selected.

Totalisation Registers, Printout Text Strings, Setpoints, and Parts Counting weights are maintained for each of 12 different PRODUCT CODES. Whenever one of these parameters is altered or updated, it only affects the value for the currently selected product.

The parameter Product Code resides in the following menu groups. Changing Code parameter in any menu, also changes Code in the other menus and changes all associated parameters to values corresponding to the new Product.

- 
  Provides a convenient place for operator to select Code from 01-12

- 
  Code is provided in this menu to permit print (Ptot), print & clear (Crt), or display (g/s/n) for each code. If Code 99 is selected, printing, or printing & clear, will perform for all 12 products.

- 
  Here Code assists programming of 'text strings' associated with each product.
The text strings are stored in four 7-character parameters St1A/St1b/St2A/St2b Select Code required, then program the 4 parameters. Repeat for all required Code numbers. See Print Formatting information for details of how to include strings within the print out.

- 
  Code 99 permits programming of a set of text strings that print regardless of current Code.

- 
  Code permits store and recall of sets of setpoints and where applicable inflight and print tolerance values.

- 
  The part weight value (PArt) can be programmed differently for each of the 12 Codes.

3.9 MODE FUNCTIONS - Selecting a Function for the MODE button

(From software versions PO6.027/PO6.127 only)

Whist the set up menus can be used for operator functions and adjustments, it is possible to allocate one of various functions to the MODE button.

MODE can be configured using the Config menu, Func parameter, to perform one of these functions:

- 
  0 - No function (default)
- 
  1 - Preset Tare
- 
  2 - Memory Tare
- 
  3 - Product Code (PLU)
- 
  4 - Target Weight
- 
  5 - High/Low, Target/Tolerance, Target/Dribble, Setpoint3/Setpoint2
- 
  6 - Cancel Tare
- 
  7 - Print & Clear Total
- 
  8 - Toggle net/gross display
- 
  9 - Toggle net/tare/gross display

A short press on the button activates the function.

In all cases a long press provides access to the SET UP MENUS as normal.

If the MODE button is 'disabled' (using the button menu) - menu access is inhibited, but any programmed function still operates.
OPERATING PROCEDURES FOR THE DIFFERENT MODE FUNCTIONS

**FUNC FU = 0 - NO FUNCTION**

**MODE** is used only to access menus (if not disabled)

**FUNC FU = 1 - PRESET TARE**

Simple Preset Tare entry - Press **MODE** Display prompts  

EITHER Press **SET ZERO** to CANCEL PRESET TARE  

OR Press **ANY OTHER** button to display the **PRESET TARE** value  

Edit the displayed value using the arrow buttons  

Press **ENTER** or **MODE** to set the tare and return to weight display  

Tip - Remember a Semi Auto Tare cannot be applied after a Preset Tare has been set

**FUNC FU = 2 - MEMORY TARE CODE**

Quick select of memory tare code - Press **MODE** Display prompts  

Edit the displayed code 00-12 using the arrow buttons  

Press **ENTER** or **MODE** to set the tare and return to weight display  

The tare value is displayed while **ENTER** or **MODE** are held pressed  

To clear tare, select Tare Code 00  

Tip - Holding side arrow while editing clears to 00  

**FUNC FU = 3 - PRODUCT CODE (PLU)**

Quick select of product codes - Press **MODE** Display prompts  

Edit the displayed code 00-12 using the arrow buttons  

Press **ENTER** or **MODE** to set the code and return to weight display  

Tip - Product codes recall and set stored descriptions and setpoints

**FUNC FU = 4 - TARGET WEIGHT**

Quick entry of Target Weight - Press **MODE** Display prompts  

Press **ANY BUTTON** and display shows current target (Setpoint 3) weight value  

Edit the displayed value using the arrow buttons  

Press **ENTER** or **MODE** to set the value and return to weight display  

Tip - Can be used to set 'setpoint 3' in any setpoint mode but always prompts 'tArg'

**FUNC FU = 5 - HIGH/LOW or TARGET/TOL**

Quick entry of two setpoints - Prompts depend on the setpoint mode (**SETD**) configured in the **In_oUt** menu.  

In each case Press **MODE** then press **ANY BUTTON** and edit using the arrow buttons  

Press **ENTER** or **MODE** to set the value then repeat for the second item prompted  

**SETD** 00/02 prompts **H19H Then L0U**  

**SETD** 01 prompts **FRR9 Then d1b**  

**SETD** 04/05/06 prompts **FRR9 Then f0L**  

**SETD** 07 prompts **S3T Then S2T**

**FUNC FU = 6 - CANCEL TARE**

Cancel Semi-Auto Tare function - If a Semi-Auto Tare is active (display in NET mode) – Press **MODE** to clear the tare.  

If a preset/memory tare is active, then display shows Gross for approx 5s then returns to Net without altering tare.  

Tip - the standard method to cancel semi auto tare (press and hold the SEMI AUTO TARE button) also remains available.
**FUNC** FU = 7 - PRINT & CLEAR TOTAL

Total Print and Clear function - Press **MODE** Display prompts. If **ENTER** is pressed - the system performs total print for the current Product Code and resets the total.

If **ANY OTHER** button pressed, or no button within 5s, returns to weight display without printing or clearing the total.

**FUNC** FU = 8 - DISPLAY TOGGLE NET/GROSS

**MODE** toggles display between NET and GROSS display

- Status LEDs identify if display is net or gross
- Tare is retained while gross displayed, system continues to monitor net for printing and outputs
- Any functions performed while displaying gross will return system to net display

**FUNC** FU = 9 - DISPLAY TOGGLE NET/TARE/GROSS

**MODE** toggles display between NET - TARE - GROSS displays

- Status LEDs identify if display is net or gross (tare = all LEDs off)
- Tare is the internally stored semi auto tare value (rounded)
- Tare is retained while gross displayed, system continues to monitor net for printing and outputs
- Any functions performed will return system to net display

Tip - this setting must be used for peak weight mode, in this case it toggles NET/TARE/GROSS/MAX/MIN (Just GROSS/MAX/MIN if no tare active)

**OTHER SPECIAL USES OF MODE BUTTON**

**PARTS COUNTING** - If the system is placed in 'COUNT' mode then the **MODE** button operates always for count functions as described, regardless of which **FUNC** FU is set.

**PEAK** - For PEAK weight detection (**COUNT PEAK** [MA] = 1) then **FUNC** [FU] must be set to 9)

**WARNING** – Operation of **MODE** functions (as with menus) will temporarily inhibit other weighing and communication functions. Any analogue output will assume its error state.
4. ADVANCED FEATURES

4.1 Using Tares (Net Weighing)

There are two types of tare function.

‘Semi-Automatic Tare’ - tares the current weight to zero by simply pressing the SEMI AUTO TARE front panel button.

‘Preset/Memory Tares - apply an entered value as the tare weight. – see section 4.2

Provided no Preset Tare is active, and the weight is stable, the SEMI-AUTO TARE button will tare the display to show NET ZERO. Additive weighing can be performed by repeated load and tare operations.

To cancel tare, PRESS & HOLD the SEMI-AUTO TARE key, for 1 second. The display returns to GROSS mode.

See previous section for additional facilities. For example the MODE button can be used as a CANCEL TARE function or perhaps to toggle the display between GROSS/NET modes without cancelling (losing) the tare.

Note - Preset tares may be selected ‘on top’ of an existing semi-auto tare, but a semi-auto tare cannot be selected (or cancelled) once a Preset tare is in operation. Pressing SEMI-AUTO TARE while a preset tare is active will temporarily show GROSS weight then revert to NET display.

4.2 Preset Tares

PROGRAMMING MEMORY TARES - U5Er... FReE

There are 12 Preset Tare weight registers - FReE 01-12 (FReE 00 = no preset tare set). Once these registers have values stored in them, a tare can be applied by selecting the tare code required.

- In the USEr... MENU, select FReE ~ the currently selected ‘register address’ is shown.
- Press MODE and use arrow keys to select a tare code between 01 and 12 then press ENTER
- The stored tare for this code is now displayed (NET and GROSS LEDs flash).
- At this stage, you may browse other tare codes using òñ keys
- To modify the value of any tare, press MODE and edit using the arrow keys then press ENTER
- Exit with ENTER or ï

The last selected code is set on return to weight display mode. If no Preset Tare is required, set FReE 00

OPERATION

Whilst the USEr menu can be used to select and adjust preset tares, it is much simpler to configure the MODE button to provide the preferred operation.

The MODE button can be arranged as a function to permit selection of tare codes or to allow simple entry of a Preset tare weight as required.

Simple Preset Tare entry FUnC FU = 1
Memory tare code entry FUnC FU = 2

See MODE FUNCTIONS, section 3.9 for operating instructions

OTHER TARE OPERATIONS

Automatic Tare Cancellation The Auto Zero Setting option, C onF19 25EF = 1, will automatically cancel any tare if the display returns to a negative value within zero-setting range and remains stable for 5 seconds - after tares are cancelled, an automatic SET ZERO function is attempted.

Remote Tare Functions Semi Auto and Cancel Tare can be applied using remote inputs, see later in this section.

Autotare On Start An autotare can be applied at the start of a filling sequence – See section 4.5
4.3 Checkweighing and Setpoint Modes

Several modes of operation can exploit the use of the control outputs for checkweighing and level control.

The mode is set by the parameter \( \text{SEtd} \) in the \( \text{In - o U F - MENU} \).

\( \text{SEtd} = 07 \) (Default) provides 3 simple trip outputs.
\( \text{SEtd} = 00/02/04/05/06 \) operate as Pass/Fail or Low/Pass/High comparators.
\( \text{SEtd} = 01 \) provides a sophisticated filling program
\( \text{SEtd} = 03 \) permits control of outputs via serial commands only

Setpoint values are defined by parameters in the \( \text{b A F C H - MENU} \). Setpoint prompts alter according to the setpoint mode (\( \text{SEtd} \)) in operation.

<table>
<thead>
<tr>
<th>Setpoint Mode</th>
<th>'Setpoint 1'</th>
<th>'Setpoint 2'</th>
<th>'Setpoint 3'</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEtd 03, 07</td>
<td>SP1</td>
<td>SP1</td>
<td>SP1</td>
</tr>
<tr>
<td>SEtd 00, 02</td>
<td>SP1</td>
<td>LoUU</td>
<td>HI9H</td>
</tr>
<tr>
<td>SEtd 04, 05, 06</td>
<td>SP1</td>
<td>PoL</td>
<td>Pa9G</td>
</tr>
<tr>
<td>SEtd 01</td>
<td>SP1</td>
<td>d r l b</td>
<td>Pa9G</td>
</tr>
</tbody>
</table>

Sets of values can be stored and recalled for each of the 12 PRODUCT CODES.
- Select \( \text{C o d E} \) parameter and set PRODUCT CODE (01 - 12)
- Select and set each setpoint parameter in turn
- The \( \text{MO D E} \) button can be arranged as a function to permit easy selection of Product Code or direct entry of some of the setpoints – see section 3.9

4.4 Setpoint Mode Operation

The following tables illustrate the output states in the various setpoint modes.

The states shown are the default operation. Changing parameter \( \text{In - o U F - o J E n} \) (default =1) to 0 modifies the output states to mimic the operation of LUCID weight indicators using only two outputs. Normal operation might be further altered by use of the \( \text{o P R L} \) parameter, see later.

