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. CPI type approval number is UK2677. In addition, it is built according to a strict ISO9001 Quality Assurance System and complies with EN55022 (Emissions), EN45501 Annex B (Immunity), and both SI2328:1994 and SI3260:1994 Electrical Safety directives.
## 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>
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<td>PO6.024</td>
<td></td>
<td>Remote Tare could prevent subsequent cancel tare</td>
</tr>
</tbody>
</table>

### Alternative program compilations derived

- **Baseboards 1155 rev C** use PO6.02n
- **Baseboards 1155 rev D on** use PO6.12n

| PO6.025/125 | 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 | - 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  

| PO6.027/127 | Programmable Mode Functions (FU) Introduced  
|-------------|---------------------------------------|
|             | - 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  

| PO6.028/128 | - Calibration routine can generate minor span error on systems using large deadweight with high resolution  
|-------------|---------------------------------------|
|             | - Slave display mode (ER80) no Print function available  

| PO6.029/129 | Flash disable at level 2 by menu item FLSH  
|-------------|---------------------------------------|
|             | - Revisions made to increase protection against corruption during power disruption  

| PO6.030/130 | - Support for checkweigher lightbar (CM models).  
|-------------|---------------------------------------|
|             | - New parameter STEP[SP] enables & adjusts lightbar.  
|             | - New [ME] serial command gives display 'Message' facility.  
|             | - Revisions to setpoint entry (via menu or mode function), by default x10 res digit not now shown.  
|             | - SETD[SM] settings extended to permit previous method.  
|             | - Tidied o/p states under menu/error modes. (Mainly SM 3 use)  
|             | - Revised loopback self test routine. (Mainly factory use) and extended I/O test provision to cover future optional I/O  

| PO6.031/131 | - Revised setpoint entry only applied for trade mode  
|-------------|---------------------------------------|

| PO6.032/132 | - Fixed ER20 power up error  
|-------------|---------------------------------------|
|             | - Changed Print Baud (PV) settings  
|             | PV1 now 19200 baud (previous PV1 for print disable can now be set by PV10)  

| PO6.033/133 | - Fix to permit level 2 access by pushbutton. Also reinstated SW cmd for serial read of pushbutton.  
|-------------|---------------------------------------|
|             | - New parameter in SERIAL menu - LGDZ allows leading zeros in place of spaces in weight string.  
|             | - New parameter in ENGCFG menu - UNPO permits selection of uni/bi polar display. Was previously unipolar (restricted negative range) now default is bipolar and can be restricted if required.  
|             | - Fix parameter dump to complete cleanly.  

| PO6.035/135 | Lucid enable routines to better suit latest devices.  

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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 ÖÜÖ 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 ~

\[ \begin{align*}
C &= \text{Count mode} \\
r &= \text{Rate mode} \\
U &= \text{Converted mode, converted Units.} \\
. &= \text{Command pending ~ awaiting stable weight} \\
N &= \text{Peak mode max value} \\
u &= \text{Peak mode min value} \\
- &= \text{Negative Sign (could over-ride status byte)}
\end{align*} \]

The following only display if enabled by parameter \textbf{IN\_OUT STAT} = 1

\[ \begin{align*}
F &= \text{Fail (Setpoint Mode } \textbf{SETD} = 00) \\
H &= \text{High (Setpoint Mode } \textbf{SETD} = 02/04/05) \\
p &= \text{Pass (Setpoint Mode } \textbf{SETD} = 00/02/04/05) \\
L &= \text{Low (Setpoint Mode } \textbf{SETD} = 02/04/05) \\
E &= \text{Empty/Discharge (Batching mode } \textbf{SETD} = 01) \\
d &= \text{Dribble (Batching mode } \textbf{SETD} = 01) \\
b &= \text{Bulk (Batching mode } \textbf{SETD} = 01) \\
M &= \text{Horizontal bars reflecting status of simple trip o/ps (} \textbf{SETD} = 07) \\
\end{align*} \]

\textbf{GROSS} and \textbf{NET} indicators flash to indicate displayed Totals, Preset Tares and 'Flash Alibi' weights.

\textbf{ALL} indicators flash if a remote PC has placed a ‘message’ on the display (using ME command, introduced at version PO6.030/130).

### 1.2 Installation in control panels

\textbf{Recommended practice for installation in control panels/enclosures}

1. Use a metal enclosure for improved EMC protection.
2. Incoming mains supply and control signal cables should be screened or wire armoured.
3. Screen/armouring must be terminated (and stopped) on entry to the metal enclosure using an ‘EMC screen’ gland which physically connects the screen/armour to the enclosure.
4. The glands should be located as close as possible to the internal connection terminals (DIN rail), so there is a minimum of ‘unscreened’ cabling within the enclosure.
5. The incoming mains earth should connect to a ‘central earthing point’, usually the DIN rail.
6. If a non-conducting (eg glassfibre) enclosure must be used, all glands must be ‘bonded’ together, and to the central earthing point with minimum 4 sq mm copper conductor routed directly between points.
7. The power supply providing DC to the indicator must also connect 0V to the central earthing point.
8. Preferably use screened multicore cable between the indicator connectors and the I/O terminal rail and the power supply.
9. Multicore cable screens (except load cell cable – see below) should be connected to the central earthing point at the terminal rail end only. The screens should not be connected at the indicator end.
10. Screened load cell cable should be routed well clear of all other cables. It should not share trunking with any other cables except transducers. If it needs to pass near other cables, it should not travel parallel to them, and should cross them at 90 degrees. Its screen should be continuous right up to the terminals on the rear of the indicator, but not connected at that point. The screen should be connected to the enclosure only at its entry gland (must be an ‘EMC’ type), with the screen then continuing, unbroken, inside the enclosure.
11. The load cell cable should go, preferably unbroken, directly to the indicator. (If it really must have intermediate terminals on a DIN rail, such terminals must be positioned as far from the other terminals as possible. The cable screens must connect via an insulated terminal; NOT grounding to the DIN rail. The unscreened tails must be as short as possible and the screen conductor tail must not be allowed to touch any metalwork inside the enclosure.)
12. Serial communication and printer cables must be screened. In this case, it is usually acceptable to bring the incoming cable screen direct to the central earth point (usually at the DIN rail). A screened cable must be run up to the indicator from the DIN rail, with the screen connected to earth at the DIN rail using an earthed terminal (screen not connected at the indicator).
1.3 Power Connection

**Power Connection**

Connect **12-28V DC** to terminals +Vin & 0V on P3

(Note - These terminals are internally linked to corresponding terminals on P4.)

The external supply should be fused at 3A. (Antisurge)

Internal protection is provided by a 750mA reset-able ‘poly’ fuse.

(Resets when disconnected from supply and allowed to cool)

1.4 Loadcell Connection

**See section 1.2 for installation practice.** Connection is made to P1 using 6-wire screened multi-core cable.

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

It is essential that the 'sense' inputs are connected. When using 4 wire loadcells, each 'sense' input must be linked to its corresponding 'excitation' wire at some convenient point.

**6-wire Loadcell Cable Connection Schematic**

**4-wire Loadcell Cable Connection Schematic**
1.5 Control Outputs and Inputs

The I/O interface was revised at Baseboard Rev E - Connection details for the different board versions are described below.
Refer also to
- Section 1.2 – installation practice
- Section 9 at rear of the manual - Connection layouts for both Rev C and Rev E versions
- Section 4 - operation of I/O

OUTPUTS 1, 2, 3 - REV C Baseboard

The indicator operates from an external DC supply; in most cases this will also be the supply for control I/O. The 0V and Vin terminals on connector P3 are internally linked to terminals 0V and Vin on P4 for convenience.

The outputs consist of uncommitted darlington opto-isolators, capable of ‘sinking’ up to 60mA with a ‘drop’ of <1.5v when ‘on’, and will stand up to 30v without significant leakage when ‘off’. (Note - Terminals marked for outputs 4 and 5 are never used)

They are strictly DC, and the ‘OPn+’ must not go negative of ‘OP-COM’, or damage to the output device will occur.

Each output load may draw up to 60mA (Load resistance >200Ω for 12v; >400Ω for 24v).

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.

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.