Status characters are shown in the left display digit, if enabled by parameter \( \text{In - o U F - S F R} = 1 \)

\textbf{SEtd 00} -- Comparator mode - Pass/Fail---

<table>
<thead>
<tr>
<th>Weight</th>
<th>OP1</th>
<th>OP2</th>
<th>OP3</th>
<th>Status Byte</th>
<th>Display Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>HI9H</td>
<td>ON</td>
<td>OFF</td>
<td>Not Used</td>
<td>F</td>
<td>F</td>
<td>Out of Tolerance/Fail</td>
</tr>
<tr>
<td>LoUU</td>
<td>OFF</td>
<td>ON</td>
<td>Not Used</td>
<td>P</td>
<td>P</td>
<td>In Tolerance/Pass</td>
</tr>
<tr>
<td>SP1</td>
<td>ON</td>
<td>OFF</td>
<td>Not Used</td>
<td>F</td>
<td>F</td>
<td>Out of Tolerance/Fail</td>
</tr>
<tr>
<td>Zero</td>
<td>OFF</td>
<td>OFF</td>
<td>Not Used</td>
<td>Z</td>
<td></td>
<td>Near Zero</td>
</tr>
</tbody>
</table>

\textbf{SEtd 01} -- See Batch Weighing later in this section
### SEfd 02 - Comparator mode - Lo/Pass/Hi---

<table>
<thead>
<tr>
<th>Weight</th>
<th>OP1</th>
<th>OP2</th>
<th>OP3</th>
<th>Status</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>H</td>
<td>H</td>
<td>Out of Tolerance/High</td>
</tr>
<tr>
<td>L</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>P</td>
<td>P</td>
<td>In Tolerance/Pass</td>
</tr>
<tr>
<td>S</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>L</td>
<td>L</td>
<td>Out of Tolerance/Low</td>
</tr>
</tbody>
</table>

### SEfd 03 --- Direct Control via serial interface

Commands O1, O2, O3

### SEfd 04 - Comparator mode with tolerance - Lo/Pass/Hi---

- **Targ** (Setpoint 3) defines centre of pass band
- **Tol** (Setpoint 2) is the +/- tolerance weight for the pass band (entered as a weight value)

<table>
<thead>
<tr>
<th>Weight</th>
<th>OP1</th>
<th>OP2</th>
<th>OP3</th>
<th>Status</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targ+Tol</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>H</td>
<td>H</td>
<td>Out of Tolerance/High</td>
</tr>
<tr>
<td>Targ-Tol</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>P</td>
<td>P</td>
<td>In Tolerance/Pass</td>
</tr>
<tr>
<td>S</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>L</td>
<td>L</td>
<td>Out of Tolerance/Low</td>
</tr>
</tbody>
</table>

### SEfd 05 - Comparator mode % tolerance - Lo/Pass/Hi---

- **Targ** (Setpoint 3) defines centre of pass band
- **Tol** (Setpoint 2) is a +/- % tolerance for the pass band (entered as a % value)

<table>
<thead>
<tr>
<th>Weight</th>
<th>OP1</th>
<th>OP2</th>
<th>OP3</th>
<th>Status</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targ+Tol%</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>H</td>
<td>H</td>
<td>Out of Tolerance/High</td>
</tr>
<tr>
<td>Targ-Tol%</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>P</td>
<td>P</td>
<td>In Tolerance/Pass</td>
</tr>
<tr>
<td>S</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>L</td>
<td>L</td>
<td>Out of Tolerance/Low</td>
</tr>
</tbody>
</table>

### SEfd 06 - Snake Mode (Analogue Display Mode)

Operation is as MODE 5 but with weight display segments used as an ‘analogue’ Filling guide.

- Between zero weight and Setpoint 1 (Status ‘Z’), the display is blank.
- Between Setpoint 1 and the lower ‘PASS’ limit (S3-S2%) (Status ‘L’), the bottom row of 7 horizontal segments and the lower right hand vertical segment progressively illuminate from the left as weight increases (so if the left 4 segments are lit, the weight is half way between S1 and S3-S2%).
- Within the ‘PASS’ range (Status ‘P’), S3-S2% to S3+S2%, the 7 centre horizontal segments gradually illuminate from right to left with increasing weight (so 4 centre segments lit represents exact target).
- The whole display flashes whilst the weight is in the ‘PASS’ region. Above the upper ‘PASS’ limit (Status ‘H’), the upper left most vertical segment and the top 7 horizontal segments progressively illuminate towards the right as the weight increases to scale ‘max’.
- Pressing TEST forces display to digital weight reading mode, temporarily (if in trade mode).

### SEfd 07 - Simple 3 trip mode --- (Default)

Each output independently relates to its own setpoint

- If WT > S3 then OP3 is ON
- If WT < S3 then OP3 is OFF
- If WT > S2 then OP2 is ON
- If WT < S2 then OP2 is OFF
- If WT > S1 then OP1 is ON
- If WT < S1 then OP1 is OFF
### 4.5 Batchweighing - Setpoint Mode 01

**In_oUt**  **5Etd**  **0 I** ~ Batching Control

**5Etd**  **0 I** is selected in the **In_oUt** MENU. Setpoints are defined in the **bAtCH** MENU as is the **InFt** and the **PtoL** Print Tolerance parameter which determines the acceptable limits for printing about the target. These five parameters are set individually for each of the 12 PRODUCT CODES.

**START & STOP FUNCTIONS**

Batch control will in most case require use of the remote inputs configured as **Start (+autotare)** and **Stop** commands.

These remote Start and Stop functions are configured by setting **In_oUt IPAL =01**

This allocates I/P1 as START and I/P2 as STOP(Abort)

See section 4.6 for alternative **IPAL** settings

**IMPORTANT**

The ‘STOP’ Input is configured to be ‘FAILSAFE’; it MUST be present before the ‘START’ signal will be recognised. ie I/P2 must be arranged to be normally ON for batch to run.

The ‘STOP’ Input should not be relied on as a ‘SAFETY STOP’ such isolation should be provided elsewhere

---

**Basic Configuration Parameters - In_oUt menu**

- **5Etd** =01 batching mode
- **IPAL** =01 I/P1 = Start, I/P2 = Stop
- **Atst** =1 for Autotare on start if required
- **AInF** =01 for Automatic In-Flight-Compensation if required.

These are the basic settings required for simple 2 speed fill control. After setting Target/Dribble/Inflight and Setpoint 1 in the batch menu, the system is ready to run. Additional facilities can then be applied as required.

By default
- Output 1 = Bulk (fast) feed
- Output 2 = Dribble (slow ) feed
- Output 3 can be configured using the OPAL parameter (Sec 4.7) and might typically be used as a complete output

**Batching Parameters - bAtCH menu**

- **Cade** selects Material PRODUCT CODE (01 - 12).
- The following are stored separately for each code.
  - **fARg** (Setpoint 3) desired Final TARGET Weight.
  - **drib** (Setpoint 2) the Dribble (fine) FEED Quantity (amount before target)
  - **SPt I** (Setpoint 1) LOWER ENABLE LIMIT - displayed weight must be within this band about zero to permit start of batch. Can be used for auto start of next fill when the weight drops below this figure & start i/p active.
  - **InFt** (In-flight Compensation) the ‘IN-FLIGHT’ WEIGHT VALUE.
  - **PrOL** (Print Tolerance) limits for printing (Requires use of **Pr_CF9 ToLP RUt o** etc - see later)
  - **JotH** (Jog Time) On Period for Jog mS (Requires use of **Pr_CF9 ToLP RUt o** etc - see later)
  - **oFIL** Overfill offset for cut off and inflight calculations – (range 0-255e)

- **SREP** (Sample final achieved weight every nn) For all other batches, skips checks/print etc at batch end.
Batch with Printing

The details below outline the key parameters governing use of printing for batching operations.

**bATCH Menu**

**PtoL**

Determines pass/fail criteria for batching. Sets the limits for Autoprinting in conjunction with **PtoL** and **Post**. Can be set for up to 14 batch product codes.

**SEP**

Enables some weighments to be immediately discharged on cut-off without tolerance checks, printing or auto inflight compensation. The **SEP** number, 1 to 99, is the interval after which a check is initiated. Values of 00 & 01 mean checks are made for all weighments.

**Pr_CFG Menu**

**PtoL**

Print In Tolerance parameter may either be ON (1) or OFF (0). If OFF tolerance checking will not be done, even if **PtoL** is active, if ON then operation depends on the Setpoint Mode selected. If **SEFD 01** or **07** then tolerance check will be +/- the **PtoL** value of the **Target** (Setpoint 3) i.e. the 'Ready to Print' flag will be set when in these bounds (Printing will occur when other conditions all correct).

If **SEFD 00, 02, 04, 05 or 06** then the 'Ready to Print' flag will be set when the weight is within the "PASS" Band as set by the three setpoints and this will over-ride any **PtoL** value that may be set.

**Post**

Print in Positive Tolerance parameter may also either be ON (1) or OFF(0) and enables positive only tolerance checking. If OFF then tolerance checking will be exactly as defined in **PtoL**. If ON then the tolerance check will be + **PtoL** of **Target**. This restricts the scope of **PtoL** such that the 'Ready to Print' flag will only be set when within the positive tolerance. Note that **PtoL** must be ON for this to be effective.

**Auto 0**

Autoprint disabled, print must be manually requested.

**Auto 1**

Autoprint enabled, a printout will occur as soon as conditions for printing are met (see below and 5.5). With default settings, this would mean a print occurring at the first stable weight above 'Min' but prohibited until Batch programme is run.

**Discharge and Print Parameters**

**In_out Menu**

**dSCH**

The Bulk Output can be allocated as a Discharge Output. The Discharge mode parameter can be used to force the discharge at the end of the 'batching' program regardless of achieved weight. May either be ON (1) or OFF (0). If OFF, the default setting, then at the end of the 'batching' program the MSD will display an **E** indicating the end. No discharge will occur. If ON then at the end of the program, Output 1 (Bulk O/P) will turn ON again indicating a discharge is required. This Output will remain ON until the weight drops below the value entered to setpoint one.

**dSPr**

Discharge on Print parameter can be used to inhibit the discharge if a successful print has not occurred. May either be ON (1) or OFF (0) and if OFF, the default value, then discharge will be dependent solely on the state of **dSCH** as above. If ON then discharge will only occur after a successful print function has completed. If not automatic, or out of tolerance, then manual adjustments can be made prior to printing and then discharging. Note that **dSCH** must be ON for this parameter to be effective.

**Calm Timer and Jogging.**

**In_out Menu**

**CALm**

The Batch Calm Timer may be set to run at the end of a batch to allow filling to complete. Can be set from 00 (default) to 99 and determines the length of time the system waits in 0.1 second increments. I.e. 40 = 4 seconds and this will be the interval after the dribble output has turned OFF before the weight will be checked and the batch "program" can proceed. Also sets the interval (plus motion criteria) between jogs, see next.

**Jog**

Determines whether jogging is active (01 to 5119) or turned OFF (00 the default value). If the batch weight achieved is below the minimum tolerance set by **PtoL**, **Post**, and jogging is active, then up to three jogs may occur to bring the weight within required limits. The value entered will be used to determine the JOG ON interval in milliseconds. The value entered will round down to the next 20mS i.e. an entry of 5119 will round down to 5100mS; an entry of 21-39 will give a jog ON period of 20mS.
Typical Batching Cycle

START SIGNAL (Note: stop input is ‘failsafe’, hence must be energised).
- Provided that the displayed weight is stable, Motion Lamp is OFF, and the displayed weight is below the value entered to the parameter \( spt1 \) then:
  - Either, Signal to \( ip1 \); which must be selected for “Start” - \( IPAL0 \)
  - AUTO-TARE TO NET ZERO adjustment will occur if \( Atst1 \)
  - or, Set \( Strt1 \) in \( bAtCH \) menu,
  - or send ‘ST1’ command from serial port.
- In above two cases; Feed starts immediately if weight is less than the high limit

**Note:** - Start will continue to attempt to activate as long as the start signal is active, i.e. would wait for a stable condition and then start. Signal should be removed once a valid start has occurred.

- **BULK FEED** Output 1 (Bulk) and Output 2 (Dribble) operate
  - Output remains on until the the weight exceeds the bulk feed cut-off point
  - **BULK FEED CUT-OFF** = \( \{ \text{TARGET} - \text{DRIBBLE} - \text{INFLIGHT} \} \)
  - At this point Output 1 releases, leaving Output 2 to complete dribble feed. O/P 1 is NOT latched and would turn ON again if the weight dropped back below this Cut-Off Value.

- **DRIBBLE FEED** Output 2 Remains operated
  - Output 2 remains on until final cut-off point
  - **FINAL CUT-OFF** = \( \{ \text{TARGET} - \text{INFLIGHT} \} \)
  - At this point Output 2 Releases. O/P's 1 & 2 now latch OFF pending any further conditions.

- **CUT-OFF** – occurs
  - If a Non-Sampled weighment go to Batch Complete below.
  - If \( CRL \) timeout is awaited \( BUSY \) displays.
  - If Automatic In-flight Compensation Adjustment is selected \( AInF \) and a stable weight within +/-12.5% of the capacity is detected, an adjustment of the currently selected \( InFt \) value by 25% of any error is carried out subject to total restrictions.
  - If \( Jog \) is active and final weight is below the minimum tolerance set then the system may jog the product three times to try to achieve an in-tolerance weight. The System will turn ON the Dribble Feed Output 2 for a period as set to this parameter and then OFF for the period entered in \( CRL \) plus the period required for weight stabilisation and weight check.
  - If AUTOPRINT mode is NOT selected ( \( AUt0 \) 0 in \( PrCF9 \) ), the cycle stops until the operator removes/discharges the batch. A printout may be obtained prior to discharge by pressing **PRINT** or requesting **PR** via the Serial Interface ( \( E \) status character)
  - If AUTOPRINT mode IS selected, if stable weight is within tolerance an auto-print of the selected data will occur.
Subject to Discharge conditions, Output 1 OPERATES to denote DISCHARGE. This special discharge state may be used to initiate DISCHARGE, or operator controls load removal directly. Batch Complete status (see 4.7) could be allocated to O/ps 1 or 2, if single feed, or O/p 3 if available.

If START COMMAND from remote Input 1 is still valid, the next cycle starts as soon as weight stabilises below Setpoint 1. Otherwise, a new Start Command is awaited before re-commencing the cycle.

Note
- If not required, it is preferable to disable the analogue output when batchweighing in order to achieve best ‘cutoff’ accuracy in high-speed applications (\( E_n \ E_9 \ C F \)). Default is disabled.
- SEMI-AUTO TARE and PRINT are disabled during fill.

**4.6 Remote Operation (Control I/P assignment)**

The two Control Inputs can be configured to act as Start/Stop Batch signals or as remote alternatives for the front panel buttons (see 4.3 for typical wiring).

The \( \text{IPAL} \) parameter in \( \text{In}_{-} \text{ OuT}_{-} \) is a two-digit parameter; the first selects input 1 action; the second (least significant) selects input 2 action.

<table>
<thead>
<tr>
<th>( \text{IPAL} . \langle \text{i/p1} \rangle . \quad . . . . \quad \langle \text{i/p2} \rangle )</th>
<th>0 = start batch</th>
<th>1 = hold batch (after fill)</th>
<th>2 = acquire tare (default)</th>
<th>3 = toggle tare (acquire if in Gross, cancel tare (default))</th>
<th>4 = print (cancel if in Net)</th>
<th>5 = set zero</th>
<th>6 = display gross</th>
<th>7 = send/display totalised net wt.*</th>
<th>8 = print/clear totalised wt.*</th>
<th>9 = print, don’t clear, totalised wt.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = start batch</td>
<td>1 = stop batch</td>
<td>2 = acquire tare</td>
<td>3 = cancel tare (default)</td>
<td>4 = print</td>
<td>5 = set zero</td>
<td>6 = display gross</td>
<td>7 = send/display totalised net wt.*</td>
<td>8 = print/clear totalised wt.*</td>
<td>9 = re-configure i/p2 as output 3*</td>
<td></td>
</tr>
</tbody>
</table>

* operate on currently selected PRODUCT CODE total. 8/9 clear/print all if CODE = 99.

* requires i/p2 to be factory (hardware) configured as an output.

A second indicator may be used as a ‘Remote’ Display/Keyboard for the ‘Local’ indicator. They are interconnected via their Serial Interface ports and the \( \text{rE}d5 \) parameter in \( \text{SE}r_{-} \text{IRL} \) is set in each unit according to the list in Section 5.2.

**4.7 Control O/P and Printout Assignment**

The \( \text{oPAl} \) parameter in \( \text{In}_{-} \text{ OuF}_{-} \) consists of six hex digits which can modify the operation of each output as below:

<table>
<thead>
<tr>
<th>Digit No:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Used – see note</td>
<td>Comparator Mode</td>
<td>Comparator Mode</td>
<td>Comparator Mode*</td>
<td>Status Mode</td>
<td>Comparator Mode*</td>
<td>Status Mode</td>
<td></td>
</tr>
</tbody>
</table>

Note: Digit 1 is unused – from NO6_00F is automatically set by the software and used as a check digit.

* These digits unused except in Setpoint Mode \( \text{SE} \dd 0 \text{1} \).

Outputs operate as described in Setpoint Mode descriptions (see 4.3 and 4.4), but may be customised using these digits. Leave as all zeroes unless special function required. In such cases, read the following carefully before modifying Digits 2-7.

- **Digit 2** Modifies how outputs operate in Setpoint Modes other than ‘07’
  - 0 (Default) Setpoint weight value based on Net Weight. Setpoint values are positive of this zero, and output operation is ‘instantaneous’ (stability is not awaited).
  - 1 Setpoint weight values based on Gross Weight (‘zero’ is always true zero weight). Only valid for Setpoint Modes 00, 02, 03 and 07.
  - 2 Setpoints operate when Negative of indicated zero instead of positive (for weighing out).
  - 4 Setpoints operate when Positive or Negative (i.e. on the modulus of weight).
  - 8 Must await stability (no-motion) before outputs operate.

The values above may be summed to give a combination of ‘modifications’. E.G. ‘OPAL 9xxxx’ (i.e. 8+1) would delay output operation until a stable gross weight at or above the particular setpoint was reached. ‘OPAL Cxxxx’ (8+4): output operates when no motion at or beyond setpoint, positive or negative of NET zero.
Digits 2, 4, 6  Modify how outputs operate in Setpoint Mode ‘07’

In this mode, each output has its own ‘definition’ digit, each as described above, rather than all being forced to the same function as defined by digit 2. Thus, one output might be modified to operate only on no-motion, for example.

- **Output 3**, if fitted (factory option), is only available for Setpoint Mode in Mode 07. In other modes it may therefore be used to indicate a particular Status condition; according to the table below.

**Digits 3, 5, 7**  If not at zero (default), the Output (1, 2, 3) corresponding to the digit (3, 5, 7) is forced into a Status Mode (regardless of Setpoint Mode selected) and operates on the status conditions as listed below. Thus a digit other than zero overrides the normal Comparator operation as described in Setpoint Modes for the particular output.

<table>
<thead>
<tr>
<th>Digit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(Default) Output operates in normal Setpoint Mode (as 4.3 / 4.4 and modified as above)</td>
</tr>
<tr>
<td>1</td>
<td>Output operates on Net mode (follows NET indicator).</td>
</tr>
<tr>
<td>2</td>
<td>Output operates on Motion (follows MOTION indicator).</td>
</tr>
<tr>
<td>3</td>
<td>Output operates when Negative and in Net mode.</td>
</tr>
<tr>
<td>4</td>
<td>Output operates on Negative Gross.</td>
</tr>
<tr>
<td>5</td>
<td>Output operates on Negative Gross release (i.e. failsafe) when weight Out of Range.</td>
</tr>
<tr>
<td>6</td>
<td>Output operates on Gross Zero (follows ZERO indicator).</td>
</tr>
<tr>
<td>7</td>
<td>Output operates on Gross mode (follows GROSS indicator).</td>
</tr>
<tr>
<td>8</td>
<td>Output operates when ‘Printed’ Flag set (i.e. after successful print).</td>
</tr>
<tr>
<td>9</td>
<td>Output operates at Batch Complete.</td>
</tr>
<tr>
<td>A</td>
<td>Output operates by Serial Commands Only.</td>
</tr>
<tr>
<td>B</td>
<td>Output operates on Gross Zero (follows ZERO indicator).</td>
</tr>
<tr>
<td>C</td>
<td>Output operates at Batch Complete.</td>
</tr>
<tr>
<td>D</td>
<td>Output operates by Serial Commands Only.</td>
</tr>
</tbody>
</table>

* **Alarm** condition is any non-weighing mode; such as parameter entry mode, calibration, out of range, or any detected error condition.

+ If ‘A’ is selected, the appropriate output is reset when a new print is allowed (after return to zero or sufficient weight change; as programmed).

**Examples of Output Allocation Parameter**

```
 00 00 0C  OP's 1 and 2 operate as normal. OP3 operates as 'Batch Complete' signal (SETD 01 only).
 00 00 0A  OP's 1 and 2 operate as normal. OP3 operates when print successful.
10 08 20  Using SETD 07, this arrangement might be used for filling and discharging a vessel
          OP 1 monitors Gross weight (ie contents high level)
          O/P2 net zero status (confirms successful tare to zero)
          O/P3 monitors negative net (amount removed after tare)
20 00 0C  Using SETD 01
          OPs 1 and 2 operate negative for 'weighing out'. OP3 is batch complete
80 00 00  Using SETD 00, 02, 04, 05, 06 - OPs operate only when stable. Hence the appropriate low/pass/high signal will not be given until weight stabilises.
00 00 04  OP 3 comes on when weight is negative and net.
          Such an output might be wired to (say) input 2 to automatically CANCEL TARE when load removed.
```
4.8 Part Counting

Several methods of simplified Part Counting are described below where the MODE key operates as a Sample button.

Count mode has to be enabled with CnEn in CoUnT menu set ON (1). Display will show live count with flashing C in leftmost digit position. (Count mode over-rides any MODE Function set with FUnC parameter)

Sample Weighing
- With the weighpan empty, ensure the ’ZERO’ light is on ~ press SET ZERO if not.
- Add the required sample number (1-99) to the weighpan ~ press MODE
- Display will show Rdd nn
  - The sample size on the pan can now be entered as follows
  - The ò when pressed increments the tens, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0 but does NOT carry over.
  - The ô key increments the tens similarly, 10, 20, 30 etc.
  - E.g. to enter 32 press ôôôô
  - Press ENTER. A new part weight will be calculated; part weight must be greater than e/10 otherwise the display will change to show Add --.
  - Pressing ENTER whilst displaying Rdd 00 returns to weighing but leaves Count mode re-enterable.
  - Pressing ENTER whilst displaying Rdd -- uses previous part weight as sample size.
Part weight is calculated and internally stored in units of e/1000
- Count mode can be exited by setting the CnEn parameter to zero.
- Whilst in the count mode, pressing TEST will display the live weight.

Changing to a Different Part (or to Cancel Mode)
- Ensure COUNT mode is enabled as Sample Weighing above.
- With the weighpan empty, ensure the ZERO light is on ~ press SET ZERO if not.
- Press MODE ~ display will indicate ‘Add 10’ (or 01 - 99, as previously set)
- Select a new sample size, if required, as below ~
  - Pressing ò increments the ‘units’ sample number digit
  - Pressing ô increments the ‘tens’ sample number digit
  - Pressing ì clears both digits to zero
- Add the selected/requested sample number to the weighpan (none if cancelling mode)
- Press ENTER
- Display will show live count with flashing C in leftmost digit position
- NOTE: Pressing ENTER with Rdd 00 displayed cancels Part Count Mode.

Counting with known Part(s) Weight
- From the CoUnT .. MENU; select Part
- Enter EDIT mode and key in the part(s) weight
- Press ENTER, ENTER, ENTER to return to live display
- Display will show live count with flashing C in leftmost digit position.

Counting with Part Weight stored against Code
- Each time a sample is weighed, or a part weight edited, its value is written into the currently active ‘PRODUCT’ CODE memory (CoDE xx). Thus up to 14 pre-set items can be counted without having to do the above sample weighment.
- Select CoUnT .. (or USE ..) menu, Select appropriate CoDE
- Press ENTER, ENTER, ENTER to return to direct part counting of the selected item.
- Use any of the above routines to programme alternative weight into the selected ‘Code’ location.
- Preferably use 01 as a ‘scratchpad’ for general part counting, using 02 - 14 for specific products. Leave 01 selected when not using pre-set items to avoid accidental corruption.

Exit COUNT mode
- Press MODE then ì to show Rdd 00 then ENTER.
- Alternatively, select CnEn 00 from the CoUnT .. menu.

Note: Setpoints are always relative to weight regardless of count mode.
4.9 **LIVE Animal Weighing**

Many animal weighing applications will be readily satisfied by simply setting a higher filter (Filter Band) parameter in CALIBn_ or Config_ Menus.

Where a print is required, optimum performance might be gained by using this LIVE parameter in Pr_CFg_ and setting this to ‘1’. If set this will force the Motion Time-out tOut in Config_ to 30 seconds. On initiating a printout, the system will look for a stable value by progressively increasing the FILt setting until a ‘no motion’ condition is found. tOut is used as a time limiter - if stability is reached before it expires a print occurs. If it expires the print command is aborted.

The FILt returns to its original value on completion.

**Note:** Any calibration adjustment sets LIVE to OFF = 0. LIVE must be reset to ON = 1 if required.

4.10 **Conversion Mode**

A conversion factor may be applied to the current weight value and the converted value displayed and printed. Enter the conversion factor in FACT in the Config_ MENU. It may be in the range 0.1000 to 10.0000.

- To enable conversion mode, select ConS 1 in Config_ MENU.
- Conversion mode is indicated by flashing ‘U’ in display most significant digit.
- Exit Conversion Mode by setting ConS 0.