Connection - Common Positive Drive only

For driving LED’s, small relays, etc. the indicator supply can be picked up at terminals Vin & 0V on P4. (Diodes required as shown for inductive loads.)
When interfacing with PLC inputs, avoid ground loops by bringing supply from PLC and run separate lines for each - do not connect to supplies at P3/P4.
OUTPUTS 1, 2, 3 - REV E Baseboard

The indicator operates from an external DC supply; in most cases this will also be the supply for control I/O. The 0V and Vin terminals on connector P3 are internally linked to terminals 0V and Vin on P4 for convenience.

On the rev E board the three outputs are fully separated, permitting positive or negative switching. Each is an uncommitted darlington opto-isolator, capable of ‘sinking’ up to 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-’, or damage to the output device will occur.

Each output load may draw up to 60mA (Load resistance >200Ω for 12v; >400Ω for 24v). Each output incorporates a 100mA poly resettable fuse to provide protection (reset by power off and leave to cool).

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.

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.

Connection - Common Positive Drive

For driving LED’s, small relays, etc. the indicator supply can be picked up at terminals Vin & 0V on P4. (Diodes required as shown for inductive loads).

When interfacing with PLC inputs, avoid ground loops by bringing supply from PLC and run separate lines for each – do not connect to supplies at P3/P4.

Connection Common Ground Drive

For driving LED’s, small relays, etc. the indicator supply can be picked up at terminals Vin & 0V on P4. (Diodes required as shown for inductive loads).

When interfacing with PLC inputs, avoid ground loops by bringing supply from PLC and run separate lines for each – do not connect to supplies at P3/P4.
**INPUTS 1 and 2 - Rev C and Rev E Baseboard**

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

The control input pairs can be activated with a voltage 12-24V DC, 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 board).

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).

The use of good quality, gold plated contacts is advised, especially if 12V is used.

**Connections – Switching to negative**

![Connections diagram]

**Connections – Switching to positive**

![Connections diagram]

### 1.5 Printer & Comms Connections

See section 9 at rear of manual to identify terminal locations and designation. Further operational information is in section 5. Connections for most common PC and printer use will be as below

<table>
<thead>
<tr>
<th>Indicator to Printer</th>
<th>Printer Function</th>
<th>9 Way ‘D’</th>
<th>25 Way ‘D’</th>
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</thead>
<tbody>
<tr>
<td>CPI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 0V (ground)</td>
<td>Comms Ground</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>P3 PTX (transmit)</td>
<td>Receive (RX)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>P3 PBUSY (busy)</td>
<td>Busy (DTR)</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<td>P3 0V (ground)</td>
<td>Comms Ground</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>P3 RS232 TX (transmit)</td>
<td>Receive (RX)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>P3 RS232 RX (receive)</td>
<td>Transmit (TX)</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
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1.6 Switching On

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

q Software Version number display e.g. **PO6_022** (give this number in event of a query).
q Traceable Access Number display e.g. **tAn 021**
   (This number increments when changes are made to calibration — Requiring Access Level 2
q Self testing of internal electronics; prom, eeprom, ram, a-d etc. will occur.
   Diagnostics indicate failures (see Section 6).
q 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
- 1/2= 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

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 (Max/TOP) and increment (e/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.

e/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 (DISP) and progress through the sequence. However, if appropriate, stages can be skipped by simply using òñ keys to step through the menu.

From weight display mode

q Press MODE for 1 second to display PASS.
Obtain required Access Level using Passcode or pushbutton and proceed to MAIN MENU USEr__
Then ÒÒÒ to select CALIbn_.

If Access Level is already 1 or 2 pass will not be displayed.
At pass pressing internal pushbutton gains Access Level 2
Passcode 1 Ò Õ Ù Ê Ñ ENTER gains access level 1
Passcode 900 Ò Õ Ù Ê Ñ ENTER gains access level 2 if permitted
These are default passcodes and may be altered by installer
Level 2 Passcode access is permitted when ENG_CFG CERT = 0/1

q Press MODE again to enter the calibration menu.

Unless the SECURITY ACCESS LEVEL is already 2, the message pass (or PShBuT) 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 MODE to skip this step. Items within the calibration menu can then be examined but not changed.

dISP ~ Display Increment and Decimal Point (‘e’)

q Press MODE to show ‘increment’ (scale interval) together with decimal point position, if applicable.
Press Ò or Ù to step increment in sequence 1, 2, 5, 10, 20, 50, 1 ... etc.
Press Ò 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

q Press ENTER to set selection and move on …

t oP ~ Maximum Display Capacity (‘max’)

q Press MODE to show current value for MAX CAPACITY.
Edit using the Ò Ù Õ keys
Note: The display will be maintained for 9 divisions (e) beyond this value.
Having changed this value, full calibration MUST be carried out.

q Then press ENTER to set selection and move on…

FILT ~ Filter Band Parameter

q Shows current Filter Band Setting 00 - 05 or 10
Press MODE to Edit using the Ò Ù Õ 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 Fltc parameter in the ConFIg_ Menu

q Press ENTER to set edited selection or Ù to step past and move on….
Fast ~ Fast Track Parameter

- **q** 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 **UO** keys
  - **0** – OFF, Filter is always applied at a uniform rate
  - **1** – ON, Filter effect reduces when weight is ‘in motion’
  - Other settings 2+ reserved for future

- **q** Press **ENTER** to set edited selection or **U** to step past and move on…

Frez ~ Display Freeze Parameter

- **q** Freeze feature latches on stable readings to prevent flicker.
  - See further information on Filtering later in this section.
  - Press **MODE** to Edit using the **UO** keys
  - **0** – OFF, display tracks weight changes immediately
  - **1** – ON, stable readings will latch for up to ~ 0.5s

- **q** Press **ENTER** to set edited selection or **U** to step past and move on…

dead ~ Deadload Offset Calibrate

- **q** 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.

- **q** Press **ENTER** to initiate 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 **TEST** to store the new value, for **Verified Systems** treat as re-calibration, unit will have to be re-verified.

- **q** Display will eventually show… or press **U** to skip Deadload Calibration and reach …

CALat ~ Enter Span Calibration Weight

- **q** Press **MODE** to display currently defined Span Calibration Weight value.
  - Press **MODE** to Edit using the **UO** 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 (TOP)

- **q** Press **ENTER** to set selection and move on …

CAL ~ Span Calibrate

- **q** 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.
  - Ensure weigh platform is loaded with the previously selected CALat calibration weight value, it is stable, and the mV/V reading is as might be expected

- **q** Press **ENTER** to initiate automatic SPAN acquisition. This will take several seconds.
  - For Trade mode, the loadcell signal must be ≥ 1µV for each division (e).

- **q** Display will eventually show… Or press **U** 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.

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

TIP: 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.

\[
\text{Millivolt reading} = \frac{8 \times 2}{20} = 0.8\text{mV/V.}
\]
q Pressing MODE puts into x10 weight display mode with a flashing t in the display MSD, then:

- O Enters a ‘SPAN TRIM’ mode (only if level 2), indicated by flashing t . . in MSD (with decimal point.).
- õ Nudges span calibration factor up by one tenth of a division.
- U Nudges span calibration factor down.
- 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.
- The limit of 12.5% of capacity applies so nudging is inhibited below this weight.

q ENTER or MODE ends the span trim procedure.

Unless at ACCESS LEVEL 2, it is not possible to ‘fix’ any values obtained above.

In non trade mode – pressing the ENTER key will bring up the S U R E ? message and a second press of ENTER will store the new values. Pressing õ instead of ENTER will bring up the A b o r t ? Message. A further press of the ENTER key or the õ key will restore the old values.

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.

After calibration the Display interval can be altered without the need for full re-calibration.

Disp located in the C A L i b n _ menu can set a “pseudo” Display interval value - with the constraints that the decimal point cannot be moved.

Once back at the C A L i b n _ menu heading, other menus may then be accessed, or the weight indication resumed by pressing ENTER (closing access level) or õ keeping the access level active for subsequent return to menus.

2.2 Linearity adjustment

In the E N G C F G _ menu a 5 slope 6 point linearity adjust can be made at 20% L i n 2 , 40% L i n 4 , 60% L i n 6 and 80% l i n 8 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 õ when showing t E S t in non trade mode enables Calibration via entry of the cell mV/V rating as an alternative to conventional calibration. Displays S P A n 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 S P A n parameter.

A deadload step (without a subsequent C A L step) must have been performed previously; an E r r o r display or serial ‘?F’ error will be generated otherwise.