**Note:** Setpoints are always relative to weight regardless of any conversion.

4.11 **Analogue Output (Option)**

Baseboards Rev C may have an integral analogue output fitted. Rev D onward use an optional plug in module.

The DAC is designed to an ultimate resolution of about 1 part in 50,000 over full range output. However, its overall performance is optimised for medium accuracy instrumentation purposes. Typical system accuracy is in the order of 0.1% full scale over 10°C temperature range.

If analogue output is fitted, En9CF9_ RnEm must be set to ‘1’ to enable the RnAlo9_ menu.

The output can be 4-20mA (up to 500Ω) or 0-10V by setting parameter 4-20 to 1 or 0 in the RnAlo9_ menu. Only current loop or voltage output may be selected at one time, there must be no electrical connection between the two external circuits. Current Output is recommended. If a Voltage Output is to be used consult Application Notes at www.ianfellows.co.uk

**Connection**

The Analogue Output is calibrated using the RnAlo9_ menu.

To calibrate Zero output, select RdJ press MODE then use ñ to nudge up or down whilst monitoring the output on a meter. If a large adjustment is needed, then it can be quicker to manually edit the ZEro parameter.

Similarly to calibrate the gain, select gadj and nudge as above this time checking the meter for the reading required at the CALA value (usually = TOP) Again large adjustments can be made by editing the gAIn parameter.

A ‘false’ full scale can be programmed with the CALA weight value parameter. (After any change to CALA it is necessary to access the main CALIBn menu and then exit to ensure the new reading is stored.)

The Output can be set to correspond with NET or GROSS using the nEt parameter.

The output can be set to increase with loss of weight with the nEgn parameter.

If flow rate mode is enabled, the output can be set to reflect flow rate by setting the rate parameter.

The error condition output (eg when out of range or when menus and functions are being operated) can be forced to the lowest or highest electrical limit depending on the Err parameter. Note: The output may pass between the normal range, before switching to an error condition.
4.12 Flow Rate Display/Output

A RATE display and/or output signal, in which the 'change of weight' against time ('dW/dt') is produced, may be enabled in non-trade mode by setting $r_{en}$ in $En 9 C F 9$ to 1. Output is set in calibrated weight units per second and is displayed by a single short press of the MODE key.

The rate value may be output as an analogue signal if an Analogue Output Module is installed (0-10V or 4-20mA ~ see 4.11).

Select $r 4 F E$ in the Analogue menu to enable.
Set to 0 to disable.

Note the flow rate feature computes ‘instantaneous’ flow from changes in the immediate weighing integrations. As such it is generally not useful for slow rates of flow where the change from one integration to the next is insignificant.
5. SERIAL INTERFACING AND PRINTING

5.1 Serial/Printer Installation

Comms Connection - Refer to diagram at rear of manual for position of connections.

5.2 Serial Comms ~ SERIAL Parameter Menu

- The serial port is designed to connect to a host computer for remote control, production of logs and as an input for applications requiring weight data. For Trade Approved applications a legal weight Alibi may be required – refer to Application Notes.
- In its simplest application, a string of status and current weight information might be transmitted (without handshake) every time the display is updated (default; every 300ms).
- At a more sophisticated level there is a powerful suite of commands that enables the host to become the ‘operator interface’ without use of the indicator panel. The ‘host’ computer applications programmer must write software to ‘talk’ to CPI.
- All of the parameters available on the CPI are available via the Serial Interface.
- A multi-drop (network) mode is also available for multi-weigher systems (see 5.4).

Serial Port Configuration

In the SERIAL Menu, use the following parameters:

- BAUD Baud rate (01=19200Bd, 02=2400Bd, 04=4800Bd, 09=9600Bd-Default)
- PRTY Parity/bytes (00 = 8+none (Default), 01 = 7+odd, 02 = 7+even, 09 = 8+odd, 0A = 8+even)

H 3 2 (rev C) 1=RS232, 0=RS485 ; RS485 for use on Multi-drop networks.
4 8 5 E (rev D+) 0=RS232, 1=RS485 ; RS485 for use on Multi-drop networks.

Weight Data Format control parameters

- CR LF I appends a line feed to a carriage return (default 1, on : Cr = CrLf).
- ECHO I echoes received characters (default ‘1’)(Multi-drop mode forces Echo 0 off).
- NODP I removes embedded dec. point from weight data (default ‘0’ d.p. embedded).
- CHSU I appends a checksum byte to data (default ‘0’ gives no checksum).
- NO5I I removes status bytes from weight data (default ‘0’ embeds status bytes).
- SFRG I sets serial string format (SG1 or O – see 5.3).
- SINT I weight data transmitted on request only (default ‘0’ gives continuous output).

FRL Allows up to 4 Hex Control Bytes to prefix the standard weight data string.

(Default FRL = 0 00 00 00 sends no prefix characters, 00 – ‘Nulls’ are ignored. The first ‘byte’ is only 1 digit long and, thus, can only be a control character 01h - 0Fh).

Serial Commands

The menus at rear of manual show the serial command corresponding to each parameter. Commands must be sent terminated with CR and the indicator allowed to complete its response before sending further commands.

Below are a selection of useful commands not covered by the menu system ~

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT</td>
<td>Request Weight</td>
</tr>
<tr>
<td>PR</td>
<td>Request print</td>
</tr>
<tr>
<td>AT</td>
<td>Acquire new semi-auto tare</td>
</tr>
<tr>
<td>CT</td>
<td>Cancel semi-auto tare</td>
</tr>
<tr>
<td>NT</td>
<td>Tare Code</td>
</tr>
<tr>
<td>XT</td>
<td>Request semi-auto tare value</td>
</tr>
<tr>
<td>ST1</td>
<td>Start Batch</td>
</tr>
<tr>
<td>ST0</td>
<td>Stop Batch</td>
</tr>
<tr>
<td>MO</td>
<td>Toggle net/tare/gross weight (= MODE)</td>
</tr>
<tr>
<td>ET1</td>
<td>Select x10 weight mode</td>
</tr>
<tr>
<td>RA</td>
<td>Request current Access Level</td>
</tr>
<tr>
<td>PW</td>
<td>Send Password ie PW1, PW900</td>
</tr>
<tr>
<td>AZ</td>
<td>Set zero</td>
</tr>
<tr>
<td>FT</td>
<td>Preset Tare value</td>
</tr>
</tbody>
</table>

Changes to Tare code, command NTxx, receive response giving current value of preset tare for that code.

To change parameters with serial commands still demands the correct access level. In most cases this will be level 1 which is gained by sending level 1 passcode PW1. As a general rule, for configuration parameters, send the command with no value to receive the current setting. Send with a valid value, at the right access level, to change the setting.

Weight registers are sent with extended x10 digit (ie superfluous 0 unless displaying x10 digit) and without decimal point. Some registers are sent with a suffix ‘type’ letter (W-weight, D-decimal, H-hex etc.) These are a legacy to earlier protocols, primarily retained for compatibility and bear no great significance.
5.3 Serial Interface Weight Data Format

The default output from the serial interface is shown below. It can be set to continuously transmit (5 ln 9 0) each time the weight display is updated (default ~300ms) or may be sent on request only (5 ln 9 1) by issuing command WT. There are two string formats and each has elements that are subject to settings of parameters in the SERIAL menu. If multi-drop mode is selected (see below), output is not automatic, the weight data must be requested (‘Address’ + WT command).

Multi-drop Address (if applicable)
Is character 00-FF
Default = 1C

Prefix 0-4 Control Characters set via serial control characters

Status 1 Stability
S = Stable M = Motion

Status 2 Mode
G = Gross, N = Net, T = Tare Weight,
P = Axle Weighing versions only

Status 3 according to SM Setpoint Mode

Status 4 Printable Status
M Weight in Motion
H Gross Weight > Max + 9e (over-range)
Z Centre Zero
P Printed flag set
G Negative interlock active (bit 5/7 also set)
B Below MIN interlock active
R Ready to Print/Store

Sign/Out of Range
' - Positive and In Range
O Over Range
U Under Range

Weight Data 6 ASCII Digits
(Leading zeros blanked, optional Embedded Decimal Point)

Blank in Normal Mode
LSD in x10 Mode

Units
Kg, lb, g, gm, t, N, klb, mV, Fl, Cn, Cv

D.P. Number of Decimal Places if no Embedded Decimal (0, 1, 2, 3)

Checksum
Modulo 128-Bit sum of all preceding characters (MSB always set if 8-Bit Character)

CR or CRLF
Set by serial control characters

1. ◆ = Space (ASCII 20h)
2. All shaded items are optional
3. Status 3 Notes
   In Setd 03/07 the state of I/O is reflected ~
   Bit 7 6 5 4 3 2 1 0
   State o3 o2 o1 i2 i1
   1 = Off or No Input
   From version NO6_00F the CPI 3rd O/P option IA=X9, the O/P state is read on Bit 1

4. Printable Status Notes
   • M (motion) takes priority until printed, P then takes priority until print flag reset
   • H will over-rule P but not M
   • BIT 7 is set if NET is negative (+80H); BIT 5 is set if GROSS is negative (+20H)
   • In GROSS MODE, net = gross, thus BIT 7 & BIT 5 are set (+A0H)
   • B & G appear subject to n ln(MW) & n E9 P(NP) parameters
   • When Z set, print may or may not be permitted subject to n ln(MW)
   • When P set, printing may be permitted by P n t U(PU) parameter

4. Multi-drop Address Allocation
   To avoid conflicts, do NOT use addresses 0ah (LF) and 0dh (CR) or other characters contained in messages and weight strings
**Alternative Weight Output String (Gross/Net Mode)**

If an SG1 command is sent to CPI via the serial port, the following weight data format is available. SG0 forces back to default mode described above.

Can also be set by SFR 9 parameter in SFR IRL menu.

<table>
<thead>
<tr>
<th>Multi-drop Address (if applicable)</th>
<th>Is character 00-FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default = 1C</td>
<td></td>
</tr>
</tbody>
</table>

Printable Status
- **M**: Weight in Motion
- **H**: Gross Weight > Max + 9e (over-range)
- **Z**: Centre Zero
- **P**: Printed flag set
- **G**: Negative interlock active (bit5/7 also set)
- **B**: Below MIN interlock active
- **R**: Ready to Print/Store

Gross Weight Data 6 ASCII Digits
(Leading zeros blanked, Embedded Decimal Point not allowed)
In Part Count Mode = Net Part Count at full resolution

Blank in Normal Mode. LSD in x10 Mode

Display Format Byte, Bit 0 is LSB
- **Bits 1, 0**: Number of decimal places (0-3)
- **Bit 2**: Motion
- **Bit 3**: Undefined
- **Bits 6, 5, 4**: Units code (0-7), 0 if mV, Fl, Cn, Cv
- **Bit 7**: Always set (8 bit data only)

Net Weight Data 6 ASCII Digits
(Leading zeros blanked, Embedded Decimal Point not allowed)
In Part Count Mode = Net Weight

I/O Status Byte – Bit 0 is least significant Bit
- **Bits 1, 0**: Input 2, 1 status (1 = ON)
- **Bits 4, 3, 2**: Output 3, 2, 1 status (1 = ON)
- **Bit 5**: Always Set
- **Bit 6**: Convert Mode | Both 6 + 7
- **Bit 7**: Count Mode | Flow Mode

checksum
Modulo 128-Bit sum of all preceding characters (MSB always set if 8-Bit Character)

1. = Space (ASCII 20h)

2. All shaded items are optional

3. Printable Status Notes
   - **M**: M (motion) takes priority until printed, then takes priority until print flag reset
   - **H**: H will over-rule P but not M
   - **BIT 7** is set if NET is negative (+80H); **BIT 5** is set if GROSS is negative (+20H)
   - **In GROSS MODE, net = gross, thus BIT 7 & BIT 5 are set (+A0H)
   - **B & G** appear subject to **nnln(MW)** & **nE9(PNP)** parameters
   - When **Z** set, print may or may not be permitted subject to **nnln(MW)**
   - When **P** set, printing may be permitted by **PnT I(PU)** parameter

4. multi-drop address allocation
   - To avoid conflicts, do NOT use addresses 0ah (LF) and 0dh (CR) or other characters contained in messages and weight strings

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Revision B - Page Issue 002 Software Release PO6_027/127
5.4 Multi-drop Operation (RS 485 only)

A MASTER can speak to several CPI over an RS485 network (all data must now be requested).

- **nEt 1**: Set to force multi-drop mode (‘0’, non-multi-drop is default).
- **Sing 0**: Set so weight data on request only
- **Addr nn**: Sets the multi-drop address this unit responds to (00-FF(h) 2 Digit Hex).
- **Prty 08**: Special 8 data bits + bit 9 set to mark addresses only (see * below).
- **Ctrl**: 4-char. hex control prefix if reqd., 00h 00h 00h 00h (1st chara. may only be 00h-0Fh).
- **H232**: Set 0 for RS485 (1 = RS232 can be used for addressed RS232 communication, but not multidrop)

- Use not recommended below baud rate 9600.
- Maximum 31 SLAVES (CPI) and only one MASTER.
- SLAVES configured with addresses 00 – FF(h) (2 Digit Hex).
- Connections to be twisted pair and ‘daisy-chained’ (not ‘star’ connected).
- 2 Network ends to be specified and terminated. Install terminators in cable plugs at network ends.
  Fit termination resistors to match the characteristic impedance of the comms cable (if unknown, fit 100Ω externally on the cable connectors at the extreme ends of the network. Then all indicators are identical.
- SLAVES (CPI) will always ‘listen’ unless spoken to (no unsolicited messages).
- SLAVES will default to ‘listen’ within 1 character time of requested response.
- Time-out on all operations to default ‘SLAVES listen’ mode is normally 1 second.
- All communication ‘packets’ commence with ‘Address’ and terminate with CR (or CR, LF). If function demands a response with an indeterminate delay: MASTER must poll for it.
- To avoid possible communication conflicts, either set ‘UNITS’ to 0 or do not use addresses that contain unit characters eg k, g or characters that may be in messages and weight strings and do not use 0ah (LF) or 0ch (CR)

**Multi-Drop Network Notes**

**HINTS & TIPS:** The most usual problem encountered whilst setting up a RS485 2-wire system is caused by two or more devices trying to ‘talk’ at the same time.

The transmitter in each indicator is enabled only in response to a command/request directly addressed to it (anything else is ignored, and there are no unsolicited messages transmitted). Hence the ‘host’ PC or Controller initiates all ‘dialogue’.

The only time two indicators might try to transmit simultaneously is if both have the same address (illegal) or there is a hardware fault. Try removing units until some dialogue is established.

It is important that the ‘host’ disables its transmitter immediately after sending a command/request and goes to ‘listen’ mode (also, beware of a situation where the host disables it’s transmitter prematurely, truncating the transmitted message).

If an external RS232 to RS485 converter is used by the ‘host’, its RTS signal is normally used to enable the transmitter. The ‘host’ programmer must generate this signal and ensure it correctly matches the transmitted message length.
5.5 Printer Config. ~ Pr_CFg_Menu

These parameters set up the printer-interface configuration. (Refer also to Printer manufacturer manuals).

**Note:** Setting Printer Baud rate to ‘00’ re-directs output to the CPI serial port.

**Printer Port Configuration**

The printer port is permanently configured for 8 data bits, 1 stop bit. To use a printer with only 7 data bit setting, set the printer to receive zero parity, or no parity and 2 stop bits.

- **Baud rate**
  - Baud rate (00=output via serial, 01=disable, 02=2400Bd, 04=4800Bd, 09=9600Bd)
  - Default 02 = 2400

- **Parity**
  - Printer Parity (00=none, 01=odd, 02=even). Default 00

- **Linefeed**
  - Printer Linefeed mode (0=CR only, 1=CR+LF) Default 0

- **Handshake**
  - Printer Handshake (00=none, 01=ready when high, 02=ready when low) Default 01

- **Delay**
  - End of line delay (00-09 x 0.1 second delay after CR)
  - If no handshake is used, some printers may need EOL delay to allow printer time to catch up with transmission.

**Printing Conditions**

**Note:** Default is 0 ‘off’ for these parameters.

- **nnIn**
  - Enables Printing when below Minimum weight
  - (Minimum = 20 divisions ‘20e’ Except See 5E_P below)
  - Default 00

- **nE9P**
  - Enables Printout of a Negative Net weight (e.g. Print ‘lost’ weight).

- **CH9E**
  - Enables Print on Weight Change of 20e - otherwise, weight must return to below 3e above zero before printing is re-enabled.

- **5E_P**
  - Sets Minimum weight to 5e. See nnIn above.

- **fOLP**
  - Restrict Printing to ‘In Tolerance’ conditions only

- **PosH**
  - Further limit above to Positive Tolerance only, where applicable

The tolerance conditions depend on setpoint mode that is in operation

For 5E_Pd = 00,02,04,05,06 In Tolerance is when the ‘PASS’ Condition is met

For 5E_Pd = 01 & 07 In Tolerance is when weight is within +/- P oL about S P T / Targ 9

- **CAL**
  - Batch Mode Calm Timer 01-99 x 0.1 sec.

- **Auto**
  - Enable Autoprint mode - automatically prints when conditions satisfied and the weight becomes stable - e.g. if nnIn, nE9P and CH9E are 0, a print would occur when weight stabilises above ‘20e’ after returning to zero

Also – located in the En9CF9 menu

- **PnU**
  - Unconditional Print - overrides print interlocks for weight change between prints (except in Setpoint mode 01 – Batching mode).

- **LIUE**
  - Activates auto filter acquisition on Print (ie for Animal Weighing)
5.6 Print Formatting ~ Pr_for_Menu

Formatting Print Content
The print format is constructed as follows:

- Up to 14 items of data may be printed in any sequence.
- Parameter Pr_for specifies the first 7 items to print. Pr_for specifies the next 7 items
- Each digit (range 0-9,A-F) selects a different ‘Data Type’ – See next page
- Items to be printed must be set as ‘most significant digits’, a type 0 terminates the print file (unless leading spaces are associated).
- Parameters Pr_sp & Pr_sp set corresponding leading spaces for each item
- Parameters Pr_cr & Pr_cr set corresponding trailing Carriage Returns for each item
  (each digit has range 0-9,A-F = up to 15 spaces and/or carriage returns can be associated to each item)
- Some ‘data types’ 2, 3, B, and C are text strings that can be pre-programmed using parameters Pr_sx & Pr_sx
  (see section 3.8)
- Each PRODUCT CodE 01 to 14 recalls a different set of text strings
  Data type 2 prints the Pr_sx/Pr_sx string for the currently selected product code
  Data type 3 prints the Pr_sx/Pr_sx string for the currently selected product code
- Separate text strings can also be programmed with PRODUCT CodE set to 99
  Data type B prints code 99 Pr_sx/Pr_sx string regardless of the selected product code
  Data type C prints code 99 Pr_sx/Pr_sx string regardless of the selected product code
- Each string is up to 14 characters (first 7 set by Pr_sx, next 7 set by Pr_sx). Each part of the string can be
  shortened with an end of string (EOS) terminator character. (The EOS character is ascii 1Fh ~ looks like ‘˘’).
  Control characters may also be included; see 3.8.

Format Control Parameters

<table>
<thead>
<tr>
<th>Char</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>Enable Column Mode Printing (Default 0=standard mode)</td>
</tr>
<tr>
<td>For</td>
<td>0 - 99 No. of lines to print before sending Pr_cr control string, see below (00 = never send, 99 = send at end of every print)</td>
</tr>
<tr>
<td>Pr_cr</td>
<td>Hex Control String appended to Print subject to For setting above.</td>
</tr>
<tr>
<td>Pr_crL</td>
<td>Hex Control String prefixing entire print or each line subject to Line setting below Special case – setting xx xx xx EF cuts off the print ‘Header Labels’.</td>
</tr>
<tr>
<td>Pr_cx</td>
<td>Hex Control String placed in middle of each line if Line =1 Allows for example ‘Gross’ in standard chrs and ‘123.4kg’ in double width</td>
</tr>
<tr>
<td>Line</td>
<td>0= Pr_crL String only sent once before complete print out</td>
</tr>
<tr>
<td></td>
<td>1= Pr_crL String sent before each line and Pr_cx string sent midline</td>
</tr>
</tbody>
</table>

- Each Control Character string (Default 0 00 00 00) allows up to 4 Hex bytes to be set. The first ‘byte’ is only 1 digit long, so limited to Hex 01 - 0F
- Nulls (Hex 00) are ignored, not sent.

Several Print parameters apply different functions when used for controlling a remote display on the printer port. See Section 5.7.
Data Type Selection

<table>
<thead>
<tr>
<th>DATA TYPE</th>
<th>COMMENTS</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 End Print File</td>
<td>Unless spaces associated by P5SP/9SP</td>
<td></td>
</tr>
<tr>
<td>1 Product Code</td>
<td>Currently selected Code Number</td>
<td>Product Ref. 01</td>
</tr>
<tr>
<td>2 Text String 1A/1B</td>
<td>$tIR/$tIb for current Product code</td>
<td>Product 1</td>
</tr>
<tr>
<td>3 Text String 2A/2B</td>
<td>$SK+/SK+/b for current Product code</td>
<td>Description 1</td>
</tr>
<tr>
<td>4 Date</td>
<td>Current Date – set by dRFE in USER menu</td>
<td>Date dd/mm/yyyy</td>
</tr>
<tr>
<td>5 Time</td>
<td>Current Time – set by tIn in USER menu</td>
<td>Time hh:mm</td>
</tr>
<tr>
<td>6 Running Number</td>
<td>r UNn in USER menu, auto increments on Print</td>
<td>Running No. xxxxxxxx</td>
</tr>
<tr>
<td>7 Numeric ID Code</td>
<td>IDn in USER menu</td>
<td>Code xxxxxxxxx</td>
</tr>
<tr>
<td>8 Gross Weight</td>
<td></td>
<td>Gross xxxxx.xkg</td>
</tr>
<tr>
<td>9 Net Weight</td>
<td>If no tare &amp; no item 8 in printout, prints ‘Gross’ not ‘Net’</td>
<td>Net xxxxx.xkg</td>
</tr>
</tbody>
</table>

- The shaded items represent variable data dependent on configuration or result of weighing.
- The Fixed Text (Header Labels, ie ‘Time’, ‘Gross’ etc.) can be suppressed - Set C+R = xxx xx EF

Default Print Format

```
PFor 5 4 9 0 0 0 0 0 9For 0 0 0 0 0 0 0
P 5P 0 0 0 0 0 0 0 0 5P 0 0 0 0 0 0
P cr 1 1 1 0 0 0 0 0 cr 0 0 0 0 0 0
```

The default print format settings select TIME, DATE, NET WEIGHT each followed by a single carriage return. Creates a basic print out:

```
Time hh:mm
Date dd/mm/yyyy
Net xxx.xxx kgs
```

Formatting Example:

- **Note:** Each time these parameters are altered a revised sample printout will be produced.

```
PFor B C 4 7 2 8 D 9For 9 3 0 0 0 0
P 5P 8 6 0 0 5 0 0 5P 0 6 0 0 0 0
P cr 1 2 1 2 1 1 1 cr 1 2 0 0 0 0
```

- In this example, the first DATA TYPE (first digit in PFor) is B, which will print out the text string $tIR/$tIb regardless of currently selected Product Code.
- It is preceded by 8 spaces (first digit in P 5P) and followed by 1 carriage return (first digit in P cr), so the next item will appear on the next line with no gap.
- The next item is C, preceded by 6 spaces (to centralise) and followed by 2 carriage returns.
- The 3rd item is 4 causing the current date to be printed with 0 leading spaces.
- The 4th item 7 (Code) prints the value entered by the operator into $nT in USER menu.
- The 5th item 2 prints out the text string $tIR/$tIb programmed when the current Product Code was selected (a different string will print with another Product Code).
- The 6th, 7th and 8th items give the current weight data.
- The 9th item 3 prints out the text string $SK+/SK+/b for the current Product Code (again string may be different for another Product Code).
- The 10th-14th items (3rd-7th items in 9For) are 0, so nothing more is printed.
The resulting Print will be:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TYPE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HEADER</strong></td>
<td>B</td>
<td>St1A/St1B string for Code 99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DESCRIPTION</strong></td>
<td>C</td>
<td>St2A/St2B string for Code 99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td>dd/mm/yyyy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Code</strong></td>
<td>1234567</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Product Name</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gross</strong></td>
<td>xx.x kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net</strong></td>
<td>xx.x kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Column Print Example:**
- Usually used with 80 column printers, to print data in columns set **HEAd 1 in Pr.For.**
- **PFor/9FOr** set the data types and order they are to be printed, but in this case the data labels are printed as a header on the first printout, with subsequent lines printing variable data only. The number of Data Types in the print format must be chosen to suit the print page width available.
- **PSp/9Sp** can be used to adjust spacing across the page. **Pcr/9Cr** are ignored.
- The number of lines to print on a page might be controlled by the printer’s own settings or the **For** parameter can be used to set the number of lines at which any control characters in CTRF will be transmitted and a new header generated. A new header is also generated after power on or Totals print.