The calculation is relatively straightforward.

\[
S P A n \text{ value} = \frac{\text{Loadcell sensitivity} \times \text{System Maximum Capacity}}{\text{No. of Loadcells} \times \text{Individual Loadcell Capacity}}
\]

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:

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

100

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 **Fas t** – enables fast track of large weight changes
- **Display Freeze** – see **FRE Z** – 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 **CONFIG** 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 **CONFIG** 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>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter Coefficient</td>
<td>80</td>
<td>40</td>
<td>20</td>
<td>10</td>
<td>08</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 **CONFIG** (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

**FRE Z** 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 **FRE Z** to 0.
Typical Fast/Freeze combinations

<table>
<thead>
<tr>
<th>FAST</th>
<th>FreZ</th>
<th>TYPICAL APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fast Track ON</td>
<td>1 = Display Freeze ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 = Display Freeze OFF</td>
</tr>
<tr>
<td>0</td>
<td>Fast Track OFF</td>
<td>1-8 = Display Freeze ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 = Display Freeze OFF</td>
</tr>
</tbody>
</table>

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

mbnd parameter, found in the CONFIG menu (level 2 Access) can be used to relax the conditions defining stability.

By default mbnd = 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 Mbnd (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 mbnd = 0.

mdly parameter, found in the CONFIG menu (level 2 Access) can be used to further condition actions that depend on stability.

<table>
<thead>
<tr>
<th>mdly</th>
<th>Tare/Print operations perform regardless of motion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</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>1</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>
<tr>
<td>2-9</td>
<td>Tare/Print operations perform regardless of motion</td>
</tr>
</tbody>
</table>

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>UPDT</th>
<th>00 01 02 03 04 05 06 07 08 09 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update rate (S)</td>
<td>0.02 0.1 0.04 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0</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 ÚÖ

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 :: Ú 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 ENG_CFG CERT =2 ; Level 2 code if ENG_CFG CERT =0/1 At PASS or Pshbut prompt, press internal pushbutton or enter code if permitted, Default = 900 :: ÚÖÚ 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, P SHbUt 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 ÚÖ 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 ÚÖ. Step to the next left using ò.

EXAMPLE - code “900” could be entered

or more easily:

<table>
<thead>
<tr>
<th>Display</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td>òÖ</td>
</tr>
<tr>
<td>PASS</td>
<td>òÖ</td>
</tr>
<tr>
<td>PASS…</td>
<td>òÖ</td>
</tr>
<tr>
<td>Access 2</td>
<td>òÖÖÖÖÖÖÖÖÖ ENTER</td>
</tr>
</tbody>
</table>

(The access level is shown while the ENTER key is held pressed)

Default level 1 code is ‘1’ - alter with SPAS in config
Default level 2 code is ‘900’ - alter with cPAS in engcfg
Level 2 is required to alter either code - Always set codes before sealing of instruments for trade use.

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Once an access level is obtained it remains effective so long as the system remains in menu mode. Return to weighing mode using the \( \text{C}_{\text{r}} \) 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 \textbf{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 \textbf{USER} is displayed.
- Step up or down through the available menu titles using the \( \text{UO} \) 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 \textbf{ANALOG} and \textbf{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 \textbf{MODE} to access the parameters in the menu. (Depending on current access level, \textbf{PASS/PUSH} may also be prompted at entry to the \textbf{CALIBN} and \textbf{ENGCFG} menus.)
- The parameters within a menu are stepped through with \textbf{UO} keys.
- The parameter name may be displayed, along with a one or two digit value. If its value is more than two digits long, \textbf{MODE} must be pressed to display & edit it.

![Diagram](image_url)

**MENU**

- **CALIBN**
- **Batch**
- **Count**
- **User**
- **Totals**
- **FLASH**

**DESCRIPTION**

- Calibration procedure
- Batch and check-weighing setpoints
- Part Counting
- Time/Date, Tares, Product code, Code/Run no etc
- Totalisation
- Electronic Tally Record (Alibi)
- Printout formatting and text strings
- Printer port characteristics and conditions
- Serial comms port & remote display settings
- Installer set-up parameters
- Factory & engineer parameters
- Enable/disable panel functions
- Configure control I/O operations
- Analogue Output operation and calibration
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 ÛÜ keys.
- If only the parameter name is displayed, then pressing **MODE** will reveal the value with one digit flashing ready to edit.
- If the Û or Ò key is held depressed, an auto-increment mode begins after a short wait.
- Ô 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 **no PASS** 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, Û or Ô will ‘flip’ a 0 to a 1 or back.

Summary of Menu Navigation

| AT MAIN MENU TITLES | ÛÜ step through the choice of **MENUS**
| ENTER or Ô return 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 | ÛÜ step through the **PARAMETERS**
| **ENTER** returns to **MAIN MENU** title, Ô returns 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
| ÔÛÔ 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.

On some versions serial comms baud rate changes (**SERIAL BAUD** [EV]) are not permanently stored until forced to store by change of additional items. If no ‘stored’ message seen, then force store by changing another parameter.

Change to **SERIAL NET** [EM] multidrop parameter is not permanently stored until forced to store by change of additional items. After changing NET, force store by changing another parameter confirmed by ‘stored’ message.
3.6 Special Editing Procedures

Negative Number Entry
Occasionally a parameter requires a negative value entry (eg 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 UO keys to step through all 16 'digits'.

Hexa-decimal data is used mainly for Print Formatting and the ADC Configuration parameters found in the Eng CF g Menu.

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

q To make entry easier, text strings are entered from the left instead of from the right as with numeric and hexa-decimal values.
q If the òkey is held pressed for 2 secs, alpha strings clear to spaces.
q The increment/decrement UO sequence is 0-9, A-Z using UP, or a-z going DOWN, ‘Esc’ (1Bh), ‘EOS’ code (1Fh), ‘space’ code (20h).
q Alpha characters are represented by a ‘stylisted’ 7 segment character set (see note below).
q 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.
q Non-printing control characters (special entry routine; see below) are displayed as ‘.’
q The ‘EOS’ code (ascii 1Fh ~ looks like ‘    ’) is an optional ‘end-of-string’ terminator (any following characters, including any in ‘Stxb’ if ‘EOS’ appears in ‘StxA’, will not be printed).

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

\[
\begin{array}{llllllllll}
 J & = \text{J} & H & = \text{k} & \equiv & = \text{M} & \leftarrow & = \text{t} & U & \text{and} & \text{V} & \equiv & = \text{W} & | & | & | & | & | & = \text{Esc} & | & | & | & | & | & = \text{EOS} \\
\end{array}
\]

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 ~

q Select the appropriate text string (‘StxA/b’ etc.) in the Pr_F or menu.
q Select PARAMETER EDIT MODE. Any previously selected control characters will appear as ‘.’.
q Use the òkey to select the character to be edited.
q Press both U and òkeys at the same time.
q The MOTION indicator will flash to indicate special entry mode and the character will appear in a ‘cryptic’ binary display format.
q The special entry mode will remain on until the next character is selected.
q 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 0Dh; 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.

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

**DAt E** Format is dmmmyy – 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.

| USER__ | Provides a convenient place for operator to select **CodE** from 01-12 |
| t o t A L S__ | **CodE** is provided in this menu to permit print (**P t o t**), print & clear (**C l r t**), or display (**g r o S / n e t / n o**) for each code. If **CodE** 99 is selected, printing, or printing & clear, will perform for all 12 products. |
| Pr _ For _ | 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. When a printout is requested, text printed is determined by the **CodE** selected at that time. **CodE** 99 permits programming of a set of text strings that print regardless of current **CodE** |
| bAt CH__ | **CodE** permits store and recall of sets of setpoints and where applicable inflight and print tolerance values. |
| Count__ | The part weight value (**P a r t**) can be programmed differently for each of the 12 **CodE**'s. |

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 **C onfi g _** menu, **F UN C** 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 **B UT T O N** 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 **TARE**

**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 **TARE 00**

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 - Edit memory tares from the **user** menu

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

Quick select of product codes - Press **MODE** Display prompts **CODE 00**

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 **tARt**

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 **HIGH** Then **LOU**

**SETD** 01 prompts **TARG** Then **BRIB**

**SETD** 04/05/06 prompts **TARG** Then **TOL**

**SETD** 07 prompts **SPT3** Then **SPT2**

**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

**Sure?**

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 (CONF 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.