**Example PFor = ‘2567890’**

<table>
<thead>
<tr>
<th>2</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9 (Data Types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Running No.</td>
<td>Code</td>
<td>Gross</td>
<td>Net</td>
<td></td>
</tr>
<tr>
<td>Product Name</td>
<td>21:02</td>
<td>3391502</td>
<td>7654321</td>
<td>12.567kg</td>
<td>9.230kg</td>
</tr>
<tr>
<td>Product Name</td>
<td>21:05</td>
<td>3391503</td>
<td>7654321</td>
<td>12.569kg</td>
<td>9.232kg</td>
</tr>
<tr>
<td>Product Name</td>
<td>21:08</td>
<td>3391504</td>
<td>7654321</td>
<td>12.565kg</td>
<td>9.228kg</td>
</tr>
</tbody>
</table>

**Totals Printing and Formatting**
- Any weighing 'Printed' adds the recorded weight to registers for the current product code.
- Totals can be printed and cleared by using the **PTrLs** menu or remote inputs.
- In the menu, **PTr** prints totals without clearing, **ClTr** prints and clears the totals. Choose the appropriate parameter change 0 to 1 and press **ENTER**
- The total printed is for the currently selected Product Code. If Code is set to 99, individual totals will be printed for all weighed products. (Ensure code is set 1-14 before continuing weighments)
- The **ClTr** option requires level 1 access, hence the correct password must be entered to the **PAss** prompt when entering the **PTrLs** menu.
- Alternatively, if the remote inputs are available, these can be configured to initiate Totals Print/Clear commands. (See section 4.6)
- The Format for Totals Printing is separately defined, in a similar fashion to above but using the parameters **PTr/UIFOr, PSp/USp, Pcr/UCr**
- Totals formatting uses the same DATA TYPE Designations except, here:

<table>
<thead>
<tr>
<th>DATA TYPE</th>
<th>COMMENTS</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Total Gross</td>
<td>Total Gross Weight for Product Code shown</td>
</tr>
<tr>
<td>9</td>
<td>Total Net</td>
<td>Total Net Weight for Product Code shown</td>
</tr>
<tr>
<td>A</td>
<td>Total Number</td>
<td>Total No of Weighings for Product Code shown</td>
</tr>
</tbody>
</table>
5.7 Remote Displays/Port Assignment

Two methods of remote display configuration are possible. In each case the ‘Printer’ or ‘Serial’ port might be used. The choice of port will most usually depend on which is available. If a printer is in use the serial port can be used for the remote, whilst if the indicator is linked to a computer the printer port would be used.

**CPI to CPI Configuration**

A standard CPI indicator can be used as a remote display.

<table>
<thead>
<tr>
<th>Using Master</th>
<th>Master CPI</th>
<th>Slave CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Port</td>
<td>\text{\texttt{SERIAL r#dS 10}} \text{\texttt{SERIAL b#A#d}} \text{\texttt{SERIAL P#ty}}</td>
<td>\text{\texttt{SERIAL r#dS 80}} \text{\texttt{SERIAL b#A#d}} \text{\texttt{SERIAL P#ty}}</td>
</tr>
<tr>
<td>Printer Port</td>
<td>\text{\texttt{SERIAL r#dS 20}} \text{\texttt{P#C#F g#A#d}} \text{\texttt{P#C#F P#ty}}</td>
<td>\text{\texttt{SERIAL r#dS 80}} \text{\texttt{SERIAL b#A#d}} \text{\texttt{SERIAL P#ty}}</td>
</tr>
</tbody>
</table>

(Always connect to the Serial port of the slave CPI)

A slave CPI connected to the ‘Serial’ port of the Master benefits from bi-directional communication and as such enables use of the front panel buttons on the slave.

**CPI to other serial displays**

(Separate Application Note Available)

The remote may use the standard Serial port continuous transmission or a continuous transmission can be created via the Printer port by setting \texttt{SERIAL r\#dS} to 01.

The content of the Printer port transmission can be configured using the print format parameters.

In these cases, there is often no specific set up as both the CPI and remote may be configurable. Once a string is created from the CPI, the remote may also need settings altered to suit.

**Connections**

<table>
<thead>
<tr>
<th>Using</th>
<th>Master CPI</th>
<th>Slave CPI</th>
<th>Other Serial Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Port</td>
<td>RS232 TX (transmit)</td>
<td>RS232 RX</td>
<td>RECEIVE</td>
</tr>
<tr>
<td></td>
<td>RS232 RX (receive)</td>
<td>RS232 TX</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>GND (ground)</td>
<td>GND</td>
<td>COMMS GROUND</td>
</tr>
<tr>
<td>Printer Port</td>
<td>PRN TX (transmit)</td>
<td>RS232 RX</td>
<td>RECEIVE</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>GND (ground)</td>
<td>GND</td>
<td>COMMS GROUND</td>
</tr>
</tbody>
</table>
6. DIAGNOSTICS

During parameter entry, erroneous values will result in the parameter not being stored and the display reverting to the corresponding sub-menu heading display but with a ‘x?’ appended to that display (‘x’ is a diagnostic, and can be used to determine the nature of the error).

Parameter Entry Error Codes - See Serial Responses Section 5.2

??   Entered parameter out of allowed range.
C?   Command or parameter value not permitted under current access level (Usually re-interpreted as nOP5).
D?   Start of calibration deadload acquisition at each PGA setting.

In response to a dEAd calibrate deadload command

??   If deadload outside +/- 40mV.
M?   Excessive motion.

In response to a CAl or CAlAt calibrate command

F?   If attempt to calibrate without valid deadload having been previously acquired. (trade only).
A?   Calibration weight is not within 12.5% - 100% of capacity (‘toP’), or l.s.d. incompatible with ‘DISP’.
L?   If input resolution <1µV/e in ‘trade’ mode or <0.1µV/e in non trade mode.

H?   (Calibn Deadload) End of each deadload acquisition step.
     (Calibn Span) Loadcell input too high during span acquisition (>100mV)

Full Display Status/Error Messages

STATUS MESSAGES

Abort?  Do you wish to abort this calibration, forgetting all alterations?
         ENTER or ⏏to confirm else back to calibrate.

ACCESSn Displays ACCESS LEVEL achieved on entry to MENU (n = 0-3).

Addnn  Place requested number of sample parts on weighpan and press ENTER
         Else press ⏏to alter sample number or ‘CanCEL’.

BUSY    Awaiting ‘CALm’ timeout or Flashcard is busy (please wait).

CLEARN  Flashcard clearing in progress.  ‘n’ indicates progress.

FLASH   Flashcard transaction in progress (please wait).

nF9     Print/store inhibited - Print disallowed when weight is negative.

nPASS   Access denied: enter password or operate internal button (if authorised).

PASS    Enter Password (or press MODE to skip).  ‘.’ indicates current digit entry position.

Print   Printing in progress.

PSHbutton  Press Internal (S1) pushbutton (or press MODE to skip).

readE   Parameters read from permanent to working memory.

SaveG   Flashcard dump to printer in progress (please wait).

storeE  Newly edited parameter written to permanent memory store.

Sure?  Do you wish to accept this calibration?  ENTER or ⏏if so, else back to calibrate.

tooL   Print/store inhibited - Net Weight is below Minimum.

UnLoAd Print/store inhibited - change in weight since last print is too small.

UnUSEd Flashcard location with nothing yet stored.

© Ian Fellows Ltd. 2004 – CPI Operation Manual   Page 44
Revision B - Page Issue 002  Software Release PO6_027/127
### Diagnostic Messages - Some require service assistance.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>Cannot re-zero because outside 20% (or 4%, dependent on condition) zero setting limits. If at switch-on, either adjust weight or press <strong>SET ZERO</strong> to re-select previous zero setting. New zero (within +/-10% of original calibration) may be set with <strong>SET ZERO+MODE</strong>.</td>
</tr>
<tr>
<td>4%</td>
<td>Cannot re-zero because outside 20% (or 4%, dependent on condition) zero setting limits. If at switch-on, either adjust weight or press <strong>SET ZERO</strong> to re-select previous zero setting. New zero (within +/-10% of original calibration) may be set with <strong>SET ZERO+MODE</strong>.</td>
</tr>
<tr>
<td>A-d?</td>
<td>Analogue to Digital converter interface failure.</td>
</tr>
<tr>
<td>bUff?</td>
<td>Keyboard fail ~ shorted tracks ... service required.</td>
</tr>
<tr>
<td>CCC CCC</td>
<td>Serial port acknowledge not received so Flash store not performed. Check serial interface and host computer.</td>
</tr>
<tr>
<td>CELL?</td>
<td>Faulty or incorrectly connected loadcell.</td>
</tr>
<tr>
<td>ClOck?</td>
<td>Failure to Read or Write to Clock - service required</td>
</tr>
<tr>
<td>dEfauln</td>
<td>Waiting to load default parameters. 'n' (0, 1 or 2) indicates default level. Internal pushbutton initiates loading.</td>
</tr>
<tr>
<td>dIAG n</td>
<td>System Error... service required.</td>
</tr>
<tr>
<td>dIag?</td>
<td>Watchdog failure...service required.</td>
</tr>
<tr>
<td>dRoPout</td>
<td>Battery low or power failure.</td>
</tr>
<tr>
<td>EEprom?</td>
<td>EEProm checksum failure ~ corrupted information. Attempt to reload defaults.</td>
</tr>
<tr>
<td>l2C r</td>
<td>Failure to read (write) from (to) Clock/RAM or EEPROM ... service required.</td>
</tr>
<tr>
<td>Out toL</td>
<td>Out of printable range in batch mode.</td>
</tr>
<tr>
<td>rOut?</td>
<td>Program ROM checksum failure ... service required.</td>
</tr>
<tr>
<td>F AULtyn</td>
<td>Print/store inhibited- Printer fault due to power, connection, paper low or handshake fail, or ‘flash’ problem. N=S~ serial loopback fail. n=1' or '2'~ control I/O test 1 or 2 fail. N=P~ printer loopback test fail.</td>
</tr>
<tr>
<td>F CALn</td>
<td>Span calibration in progress ~ part of calibration ('n' indicates progress).</td>
</tr>
<tr>
<td>S+rCk</td>
<td>System error.....Service required</td>
</tr>
<tr>
<td>EEprom b</td>
<td>Power failed while backing up new parameter (possible corruption). ⊗ allows resumption (check last entered data). Internal S1 pushbutton forces a default 2 reset.</td>
</tr>
<tr>
<td>EEprom C</td>
<td>Potentially fatal error in stored parameters ~ use Internal S1 pushbutton to force default 2 reset ~ all user data will be lost.</td>
</tr>
<tr>
<td>EEprom F</td>
<td>Failure to correctly verify parameter written to EEPROM...service required.</td>
</tr>
<tr>
<td>ClOCK?n</td>
<td>Failure to read/write to Clock/RAM ... service required (n=w' write fail, =r' read fail</td>
</tr>
<tr>
<td>dEAd n</td>
<td>Deadload calibration in progress ~ part of calibration (rotating zero in MSD).</td>
</tr>
<tr>
<td>FLASH?</td>
<td>Awaiting Flashcard initialisation (please wait).</td>
</tr>
<tr>
<td>F CALn</td>
<td>As dEAd msd F is rotating zero 1</td>
</tr>
<tr>
<td>Lo-br?</td>
<td>Clock/RAM failed to hold data while power down...service required.</td>
</tr>
<tr>
<td>not CAL</td>
<td>Not yet calibrated. Perform a calibration.</td>
</tr>
<tr>
<td>PASS n</td>
<td>n=S~ Serial loop-back passed ‘P’ Printer loop-back passed ‘C’ Control loop passed</td>
</tr>
<tr>
<td>r FAIL</td>
<td>Ram failure ... service required.</td>
</tr>
</tbody>
</table>

**Also, during warm-up**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2345</td>
<td>Software revision number</td>
</tr>
<tr>
<td>Trac 123</td>
<td>Traceable Access Number  (number of changes performed at ACCESS LEVEL 2; typically shows number of calibration procedures performed)</td>
</tr>
</tbody>
</table>
7. APPENDIX

7.1 Specifications

Features
- High Quality – Low Cost.
- 7 Digit, bright, easy to read, LED display.
- DIN standard, panel mount enclosure.
- Two part connections for quick replacement.
- Trade Approved for any R60 loadcells.
- High resolution weighing performance.
- Multi point linearity adjustment.
- Accommodates extremes of dead load and signal.
- Superb digital weight filtering with fast settle times.
- x10 resolution test mode.
- Configuration via front panel or serial communication.
- Firmware upgrades via serial port.
- Two serial ports, printer port can be used for remote display.