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 configuration of 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.

PRESET TARES

A PRESET TARE can be set either by simple entry of the value required or by recalling one of 12 previously stored memory tares.

PROGRAMMING MEMORY TARES - USE r _ t Ar E

There are 12 Preset Tare weight registers - tAr E 01-12 (tAr E 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 USE r _ MENU, select tAr E - 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 keys
- To modify the value of any tare, press MODE and edit using the arrow keys then press ENTER
- Exit with ENTER or Ü

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

OPERATION

Whilst the USE r 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 F U N C   FU = 1
Memory tare code entry F U N C   FU = 2

See MODE FUNCTIONS, section 3.9 for operating instructions

OTHER TARE OPERATIONS

Automatic Tare Cancellation The Auto Zero Setting option, Config Zset = 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
4.2 Setpoint Operations - overview

Several modes of operation can exploit the use of setpoints and the control outputs for checkweighing, level control and filling operations.

The mode is set by the parameter $\text{SEtd}$ in the \texttt{In\_Out\_} MENU.

$\text{SEtd} = 07$ (Default) provides 3 simple trip outputs.

$\text{SEtd} = 03$ permits control of outputs only via serial commands (O11/O10, O21/O20, O31/O30)

$\text{SEtd} = 00/02/04/05/06$ provide various arrangements for Pass/Fail or Low/Pass/High checkweighing

$\text{SEtd} = 01$ provides a sophisticated filling program

Setpoint values are defined by parameters in the \texttt{bAtCH\_} MENU.

The setpoint prompts alter according to the setpoint mode ($\text{SEtd}$) in operation.

\begin{tabular}{|c|c|c|c|}
\hline
Setpoint Mode & Setpoint 1 & Setpoint 2 & Setpoint 3 \\
\hline
\text{SEtd} 03, 07 & Spt1 & Spt2 & Spt3 \\
\text{SEtd} 00, 02 & Spt1 & Louu & High \\
\text{SEtd} 04, 05, 06 & Spt1 & tol & targ \\
\text{SEtd} 01 & Spt1 & Drib & targ \\
\hline
\end{tabular}

Sets of values can be stored and recalled for each of the 12 PRODUCT CODES.

q Select \texttt{Code} parameter and set PRODUCT CODE (01 - 12)

q Select and set each setpoint parameter in turn

The MODE 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

Versions up to PO6.029/129 prompted many of the setpoints for entry to include the extended (x10 resolution) digit, regardless of whether the display was being operated in x10 mode. From PO6.030/130, setpoints are prompted in the current display mode - i.e. usually without the extended digit. It is possible to configure operation as before by changing the SETD parameter from 0x to 1x.

4.3 Simple Trip Mode - Setpoint Mode 07 (Default)

\texttt{IN\_OUT\_\_SEtd\_07 -- Simple 3 trip mode -- (Default)}

In this mode, each output independently relates to its individual setpoint

- If Weight $> \text{Spt3}$ then OP3 is ON
- If Weight $< \text{Spt3}$ then OP3 is OFF
- If Weight $> \text{Spt2}$ then OP2 is ON
- If Weight $< \text{Spt2}$ then OP2 is OFF
- If Weight $> \text{Spt1}$ then OP1 is ON
- If Weight $< \text{Spt1}$ then OP1 is OFF

4.4 Checkweighing Modes - Setpoint Mode 00, 02, 04, 05, 06

Status characters L/P/H or F/P/F can be shown in the left display digit, if enabled by parameter \texttt{IN\_OUT\_STAT} = 1

The following tables illustrate the output states for the various checkweighing modes.

The states shown are the default operation. Changing parameter \texttt{IN\_OUT\_03EN} (default =1) to 0 modifies the output states to mimic the operation of LUCID/LUCI PM weight indicators using only two outputs. Normal operation might be further altered by use of the \texttt{OPAL} parameter, see later.

\texttt{SEtd\_00 -- Pass/Fail checkweighing -- \texttt{High} and \texttt{Louu} limits are individually set as required}

\begin{tabular}{|c|c|c|c|c|c|}
\hline
\text{Weight} & OP1 & OP2 & OP3 & Status Byte & Display Status & Meaning \\
\hline
$/>/ \text{High}$ & ON & OFF & Not Used & F & F & Out of Tolerance/Fail \\
$>/ \text{Louu}$ & OFF & ON & Not Used & P & P & In Tolerance/Pass \\
$>/ \text{Spt1}$ & ON & OFF & Not Used & F & F & Out of Tolerance/Fail \\
\text{Zero} & OFF & OFF & Not Used & Z & & Near Zero \\
\hline
\end{tabular}
Setd 02 -- Low/Pass/High check weighing - High and Low limits are individually set as required

<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>=/&gt; High</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>&gt; Low</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>P</td>
<td>P</td>
<td>In Tolerance/Pass</td>
</tr>
<tr>
<td>&gt; Spt1</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>L</td>
<td>L</td>
<td>Out of Tolerance/Low</td>
</tr>
<tr>
<td>Zero</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>Z</td>
<td></td>
<td>Near Zero</td>
</tr>
</tbody>
</table>

Setd 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 Byte</th>
<th>Display Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>=/&gt;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>&gt; 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>&gt; Spt1</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>L</td>
<td>L</td>
<td>Out of Tolerance/Low</td>
</tr>
<tr>
<td>Zero</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>Z</td>
<td></td>
<td>Near Zero</td>
</tr>
</tbody>
</table>

Setd 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 Byte</th>
<th>Display Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>=/&gt;Targ + Tol % of targ</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>&gt; Targ - Tol % of targ</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>P</td>
<td>P</td>
<td>In Tolerance/Pass</td>
</tr>
<tr>
<td>&gt; Spt1</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>L</td>
<td>L</td>
<td>Out of Tolerance/Low</td>
</tr>
<tr>
<td>Zero</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>Z</td>
<td></td>
<td>Near Zero</td>
</tr>
</tbody>
</table>

Setd 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).
4.5 Batchweighing - Setpoint Mode 01

**In_oUt SETp 01 ~ Batching Control**

**SEtd 01** 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**

- Setd =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**

- **CodE** selects Material PRODUCT CODE (01 - 12).
  The following are stored separately for each code.
  - tArg (Setpoint 3) desired Final TARGET Weight.
  - dRib (Setpoint 2) the DRIBBLE (line) FEED Quantity (amount before target)
  - SPt1 (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.
  - PtoL (Print Tolerance) limits for printing (Requires use of Pr_CFG TOLP Auto etc - see later)
  - Jogt (Jog Time) On Period for Jog mS (Requires use of Pr_CFG TOLP Auto etc - see later)
  - ofiI Overfill offset for cut off and inflight calculations – (range 0-255e)
  - SaMP (Sample final achieved weight every nn) For all other batches, skips checks/print etc at batch end.

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

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

**Samp**
Enables some weighments to be immediately discharged on cut-off without tolerance checks, printing or auto inflight compensation. The samp 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**
**ToLP**
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 Setd 01 or 07 then tolerance check will be +/- the PtoL value of the targ (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 Setd 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 toLP. If ON then the tolerance check will be + PtoL of targ. This restricts the scope of PtoL such that the 'Ready to Print' flag will only be set when within the positive tolerance. Note that tolp must be ON for this to be effective.

**Auto Menu**
**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.

**In_out Menu**
**oPAL**
Used to modify O/P functionality see Section 4.7.

**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.

**Jogt**
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 /tolp /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” - IPAL0x
  - 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.

q BULK FEED  
- Output 1 (Bulk) and Output 2 (Dribble) operate \( \text{(b status character)} \)
  - Output remains on until the the weight exceeds the bulk feed cut-off point-
  - BULK FEED CUT-OFF = (TARGET - DRIBBLE - 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.

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

q CUT-OFF – occurs

- If a Non-Sampled weighment go to Batch Complete below.
- If Calm timeout is awaited busy displays.
  - If Automatic In-flight Compensation Adjustment is selected AInf 1 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 jogt 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 Calm plus the period required for weight stabilisation and weight check.
  - If AUTOPRINT mode is NOT selected (Auto 0 in Pr_CFG), 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.

If ‘Auto Tare on Start’ enabled and IP 1 (start) is on, will start looking for stability here
q **BATCH COMPLETE** (E status character)
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.

q 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**
q If not required, it is preferable to disable the analogue output when batchweighing in order to achieve best ‘cutoff’ accuracy in high-speed applications (**AnEn 0 in Eng_CFG**). Default is disabled.
q **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 **IPAL** parameter in **In_OUt_** is a two-digit parameter; the first selects input 1 action; the second (least significant) selects input 2 action.

<table>
<thead>
<tr>
<th>‘IPAL’</th>
<th>&lt;i/p1&gt;</th>
<th>&lt;i/p2&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>start batch</td>
<td>0 = start batch</td>
</tr>
<tr>
<td>1</td>
<td>hold batch (after fill)</td>
<td>1 = stop batch</td>
</tr>
<tr>
<td>2</td>
<td>acquire tare (default)</td>
<td>2 = acquire tare</td>
</tr>
<tr>
<td>3</td>
<td>toggle tare (acquire if in Gross)</td>
<td>3 = cancel tare (default)</td>
</tr>
<tr>
<td>4</td>
<td>print (cancel if in Net)</td>
<td>4 = print</td>
</tr>
<tr>
<td>5</td>
<td>set zero</td>
<td>5 = set zero</td>
</tr>
<tr>
<td>6</td>
<td>display gross</td>
<td>6 = display gross</td>
</tr>
<tr>
<td>7</td>
<td>send/display totalised net wt. *</td>
<td>7 = send/display totalised net wt. *</td>
</tr>
<tr>
<td>8</td>
<td>print/clear totalised wt. *</td>
<td>8 = print/clear totalised wt. *</td>
</tr>
<tr>
<td>9</td>
<td>print, don’t clear, totalised wt. *</td>
<td>9 = re-configure i/p2 as output 3*</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 **rmd S** parameter in **SERIAL_L** is set in each unit according to the list in Section 5.2.

### 4.7 Control O/P and Printout Assignment

The **oPAL** parameter in **In_OUt_** 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>OUTPUT 1</td>
<td>Comparator Mode</td>
<td>OUTPUT 1 Comparator Mode*</td>
<td>Status Mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTPUT 2</td>
<td>Comparator Mode*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTPUT 3</td>
<td>Comparator Mode*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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 07**.

Outputs operate as described in Setpoint Mode descriptions (see 4.3 and 4.4), but may be customised using th ese 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.

q **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.

<table>
<thead>
<tr>
<th>Digits 3, 5, 7</th>
<th>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.</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 releases (i.e. failsafe) on Alarm condition*.</td>
</tr>
<tr>
<td>4</td>
<td>Output operates when Negative and in Net mode.</td>
</tr>
<tr>
<td>5</td>
<td>Output operates on Negative Gross.</td>
</tr>
<tr>
<td>6</td>
<td>Output releases (i.e. failsafe) when weight Out of Range.</td>
</tr>
<tr>
<td>7</td>
<td>Output operates on Gross Zero (follows ZERO indicator).</td>
</tr>
<tr>
<td>8</td>
<td>Output operates on Gross mode (follows GROSS indicator).</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>
</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**

<table>
<thead>
<tr>
<th>o P A L</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 00 0C</td>
</tr>
<tr>
<td>00 00 0A</td>
</tr>
<tr>
<td>10 08 20</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>20 00 0C</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>80 00 00</td>
</tr>
<tr>
<td>00 00 04</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
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 Add nn

The sample size on the pan can now be entered as follows

- The O when pressed increments the units, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0 but does NOT carry over.
- The U key increments the tens similarly, 10, 20, 30 etc.
- E.g. to enter 32 press òòòññ

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 Add 0 0 returns to weighing but leaves Count mode re-enterable.

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 U increments the ‘tens’ sample number digit
  - Pressing ò 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 Add 0 0 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, it’s 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 weight.
- Select Count (or USEr _) 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 ò to show Add 0 0 then ENTER.
- Alternatively, select CnEn 0 0 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 ConUn_ MENU. It may be in the range 0.1000 to 10.0000.

- To enable conversion mode, select ConS 1 in ConUn_ 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, EngCFG_ AEn must be set to ‘1’ to enable the AnALog_ menu.

The output can be 4-20mA (up to 500Ω) or 0-10V by setting parameter 4-20 to 1 or 0 in the AnALog_ 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 AnALog_ menu.

To calibrate Zero output, select ZAdj press MODE then use ÚÔ 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 gAln 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 theErr parameter. Note: The output may pass beyond 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 $r\_en\_eng\_cfg$ 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 **rate 1** in the **analog** 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

q 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 (Flash Electronic Tally Record).

q In it’s simplest application, a string of status and current weight information might be transmitted (without handshake) every time the display is updated (default; every 300ms).

q 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.

q All of the parameters available on the CPI are available via the Serial Interface.

q 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:

- **bAund**
  Baud rate (01=19200Bd, 02=2400Bd, 04=4800Bd, 09=9600Bd - Default)

- **Prt y**
  Parity/bits (00 = 8+none (Default), 01 = 7+odd, 02 = 7+even, 09 = 8+odd, 0A = 8+even)

- **h232**
  (rev C)
  1=RS232, 0=RS485 ; RS485 for use on Multi-drop networks.

- **485E**
  (rev D+)
  0=RS232, 1=RS485 ; RS485 for use on Multi-drop networks.

Note - On some versions baud rate changes are not permanently stored until forced to store by change of additional items. If no ‘stored’ message seen, then force store by changing another parameter.

Weight Data Format control parameters

- **Cr LF**
  1 appends a line feed to a carriage return (default 1, on : Cr = CrLf).

- **ECHo**
  1 echoes received characters (default ‘1’)(Multi-drop mode forces Echo 0 off).

- **no d P**
  1 removes embedded dec. point from weight data (default ‘0’ d.p. embedded).

- **CHSU**
  1 appends a checksum byte to data (default ‘0’ gives no checksum).

- **no S t**
  1 removes status bytes from weight data (default ‘0’ embeds status bytes).

- **Ldg z**
  (from PO6_x32)
  spaces in weight string bytes are replaced by zeros (default ‘0’ = spaces).

- **S tr g**
  1 sets serial string format (SG1 or O – see 5.3).

- **S ing**
  1 weight data transmitted on request only (default ‘0’ gives continuous output).

- **C t r L**
  Allows up to 4 Hex Control Bytes to prefix the standard weight data string. (Default **C tr L = 0 0 0 0 0 0** 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>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>PM</td>
<td>Last printed Semi Auto Tare weight</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>ST1</td>
<td>Start Batch</td>
</tr>
<tr>
<td>WE1</td>
<td>Write data to eeprom from ram</td>
</tr>
<tr>
<td>XG</td>
<td>Request gross</td>
</tr>
<tr>
<td>XN</td>
<td>Request net</td>
</tr>
<tr>
<td>XT</td>
<td>Request semi-auto tare value</td>
</tr>
<tr>
<td>ST</td>
<td>Start Batch</td>
</tr>
<tr>
<td>MO</td>
<td>Toggle net/tare/gross weight (= MODE)</td>
</tr>
<tr>
<td>ET0</td>
<td>Deselect x10 weight mode</td>
</tr>
<tr>
<td>PG</td>
<td>Last printed Gross weight</td>
</tr>
<tr>
<td>PN</td>
<td>Last printed Net weight</td>
</tr>
<tr>
<td>PM</td>
<td>Last printed Semi Auto Tare weight</td>
</tr>
<tr>
<td>SW</td>
<td>Read internal Pushbutton</td>
</tr>
<tr>
<td>*</td>
<td>Command list dump</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.

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5.3 Serial Interface Weight Data Format

The serial interface can be set to continuously transmit (Sing 0) a weight string each time the weight display is updated (default ~300ms) or on request only (Sing 1) - request command WT

( Same formats apply for request gross XG, net XN and semi-auto tare XT)

There are two string formats, selected by parameter Strg or command SG0/SG1. Each has elements that are subject to other parameter settings.