Preset & Memory tares
- Semi automatic tare
- Set zero
- 3 outputs, 2 inputs as standard.
- Real time clock as standard.
- PLUs for A/N text, setpoints, part weights and totals.
- Multi-drop communications.
- Sophisticated fill control with fast predictive cut off.
- Many advanced software features.

Options
- 15 bit Analogue Output 4-20mA or 0-10V.
- Flash Electronic Tally Record (Alibi device).
- ModBus Communications.
- 24V DC powered version.
- Additional 2 i/p, 2 o/p.

General Specifications

<table>
<thead>
<tr>
<th>Display</th>
<th>mm</th>
<th>7 Red LED digits 14mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Panel</td>
<td>Membrane with tactile metal domes, Beep response, 5 button operation.</td>
<td></td>
</tr>
<tr>
<td>Annunciators</td>
<td>4 LEDs (Motion/Zero/Net/Gross)</td>
<td></td>
</tr>
<tr>
<td>Internal Resolution, counts</td>
<td>24 bit ADC (1:16,777,215)</td>
<td></td>
</tr>
<tr>
<td>Maximum Display Resolution (trade)</td>
<td>divisions 10,000</td>
<td></td>
</tr>
<tr>
<td>Maximum Display Resolution (non-trade)</td>
<td>divisions 500,000 (x10 test mode)</td>
<td></td>
</tr>
<tr>
<td>EC Approvals OIML Class III + IIII s certificate</td>
<td>NWML UK267</td>
<td></td>
</tr>
<tr>
<td>Input Signal Range</td>
<td>mV/V</td>
<td>4.5 → 8.5</td>
</tr>
<tr>
<td>Zero Offset Range</td>
<td>%</td>
<td>100% of Input Signal Range</td>
</tr>
<tr>
<td>ADC Conversion Rate</td>
<td>Hz</td>
<td>50 (25/100°C)</td>
</tr>
<tr>
<td>Linearity error</td>
<td>%/FS</td>
<td>&lt; ± 0.0015% (+ digital correction)</td>
</tr>
<tr>
<td>Differential non linearity</td>
<td>%</td>
<td>± 0.5 LSB</td>
</tr>
<tr>
<td>Span temperature coefficient</td>
<td>ppm/°C</td>
<td>± 1</td>
</tr>
<tr>
<td>Zero temperature coefficient</td>
<td>µV/°C</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Power consumption (typical)</td>
<td>W</td>
<td>5-10</td>
</tr>
<tr>
<td>Common Mode Rejection (@500Hz)</td>
<td>dB</td>
<td>120</td>
</tr>
<tr>
<td>Power Supply Rejection (@500Hz)</td>
<td>dB</td>
<td>120</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>V</td>
<td>12-28Vdc</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>2.5kg (shipping 2.9kg)</td>
</tr>
</tbody>
</table>

Transducer Input Specifications

| Transducer type (4 or 6 wire) | Resistive, full bridge |
| Transducer input resistance | Ω | min 432 (up to 8 x 350Ω cells) |
| Excitation voltage | Vdc | 5 (nominal) |
| Minimum signal requirement (approved) | µV/e | 1 |
| Minimum signal requirement (non-approved) | µV/e | 0.1 |
| Input impedance | MΩ | ≥ 20 (sense and signal) |

Serial Communication

| Communication Ports | 1.Comms RS232 or RS485 |
| Baud rate           | 2400, 4800, 9600, 19200, 38400 |
| Protocol            | 7/8 data bits, odd/even/no parity, 1/2 stop bits |
| Maximum continuous data Rate (test mode) | Hz | 50 |
| Communication protocol | Ascci or ModBus* |

Environmental

| Operating Temperature | °C | -10 → 40 |
| Storage Temperature   | °C | -10 → 70 |
| EMC Immunity/Emissions | EN45501, EN50082-2 |
| Sealing               | IP54 front panel |
| Enclosure             | Panel mount DIN standard 43700 |

I/O

Analogue output* 0-10V or 4-20ma

| 15 bit (adjustable range) |
| Max drive load for 4-20mA: |
| 500Ω (active)/1200Ω (passive) |

Inputs

| 2 (4*) |
| Opto coupled inputs |
| ≤6V off; >10 → 30V on |
| (Supply rail on board) |

Outputs

| 3 (5*) |
| Darlington type transistors |
| Max OFF voltage 27V |
| Max ON current 50mA |
| Leakage <0.1mA Switched + or - |

* According to specification
7.2 Calibration Transfer

For non-certified, low accuracy applications (e.g. silo contents monitoring) where in-service re-calibration is often extremely difficult, it is possible to replace the ‘baseboard’ and simply transfer across old calibration constants (with some modification to account for slightly different characteristics). The overall accuracy should not vary by more than 0.5%.

It is in any case a good idea to maintain a record of all of the parameters mentioned in the first ‘bullet’ below, plus ERR and Gain parameters from ANALOG, if an analogue output module is installed. Also, if a printer is installed, print out the ADC Configuration and Memory Image by setting ADC then EEPROM level 2 access in EngCFg. If the existing baseboard parameters should ever be lost, they may enable a service technician to restore calibration exactly, without having to physically re-calibrate.

When replacing a ‘baseboard’ ~

- Have a record of all relevant (i.e. to you) previous system parameters (always keep an up-to-date record), especially UnPo, FACT, dEdF, CALF, CFrg.

**Restoring to EEPROM level 2 access**

Calibration data can be restored into EEPROM should data be lost for any reason by re-entering the calibration data as follows (this data should ALWAYS be recorded at the time of calibration).

In CALibn - re-enter the original disp, TOP and, if known, the CALAt value.

Re-enter the ADC Configuration data parameters in the printout order.

**ADC Configuration**

<table>
<thead>
<tr>
<th>Serial Cmd</th>
<th>Description</th>
<th>Typical</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF</td>
<td>Millivolt Factor *</td>
<td>0263295</td>
<td>FACT</td>
</tr>
<tr>
<td>CG</td>
<td>Config Reg</td>
<td>%060000</td>
<td>CFrg</td>
</tr>
<tr>
<td>DD</td>
<td>Deadload o/s</td>
<td>7960170</td>
<td>dEdF</td>
</tr>
<tr>
<td>CF</td>
<td>Cal Factor</td>
<td>0201050</td>
<td>CALF</td>
</tr>
<tr>
<td>IZ</td>
<td>Init Zero o/s</td>
<td>0005026</td>
<td>Zero</td>
</tr>
<tr>
<td>ZE</td>
<td>Working Zero o/s</td>
<td>0000000</td>
<td>Zoff</td>
</tr>
</tbody>
</table>

Items marked * require the calibration button to be pressed when being entered.

Set UCAL to zero (Serial Cmd SU) and ensure that the FILt setting is restored.

**Restoring Calibration with Replacement Baseboard**

1. Install and power up the replacement baseboard.
2. In CALibn re-enter the original disp, TOP and CALAt
3. Re-enter the original calibration data CFrg dEdF CALF Zero and Zoff
4. Enter the old FACT value into the CHgF parameter. This will cause a new CALF to be calculated, alternatively, as before, this can be re-calculated manually.
5. Reset the Filter Band FILt
6. Force an initial zero with the scale unloaded or re-acquire the dEdF
7. If default reload has occurred then the UCAL parameter must be set to zero.
### 7.3 Replacing Legends

The internal front panel legends for indicator data and units of measurement are inserted as follows:

1. Remove power.
2. Remove indicator from any enclosure after disconnecting rear cable harness at the connectors.
3. Remove clip-on bezel to reveal the keyboard membrane.
4. The membrane and its aluminium backing plate are pressed into the body. Avoid any force that may dislodge them. If dislodged, it must not be allowed to fall and stress the connecting ribbon cable.
5. VERY carefully lift the bottom right-hand corner of the membrane from the backing plate (a triangle of backing paper is left in place at this point when the panel is manufactured).
6. Taking care not to lift the corner more than a few millimetres so as not to crease the membrane; particularly across where the buttons are located; slide in the paper slip containing the appropriately printed indicator data.
7. The backing paper may now be fully removed so that the membrane is completely stuck down.
8. Replace the bezel and return the indicator to any enclosure.

### 7.4 Dimensions

All dimensions are approximate and measured in millimetres unless otherwise stated.

CPI

![Image of CPI dimensions]

**Notes:**
- Recommended Cut-Out size: 138 x 68mm.
- All dimensions in mm unless otherwise stated.
8. MENU TABLES
From Weight Display Mode

**MODE** for 1 sec. ~ Selects PASS (Access via pushbutton or password) - MAIN MENU MODE  
~ Step ACROSS top of columns  
~ Selects PARAMETER DISPLAY MODE  
~ Step UP and DOWN the columns  
~ Steps back to MAIN, then back to WEIGHING (Returns Access Level to 0)  
~ Steps directly back to WEIGHING (Retains Access Level)

### Parameters

**Calibn** Calibration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Increment</td>
<td>Adjusts the display increment.</td>
</tr>
<tr>
<td>Top (Max Capacity)</td>
<td>Sets the maximum capacity.</td>
</tr>
<tr>
<td>Filter Band Setting</td>
<td>Adjusts the filter band setting.</td>
</tr>
<tr>
<td>Fastrack Setting</td>
<td>Enables or disables fastrack.</td>
</tr>
<tr>
<td>Freeze 1</td>
<td>Enables or disables freeze.</td>
</tr>
<tr>
<td>Calibrate Deadload</td>
<td>Calibrates the deadload.</td>
</tr>
<tr>
<td>Cal. Weight Value</td>
<td>Sets the calibration weight value.</td>
</tr>
<tr>
<td>Calibrate Span</td>
<td>Sets the calibration span.</td>
</tr>
<tr>
<td>Test/Trim Span</td>
<td>Enables or disables test/trim.</td>
</tr>
<tr>
<td>Span Calibration Entered</td>
<td>Sets the span calibration.</td>
</tr>
</tbody>
</table>

**Batch** Batch Mode

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch Start</td>
<td>Starts the batch.</td>
</tr>
<tr>
<td>Select Product</td>
<td>Selects the product.</td>
</tr>
<tr>
<td>Setpoint 1</td>
<td>Sets the setpoint 1.</td>
</tr>
<tr>
<td>Select Setpoint Mode Table</td>
<td>Selects the setpoint mode table.</td>
</tr>
<tr>
<td>In-Filght Comp.</td>
<td>Enables or disables in-flight comp.</td>
</tr>
<tr>
<td>Batch Tolerance</td>
<td>Sets the batch tolerance.</td>
</tr>
<tr>
<td>Batch Sample Int.</td>
<td>Sets the batch sample interval.</td>
</tr>
<tr>
<td>Jog Timer (mS)</td>
<td>Sets the jog timer.</td>
</tr>
<tr>
<td>Overfill</td>
<td>Enables or disables overfill.</td>
</tr>
</tbody>
</table>

**Count** Count Part Count Mode

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Product Code</td>
<td>Selects the product code.</td>
</tr>
<tr>
<td>Count Mode</td>
<td>Sets the count mode.</td>
</tr>
<tr>
<td>Count Enable</td>
<td>Enables or disables count enable.</td>
</tr>
<tr>
<td>Part Weight Value</td>
<td>Sets the part weight value.</td>
</tr>
<tr>
<td>Conversion Factor</td>
<td>Sets the conversion factor.</td>
</tr>
<tr>
<td>Date/Time</td>
<td>Sets the date/time.</td>
</tr>
<tr>
<td>Date for Printing</td>
<td>Sets the date for printing.</td>
</tr>
<tr>
<td>Time for Printing</td>
<td>Sets the time for printing.</td>
</tr>
<tr>
<td>Date/Time for Printing</td>
<td>Sets the date/time for printing.</td>
</tr>
<tr>
<td>Display Total Gross</td>
<td>Displays the total gross.</td>
</tr>
<tr>
<td>Display Total Net</td>
<td>Displays the total net.</td>
</tr>
<tr>
<td>Display Number of weighments</td>
<td>Displays the number of weighments.</td>
</tr>
</tbody>
</table>