The default SG0 weight string:

<table>
<thead>
<tr>
<th>xxh</th>
<th>0xh</th>
<th>xxh</th>
<th>xxh</th>
<th>S</th>
<th>G</th>
<th>D</th>
<th>B</th>
<th>Θ</th>
<th>Θ 123.45</th>
<th>Θ</th>
<th>kg</th>
<th>x</th>
<th>c</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
</table>

Multi-drop Address (if NET=1)
Character 00-FF hex Default = 1C

Upto 4 Prefix Characters (01-FF hex) set by CTRL parameter

Status 1 Stability
S = Stable  M = Motion

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

Status 3 subject to In_Out Setpoint Mode
Set d 1  Set d  2, 4, 5, 6
B Bulk  Z   Near Zero
D Dribble  L/F Low/Fail
E Discharge  H/F High/Fail
S Waiting Start  P  Pass
Set d 03/07(default) see Note 3

Status 4 Print 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
See Note 4

Notes

1. Θ = Space (20h)  From PO6, x33
   If LDGZ =1 Θ = Zero (30h)

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  0  0  1  03 02 01  i2  i1
   1 = Off or No Input

4. Printable Status Notes
   • M (motion) takes priority until printed, P then takes priority until reset
   • H will over-rule P but not M
   • BIT 7 set if NET is negative(+80h); BIT 5 set if GROSS is negative(+20h)
     (In GROSS MODE, net = gross, thus BIT 7 & 5 are set)
   • B & G appear subject to nnI MW & NE GP (NP) parameters
   • When Z set, print may or may not be permitted subject to nnI MW
   • When P set, printing may be permitted by PNTU (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 SG1 weight string

If SG1 command is sent to CSW-20 via the serial port, the following weight data format is available. Can also be set by STRG =1 in serial menu.

<table>
<thead>
<tr>
<th>xxh</th>
<th>R</th>
<th>Ø12345</th>
<th>Ø</th>
<th>xxh</th>
<th>Ø Ø1234</th>
<th>Ø</th>
<th>&lt;</th>
<th>c</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
</table>

Multi-drop Address (if NET =1)
Character 00-FF hex: Default = 1C

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
Ø = leading spaces/zeros see Note 1
No decimal point
In Part Count Mode = Net Weight

Checksum:
Modulo 128-Bit sum of all preceding characters.
MSB always set if 8-Bit data only

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
Padded with leading spaces, no dp or (from PO6_x33) zeros if set by LDGZ =1
In Part Count Mode = Net Weight

CR carriage return (0Dh)

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 set if NET is negative (+80H); BIT 5 set if GROSS is negative (+20H)
  (In GROSS MODE, net = gross, thus BIT 7 & 5 are set)
• B & G appear subject to nnln(MW) & nEnP (NP) parameters
• When Z set, print may or may not be permitted subject to nnln(MW)
• When P set, printing may be permitted by PNTU (PU) parameter

5. 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
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).

**Set to force multi-drop mode (‘0’, non multi-drop is default).**

**Set so weight data on request only**

Sets the multi-drop address this unit responds to (00–FF(h) 2 Digit Hex).

Sets 0 for RS485 (1 = RS232)

or

Set 1 for RS485 (0=RS232)

RS232 can be used for addressed communications, but not multidrop)

---

Use not recommended below baud rate 9600.

Maximun 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.

- **bA**d 00 = output via serial, 01 = 19200, 02 = 2400Bd, 04 = 4800Bd, 09 = 9600Bd, 10 = disable
  (Revised at PO6.032/132) Default 02 = 2400

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

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

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

- **E o L d** 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** 1 Enables Printing when below Minimum weight
  (Minimum = 20 divisions ‘20e’ Except See 5E ? below)

- **Neg P** 1 Enables Printout of a Negative Net weight (e.g. Print ‘lost’ weight). -ve Gross never allowed.

- **Chg E** 1 Enables Print on Weight Change of 20e - otherwise, weight must return to below 3e above zero before printing is re-enabled.

- **5 E ?** 1 Sets Minimum weight to 5e. See Nnin above.

- **tol p** 1 Restrict Printing to ‘In Tolerance’ conditions only

- **Post** 1 Further limit above to Positive Tolerance only, where applicable

The tolerance conditions depend on setpoint mode that is in operation
For Setd = 00,02,04,05,06 In Tolerance is when the ‘PASS’ Condition is met
For Setd = 01 & 07 In Tolerance is when weight is within +/- pTOL about SPT3 / Target

- **c a l m** Batch Mode Calm Timer 01-99 x 0.1 sec.

- **Auto** 1 Enable Autoprint mode - automatically prints when conditions satisfied and the weight becomes stable - e.g. if nini n , nE g P and CH g E are 0, a print would occur when weight stabilises above ‘20e’ after returning to zero

Also – located in the Engcfg menu

- **PNTU** 1 Unconditional Print - overrides print interlocks for weight change between prints
  (except in Setpoint mode 01 – Batching mode).

- **Live** 1 Activates auto filter acquisition on Print (ie for Animal Weighing)
5.6 Print Formatting ~ Pr Frm Menu

Formatting Print Content
The print format is constructed as follows:

q Up to 14 items of data may be printed in any sequence.
q Parameter Pr Frm specifies the first 7 items to print, q f o r specifies the next 7 items
q Each digit (range 0-9,A-F) selects a different ‘Data Type’ – See next page
q Items to be printed must be set as ‘most significant digits’, a type 0 terminates the print file (unless leading spaces are associated).
q Parameters P S P & q s p set corresponding leading spaces for each item
q Parameters P cr & q 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)
q Some ‘data types’ 2, 3, B, and C are text strings that can be pre-programmed using parameters S t 1 A / S t 1 b & S t 2 A / S t 2 b (see section 3.8)
q Each PRODUCT Cod E 01 to 12 recalls a different set of text strings
   Data type 2 prints the S t 1 A / S t 1 b string for the currently selected product code
   Data type 3 prints the S t 2 A / S t 2 b string for the currently selected product code
q Separate text strings can also be programmed with PRODUCT Cod E set to 99
   Data type B prints code 99 S t 1 A / S t 1 b string regardless of the selected product code
   Data type C prints code 99 S t 2 A / S t 2 b string regardless of the selected product code
q Each string is up to 14 characters (first 7 set by S t x A , next 7 set by S t x b ) Each part of the string can be shortened with an end of string (EOS) terminator character. (The EOS character is ascii 1Fh ~ looks like ‘Ÿ ’). Control characters may also be included; see 3.8.

Format Control Parameters

head
  1= Enable Column Mode Printing (Default 0= standard mode)

Form
  0 - 99 No. of lines to print before sending C TR F control string, see below
  (00 = never send, 99 = send at end of every print)

C t r f
  Hex Control String appended to Print subject to F or m setting above.

C t r L
  Hex Control String prefixing entire print or each line subject to L in E setting below
  Special case – setting x xx xx EF cuts off the print ‘Header Labels’.

C t r m
  Hex Control String placed in middle of each line if L in e =1
  Allows for example ‘Gross’ in standard chrs and ‘123.4kg’ in double width

L i n E
  0= c t r L String only sent once before complete print out
  1= c t r L String sent before each line and C t r m string sent midline

q 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
q 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 P S P / Q S P</td>
<td></td>
</tr>
<tr>
<td>1 Product Code</td>
<td>Currently selected Co de Number</td>
<td>Product Ref.</td>
</tr>
<tr>
<td>2 Text String 1A/1B</td>
<td>st 1A/st 1b for current Product code</td>
<td>Product 1</td>
</tr>
<tr>
<td>3 Text String 2A/2B</td>
<td>st 2a/st 2b for current Product code</td>
<td>Description 1</td>
</tr>
<tr>
<td>4 Date</td>
<td>Current Date – set by d a t e in user menu</td>
<td>d d / mm/ y y</td>
</tr>
<tr>
<td>5 Time</td>
<td>Current Time – set by t i m e in user menu</td>
<td>h h : m m</td>
</tr>
<tr>
<td>6 Running Number</td>
<td>Running in user menu, auto increments on Print</td>
<td>Running No.</td>
</tr>
<tr>
<td>7 Numeric ID Code</td>
<td>d n t in user menu</td>
<td>Code</td>
</tr>
<tr>
<td>8 Gross Weight</td>
<td></td>
<td>Gross xxxxx.x kg</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.x kg</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 CTRL = xx xx EF

### Default Print Format

<table>
<thead>
<tr>
<th>P f o r</th>
<th>5 4 9 0 0 0 0 0 0</th>
<th>Q f o r</th>
<th>0 0 0 0 0 0 0 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>P s p</td>
<td>0 0 0 0 0 0 0 0 0</td>
<td>Q s p</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>P c r</td>
<td>1 1 1 0 0 0 0 0 0</td>
<td>Q c r</td>
<td>0 0 0 0 0 0 0 0 0</td>
</tr>
</tbody>
</table>

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

- **Time**: h h : m m
- **Date**: d d / mm/ y y
- **Net**: xxx.x xx kg

### Formatting Example:

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

<table>
<thead>
<tr>
<th>P f o r</th>
<th>B C 4 7 2 8 D</th>
<th>Q f o r</th>
<th>9 3 0 0 0 0 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>P s p</td>
<td>8 6 0 0 5 0 0 0</td>
<td>Q s p</td>
<td>0 6 0 0 0 0 0 0 0</td>
</tr>
<tr>
<td>P c r</td>
<td>1 2 1 2 1 1 1 1</td>
<td>Q c r</td>
<td>1 2 0 0 0 0 0 0 0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>St1A/St1B string for Code 99</td>
</tr>
<tr>
<td>C</td>
<td>St2A/St2B string for Code 99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>dd/mm/yy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>1234567</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gross</th>
<th>xx.xkg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semi-Auto Tare</th>
<th>xx.xkg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>7</th>
</tr>
</thead>
</table>

Column Print Example:
- Usually used with 80 column printers, to print data in columns set **HEAd** in **Pr For**.
- **Pfor** 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** can be used to adjust spacing across the page. **Pcr** are ignored.
- The number of lines to print on a page might be controlled by the printer's own settings or the **Form** 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>Time</th>
<th>Running No.</th>
<th>Code</th>
<th>Gross</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>21:02</td>
<td>3391502</td>
<td>7654321</td>
<td>12.567kg</td>
<td>9.230kg</td>
</tr>
<tr>
<td>21:05</td>
<td>3391503</td>
<td>7654321</td>
<td>12.569kg</td>
<td>9.232kg</td>
</tr>
<tr>
<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 **Totals** menu or remote inputs.
- In the menu, **Ptot** prints totals without clearing, **clrt** 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 **clrt** option requires level 1 access, hence the correct password must be entered to the **PASS** prompt when entering the **Totals** 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 **tFor/UFor**, **tSP/USP**, **tCr/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>Serial rmds 10</td>
<td>Serial rmds 80</td>
</tr>
<tr>
<td></td>
<td>Serial baud</td>
<td>Serial baud</td>
</tr>
<tr>
<td></td>
<td>Serial Prty</td>
<td>Serial Prty</td>
</tr>
<tr>
<td>Printer Port</td>
<td>Serial rmds 20</td>
<td>Serial rmds 80</td>
</tr>
<tr>
<td></td>
<td>Pr_cfg baud</td>
<td>Serial baud</td>
</tr>
<tr>
<td></td>
<td>Pr_cfg Prty</td>
<td>Serial Prty</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 Serial rmds 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>

Note
If using the printer port for any continuous transmission, then always set the SERIAL BAUD rate less than or equal to the PRINTER BAUD rate.
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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>??</td>
<td>Entered parameter out of allowed range.</td>
</tr>
<tr>
<td>C?</td>
<td>Command or parameter value not permitted under current access level (Usually re-interpreted as no PASS).</td>
</tr>
<tr>
<td>D?</td>
<td>Start of calibration deadload acquisition at each PGA setting.</td>
</tr>
</tbody>
</table>

In response to a d E A d  calibrate deadload command

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

In response to a C A L  or C A L A t  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 (‘t0P’), 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abort</td>
<td>Do you wish to abort this calibration, forgetting all alterations? ENTER or 0 to confirm else back to calibrate.</td>
</tr>
<tr>
<td>ACCESS n</td>
<td>Displays ACCESS LEVEL achieved on entry to MENU (n = 0-3).</td>
</tr>
<tr>
<td>Add nn</td>
<td>Place requested number of sample parts on weighpan and press ENTER. Else press 0 to alter sample number or ‘CAnCEL’.</td>
</tr>
<tr>
<td>BUSY</td>
<td>Awaiting ‘CALm’ timeout or Flashcard is busy (please wait).</td>
</tr>
<tr>
<td>CLEAr n</td>
<td>Flashcard clearing in progress. ‘n’ indicates progress.</td>
</tr>
<tr>
<td>FLASh</td>
<td>Flashcard transaction in progress (please wait).</td>
</tr>
<tr>
<td>NEg</td>
<td>Print/store inhibited - Print disallowed when weight is negative.</td>
</tr>
<tr>
<td>No nE</td>
<td>Selected flashcard location has been erased.</td>
</tr>
<tr>
<td>No PASS</td>
<td>Access denied; enter password or operate internal button (if authorised).</td>
</tr>
<tr>
<td>PASS</td>
<td>Enter Password (or press MODE to skip). ‘.’ ‘ ’ indicates current digit entry position.</td>
</tr>
<tr>
<td>PrInt</td>
<td>Printing in progress.</td>
</tr>
<tr>
<td>PSHbUt</td>
<td>Press Internal (S1) pushbutton (or press MODE to skip).</td>
</tr>
<tr>
<td>REAd E</td>
<td>Parameters read from permanent to working memory.</td>
</tr>
<tr>
<td>SNDIng</td>
<td>Flashcard dump to printer in progress (please wait).</td>
</tr>
<tr>
<td>Sot r E d</td>
<td>Newly edited parameter written to permanent memory store.</td>
</tr>
<tr>
<td>SUr E ?</td>
<td>Do you wish to accept this calibration? ENTER or 0 if so, else back to calibrate.</td>
</tr>
<tr>
<td>To o Lo</td>
<td>Print/store inhibited - Net Weight is below Minimum.</td>
</tr>
<tr>
<td>UnLoAd</td>
<td>Print/store inhibited - change in weight since last print is too small.</td>
</tr>
<tr>
<td>UnUSEd</td>
<td>Flashcard location with nothing yet stored.</td>
</tr>
</tbody>
</table>
### DIAGNOSTIC MESSAGES - Some require service assistance.

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</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>BttS?</td>
<td>Keyboard fail ~ shorted tracks ... service required.</td>
</tr>
<tr>
<td>CCCCC</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>CLoCt?</td>
<td>Failure to Read or Write to Clock - Service required.</td>
</tr>
</tbody>
</table>
| DEFAULn| Waiting to load default parameters. 

- `n` (0.1 or 2) indicates default level. Internal pushbutton initiates loading. |
| DIAg n| System Error... service required.                                                            |
| Dog? | Watchdog failure...service required.                                                         |
| DroPoUt| Battery low or power failure.                                                               |
| EEPROM?| EEPROM checksum failure ~ corrupted information. Attempt to reload defaults.                |
| I2Cr| Failure to read (write) from (to) Clock/RAM or EEPROM ... service required.                 |
| oUt toL| Out of printable range in batch mode.                                                       |
| r om?| Program ROM checksum failure ... service required.                                           |
| FAULTY n| 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 |
| F CALn| Span calibration in progress ~ part of calibration ('n' indicates progress).                  |
| StACK| System error.....Service required                                                          |
| EEProm?| Power failed while backing up new parameter (possible corruption). O allows resumption (check last entered data). Internal S1 pushbutton forces a default 2 reset |
| EEProm?| Potentially fatal error in stored parameters ~ use Internal S1 pushbutton to force default 2 reset ~ all user data will be lost. |
| EEPromF| Failure to correctly verify parameter written to EEPROM...service required.                  |
| CLoCk? n| Failure to read/write to Clock/RAM ... service required (n='w' write fail, ='r' read fail |
| dEAdn| Deadload calibration in progress ~ part of calibration (rotating zero in MSD).               |
| FLASH?| Awaiting Flashcard initialisation, please wait. If **FLASH? e /0 /S** consult factory for assistance |
| F CALn| As dEAd msd F is rotating zero 1 ✗                                                        |
| Lo-bAt| Clock/RAM failed to hold data while power down...service required.                           |
| Not CAL| Not yet calibrated. Perform a calibration.                                                   |
| PASS n| n='S' Serial loop-back passed  “P” Printer loop-back passed  “C” Control loop passed           |
| r FAIL| Ram failure ... service required.                                                            |

**Also, during warm-up**

<table>
<thead>
<tr>
<th>NI</th>
<th>Software revision number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2345</td>
<td></td>
</tr>
<tr>
<td>tAn</td>
<td>Traceable Access Number (number of changes performed at ACCESS LEVEL 2; typically shows number of calibration procedures performed)</td>
</tr>
</tbody>
</table>

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Revision B - Page Issue 008 Software Release PO6_035/135
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.
- Superior 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.