**User** User Menu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tare Store Number</td>
<td>Sets the tare store number.</td>
</tr>
<tr>
<td>Force Gross</td>
<td>Forces the gross.</td>
</tr>
<tr>
<td>Numeric code for Printing</td>
<td>Sets the numeric code for printing.</td>
</tr>
<tr>
<td>Running No. for Printing</td>
<td>Sets the running no. for printing.</td>
</tr>
<tr>
<td>Date for Printing</td>
<td>Sets the date for printing.</td>
</tr>
<tr>
<td>Time for Printing</td>
<td>Sets the time for printing.</td>
</tr>
</tbody>
</table>

**Totals** Totals

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Product Code</td>
<td>Selects the product code.</td>
</tr>
<tr>
<td>Print Current Total</td>
<td>Prints the current total.</td>
</tr>
<tr>
<td>Display Total Gross</td>
<td>Displays the total gross.</td>
</tr>
<tr>
<td>Display Total Net</td>
<td>Displays the total net.</td>
</tr>
<tr>
<td>Display Number of weighments</td>
<td>Displays the number of weighments.</td>
</tr>
</tbody>
</table>

### Example

**Menu:**
- **Calibn** Calibration
- **Batch** Batch Mode
- **Count** Count Part Count Mode
- **User** User Menu
- **Totals** Totals

**The Full Menu is revealed only when Access Level is 1 or 2.**

**Setpoint Prompts – Setpoint Mode as set in In - o U F - menu**

<table>
<thead>
<tr>
<th>Mode Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint 1</td>
<td>For advanced users.</td>
</tr>
<tr>
<td>Setpoint 2</td>
<td>Enables or disables setpoint 2.</td>
</tr>
<tr>
<td>Setpoint 3</td>
<td>Enables or disables setpoint 3.</td>
</tr>
</tbody>
</table>
## Printer Configure

<table>
<thead>
<tr>
<th>Code</th>
<th>PrnFor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>Printout Format</td>
</tr>
<tr>
<td>1</td>
<td>01</td>
<td>Select Product Code 01-12 and 99</td>
</tr>
<tr>
<td>1</td>
<td>02</td>
<td>Printer Baud Rate 00=dump via serial 01=disable print 02=2400 04=4800 09=9600</td>
</tr>
<tr>
<td>1</td>
<td>03</td>
<td>Printer Parity 00=none 01=odd 02=even</td>
</tr>
<tr>
<td>1</td>
<td>04</td>
<td>Printer LF mode 0=cr 1=crlf</td>
</tr>
<tr>
<td>1</td>
<td>05</td>
<td>Printer Handshake 00=none 01=ready 02=ready to 03=handshake</td>
</tr>
<tr>
<td>1</td>
<td>06</td>
<td>Printer EOL delay 00-09 0.1seconds</td>
</tr>
<tr>
<td>1</td>
<td>07</td>
<td>Print below minimum weight 1=allow print if &lt;minimum</td>
</tr>
<tr>
<td>1</td>
<td>08</td>
<td>Negative Print 1=allow print if &lt;minimum</td>
</tr>
<tr>
<td>1</td>
<td>09</td>
<td>Print on w. change 0=must go to 0 0=must change 20d</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>Set minimum to 0 Se 02=0v 1=Se</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>Print in tolerance 1=only print if tolerance criteria met</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>Positive tolerance 1=use positive tolerance only</td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>Calming timer 01-99 0.1sec set time for Batch Mode</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>Auto Print mode 1=print on stable weight</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>Print unconditional 1=overrides printer flag</td>
</tr>
<tr>
<td>1</td>
<td>16</td>
<td>Animal weighing 1=enable auto filter on PRINT</td>
</tr>
</tbody>
</table>

## Serial Set-up

<table>
<thead>
<tr>
<th>Code</th>
<th>SERIAL</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>Baud rate 02=2400 04=4800 09=9600</td>
</tr>
<tr>
<td>1</td>
<td>CF8</td>
<td>Parity 00=8data+none 01=7data+odd 02=7data+even 08=8data+mark 09=8data+odd 0A=8data+even</td>
</tr>
<tr>
<td>1</td>
<td>00</td>
<td>Line feed mode 0=cr 1=cr+lfn 2=cr+lfn only</td>
</tr>
<tr>
<td>1</td>
<td>01</td>
<td>No DP in w data 0=embedded dp</td>
</tr>
<tr>
<td>1</td>
<td>02</td>
<td>Append Checksum 0=off 1=on</td>
</tr>
<tr>
<td>1</td>
<td>03</td>
<td>No status information 0=embedded status info.</td>
</tr>
<tr>
<td>1</td>
<td>04</td>
<td>Serial string 1=outputs serial string 2=outputs extended string</td>
</tr>
<tr>
<td>1</td>
<td>05</td>
<td>Data on request 0=on 1=off</td>
</tr>
<tr>
<td>1</td>
<td>06</td>
<td>Remote display 0=off 1=on 01=cont o/p on print port 10=master (via serial) 20=master (via print port) 30=slave mode</td>
</tr>
<tr>
<td>1</td>
<td>07</td>
<td>Multi-drop mode 1=multi-drop</td>
</tr>
<tr>
<td>1</td>
<td>08</td>
<td>Modbus Protocol (Factory Option)</td>
</tr>
<tr>
<td>1</td>
<td>09</td>
<td>RS232/485 select 1=RS232 0=RS485</td>
</tr>
</tbody>
</table>

## User Configure

<table>
<thead>
<tr>
<th>Code</th>
<th>Conf9</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>Units (for printing) 00=none 01=kg 02=lb 03=g 04=gm 05=oz 06=mg 07=lb 08=mg/convert md</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Auto filter acquire 0=on 1=off</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Digital filter coefficient 01-FF (FF is lightest)</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Fastrack 0=off 1=on</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Freeze 0=on 1=off</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Motion band sensitivity 0=off 1=on</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Motion delay 00-99seconds 0=non timeout</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Motion time-out 00=off 1-15=on – set delay stability criteria</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Display rate update 01-06=0.1 1 to 0.6sec 07=0.1sec 08=0.05sec</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Non Trade 07=0.10=0.7 to 1.0sec</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Default set-up 0=force defaults 1=force options</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Running No. disable 0=on 1=off</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Zero track enable 0=disable 1=on</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Supervisor password 00-FF (FF is lightest)</td>
</tr>
<tr>
<td>ENCFG</td>
<td>Engineering Configuration</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>---------------------------</td>
<td></td>
</tr>
</tbody>
</table>
| 01    | 2 | EX | Trade Mode  
00=non-certified (pushbutton or password)  
01=trade (pushbutton or password)  
02=trade (pushbutton only) |
| 0     | 2 | SU | Set/Force Uncal  
1=not calibrated |
| 0     | 8 | KS | Rest system  
1=reset  
2=normal |
| 0     | 2 | EV | Power on delay  
0=reduced power up time |
| 0     | 2 | EP | Power on with weight displayed  
0=non zero power up |
| 1     | 2 | CZ | Calibration zero value  
0=displayed  
1=original zero |
| 1     | 2 | PU | Print unconditional  
0=disabled  
1=overrides printer flag |
| 2     | 2 | L2 | Set linearity breakpoint |
| 2     | 2 | L4 | Set linearity breakpoint |
| 2     | 2 | L6 | Set linearity breakpoint |
| 3     | 2 | MF | mV display calibration factor |
| 3     | 2 | CG | Adc configure display |
| 2     | 2 | GO | Adc deadload offset |
| 3     | 2 | GF | Adc calibration factor |
| 3     | 2 | U | First zero offset |
| 2     | 2 | ZE | Zero offset |
| 1     | 2 | AA | Dump adc configuration |
| 1     | 2 | RW | Restore calibration |
| 5     | 2 | MS | Serial number |
| 3     | 2 | VN | Version number |
| 2     | 2 | PE | Level 2 (call) password  
(Non-trade mode only) |
| 1     | 2 | LO | Error log  
0=dump error log |
| 1     | 2 | XC | Parameter dump  
0=full parameter dump |
| 1     | 2 | XR | Memory image  
0=dump memory |
| 2     | 2 | EA | Enable analogue  
0=disabled  
1=enabled analogue |
| 2     | 2 | EF | Enable flow rate  
0=disabled  
1=enabled flow rate |

<table>
<thead>
<tr>
<th>Key</th>
<th>Button</th>
<th>Disable</th>
</tr>
</thead>
</table>
| 0 | EX | Mode key disable  
0=enabled |
| 0 | KP | Print key disable  
0=enabled |
| 0 | KT | Tare key disable  
0=enabled |
| 0 | KZ | Zero key disable  
0=enabled |
| 0 | KE | Test key disable  
0=enabled |

If MODE is disabled, hold it and press TEST to re-enter PARAMETER mode.

<table>
<thead>
<tr>
<th>ENCFG</th>
<th>Configure Control I/O</th>
</tr>
</thead>
</table>
| 01    | 2 | SM | Setpoint mode  
00=comparator P/F  
01=batching  
02=calibration L/P/H  
03=test I/O  
04=comparator+tolerance  
05=comparator+tolerance%  
06=comparator+tolerance%’S’  
07=simple trip |
| 0     | 2 | OP | Test inputs 1 & 2  
0=ON  
1=OFF |
| 0     | 2 | PO | Test output 1  
0=forces ON |
| 0     | 2 | PP | Test output 2 |
| 0     | 2 | PO | Test output 3 |
| 0     | 2 | PC | Allocate inputs  
0=2 digits: i/p1, i/p2  
See section 4.8 |
| 0     | 2 | PM | Allocate outputs  
0=2 digits: o/p1, o/p2  
See section 4.8 |
| 0     | 2 | PS | Third output  
0=On |
| 0     | 2 | PF | Auto tare on start  
0=before fill |
| 0     | 2 | PG | Auto inflight compensation  
0=auto compensation enable |
| 0     | 2 | PR | Calm timer  
0=999 in 0.1seconds |
| 0     | 2 | PD | Discharge status  
0=discharge mode |
| 0     | 2 | PE | Discharge on print  
0=enable |

<table>
<thead>
<tr>
<th>ZER</th>
<th>Analog Output Set-up</th>
</tr>
</thead>
</table>
| 00   | 2 | GE | Error action  
0=maximum on error  
1=minimum on error |
| 00   | 2 | RO | Enable rate signal  
0=follow flow rate |
| 00   | 2 | QC | Current mode  
0=0-10V  
1=4-20mA |
| 00   | 2 | ON | Weigh out mode  
0=increasing o/p with decreasing weight |
| 0    | 2 | OZ | Zero offset factor |
| 0    | 2 | TZ | Zero trim  
0=step zero offset  
1=and step zero factor |
| 0    | 2 | CA | Set full o/p at other than FeP  
(i.e. max)  
(default=FeP value) |
| 0    | 2 | TG | Gain factor  
0=step factor  
1=and step factor |

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Revision B - Page Issue 002 Software Release PO6_027/127
9. BASEBOARD LAYOUT - REFERENCES
Wiring Location References

<table>
<thead>
<tr>
<th>No</th>
<th>Description – Rev C (or earlier) Baseboards</th>
<th>Description – Rev E Baseboards</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>ADC</td>
<td>ADC</td>
</tr>
<tr>
<td>1</td>
<td>Loadcell Screen (Faston 6.35mm crimp)</td>
<td>Loadcell Screen (Faston 6.35mm crimp)</td>
</tr>
<tr>
<td>2</td>
<td>- Signal</td>
<td>- Signal</td>
</tr>
<tr>
<td>3</td>
<td>+ Signal</td>
<td>+ Signal</td>
</tr>
<tr>
<td>4</td>
<td>- Supply</td>
<td>- Excite</td>
</tr>
<tr>
<td>5</td>
<td>- Sense</td>
<td>- Sense</td>
</tr>
<tr>
<td>6</td>
<td>+ Sense</td>
<td>+ Sense</td>
</tr>
<tr>
<td>7</td>
<td>- Supply</td>
<td>- Excite</td>
</tr>
<tr>
<td>8</td>
<td>Calibration Switch Access Location</td>
<td>Calibration Switch Access Location</td>
</tr>
</tbody>
</table>

Revision C baseboard (or earlier).

Note: Firmware version prompted at power on will be PO6.0xx.

Revision E baseboard. Identified by REV E printed on terminal connection label.

Revisions to the IFE1131 baseboard mean that the I/O terminal positions on P4 connector are different to earlier revisions, not directly interchangeable.

All revision E baseboards will be fitted with a ‘polarising’ pin and a mating connector.

Note: Firmware version prompted at power on will be PO6.1xx.