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>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>7 Red LED digits 14mm</td>
</tr>
<tr>
<td>Front Panel</td>
<td>Membrane with tactile metal domes, Beep response, 5 button operation.</td>
</tr>
<tr>
<td>Annunciators</td>
<td>4 LEDS (Motion/Zero/Net/Gross)</td>
</tr>
<tr>
<td>Internal Resolution, counts</td>
<td>24 bit ADC (1:18,777,215)</td>
</tr>
<tr>
<td>Maximum Display Resolution (trade)</td>
<td>10,000 divisions</td>
</tr>
<tr>
<td>Maximum Display Resolution (non-trade)</td>
<td>500,000 (x10 test mode)</td>
</tr>
<tr>
<td>EC Approvals OIML Class III + IIII s</td>
<td>certificate NWML UR2677</td>
</tr>
<tr>
<td>Input Signal Range</td>
<td>mV/V 6.5 – 6.5</td>
</tr>
<tr>
<td>Zero Offset Range</td>
<td>% 100% of Input Signal Range</td>
</tr>
<tr>
<td>ADC Conversion Rate</td>
<td>Hz 50 (25/100)</td>
</tr>
<tr>
<td>Linearity error</td>
<td>%/FS &lt; ± 0.0015% (± digital correction)</td>
</tr>
<tr>
<td>Differential non linearity</td>
<td>± 0.5 LSB</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>ppm/°C 1.6</td>
</tr>
<tr>
<td>Zero temperature coefficient</td>
<td>nV/°C &lt; 0.005</td>
</tr>
<tr>
<td>Power consumption (typical)</td>
<td>W 5-10</td>
</tr>
<tr>
<td>Common Mode Rejection (@900Hz)</td>
<td>dB 120</td>
</tr>
<tr>
<td>Power Supply Rejection (@900Hz)</td>
<td>dB 120</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>V 12-28Vdc</td>
</tr>
<tr>
<td>Weight</td>
<td>kg 2.5kg (shipping 2.9kg)</td>
</tr>
</tbody>
</table>

**Transducer Input Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transducer type (4 or 6 wire)</td>
<td>Resistive, full bridge</td>
</tr>
<tr>
<td>Transducer input resistance</td>
<td>Ω min 432 (up to 8 x 350Ω cells)</td>
</tr>
<tr>
<td>Excitation voltage</td>
<td>Vdc 5 (nominal)</td>
</tr>
<tr>
<td>Minimum signal requirement (approved)</td>
<td>mV/e 1</td>
</tr>
<tr>
<td>Minimum signal requirement (non-approved)</td>
<td>mV/e 0.1</td>
</tr>
<tr>
<td>Input impedance</td>
<td>MΩ ≤ 20 (sense and signal)</td>
</tr>
</tbody>
</table>

**Serial Communication**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Ports</td>
<td>1.Comms RS232 or RS485</td>
</tr>
<tr>
<td></td>
<td>2. Printer port RS232 (TX/Busy)</td>
</tr>
<tr>
<td>Baud rate</td>
<td>bits/sec 2400, 4800, 9600, 19200, 38400</td>
</tr>
<tr>
<td>Protocol</td>
<td>7/8 data bits, odd/even/no parity, 1/2 stop bits</td>
</tr>
<tr>
<td>Maximum continuous data Rate (test mode)</td>
<td>Hz 50</td>
</tr>
<tr>
<td>Communication protocol</td>
<td>Ascii or ModBus*</td>
</tr>
</tbody>
</table>

**Environmental**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>°C -10 → 40</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>°C -10 → 70</td>
</tr>
<tr>
<td>EMC Immunity/Emissions</td>
<td>EN45501, EN50082-2</td>
</tr>
<tr>
<td>Sealing</td>
<td>IP54 front panel</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Panel mount DIN standard 43700</td>
</tr>
</tbody>
</table>

**I/O**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue output* 0-10V or 4-20ma</td>
<td>15 bit (adjustable range)</td>
</tr>
<tr>
<td></td>
<td>Max drive load for 4-20mA:</td>
</tr>
<tr>
<td></td>
<td>500Ω (active)/1200Ω (passive)</td>
</tr>
<tr>
<td>Inputs</td>
<td>2 (4*) Opto coupled inputs</td>
</tr>
<tr>
<td></td>
<td>&lt;6V off, &gt;10–30V on (Supply rail on board)</td>
</tr>
<tr>
<td>Outputs</td>
<td>3 (5*) Darlington type transistor</td>
</tr>
<tr>
<td></td>
<td>Max OFF voltage 27V:</td>
</tr>
<tr>
<td></td>
<td>Max ON current 60mA</td>
</tr>
<tr>
<td></td>
<td>Leakage &lt;0.1mA Switched + or -</td>
</tr>
</tbody>
</table>

* 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 ZERO and g AIn 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 Ad CI A then mEm I in Eng CFg . 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, d Ed F, 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 dSp, t o P 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 d ed f c alf zero and z off
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 dead
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

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

**UO**
- Selects PARAMETER DISPLAY MODE
- Step UP and DOWN the columns

**ENTER**
- Steps back to MAIN, then back to WEIGHING (Returns Access Level to 0)
- Steps back to MAIN, then back to WEIGHING (Retains Access Level)

### FLASH menu only displays if option installed and enabled
See separate application note

#### Nomenclature - Example:

<table>
<thead>
<tr>
<th>Menu:</th>
<th>Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>disp</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>System configuration parameter and default setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Level</td>
<td>Required to alter parameter values see section 3.3.</td>
</tr>
<tr>
<td>Serial Command</td>
<td>2 letter serial command for the advanced user or 'Systems Integrator'</td>
</tr>
<tr>
<td>Description</td>
<td>Brief description for more advanced explanation refer to section manual</td>
</tr>
</tbody>
</table>

### Mode Table

<table>
<thead>
<tr>
<th>Mode Value</th>
<th>Setd 01</th>
<th>Setd 02-06</th>
<th>Setd 03-07</th>
<th>Setd 04-05-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint 1</td>
<td>Spt 1</td>
<td>Spt 1</td>
<td>Spt 1</td>
<td>Spt 1</td>
</tr>
<tr>
<td>Setpoint 2</td>
<td>dr bl</td>
<td>l ouu</td>
<td>Spt 2</td>
<td>Tol</td>
</tr>
<tr>
<td>Setpoint 3</td>
<td>tar g</td>
<td>h ig h</td>
<td>Spt 3</td>
<td>tar g</td>
</tr>
</tbody>
</table>

### Setpoint Prompts – Setpoint Mode as set in in_out_menu

<table>
<thead>
<tr>
<th>Setpoint Value</th>
<th>Setd 01</th>
<th>Setd 02-06</th>
<th>Setd 03-07</th>
<th>Setd 04-05-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint 1</td>
<td>Spt 1</td>
<td>Spt 1</td>
<td>Spt 1</td>
<td>Spt 1</td>
</tr>
<tr>
<td>Setpoint 2</td>
<td>dr bl</td>
<td>l ouu</td>
<td>Spt 2</td>
<td>Tol</td>
</tr>
<tr>
<td>Setpoint 3</td>
<td>tar g</td>
<td>h ig h</td>
<td>Spt 3</td>
<td>tar g</td>
</tr>
</tbody>
</table>
The Full Menus reveal only when Access Level is 1 or 2.

At PASS prompt:  For level 1 : Ô ENTER
For level 2 : Ü Ü Ü ENTER
The Full Menus reveal only when Access Level is 1 or 2.

At PASS prompt: For level 1: **ENTER**
For level 2: **Ü Ü Ü ENTER**
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><strong>P1</strong></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 - Signal</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>+ Signal - Signal</td>
<td>+ Signal</td>
</tr>
<tr>
<td>4</td>
<td>- Supply - Excite</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>- Sense - Sense</td>
<td>+ Sense</td>
</tr>
<tr>
<td>6</td>
<td>+ Sense + Sense</td>
<td>+ Sense</td>
</tr>
<tr>
<td>7</td>
<td>- Supply - Excite</td>
<td></td>
</tr>
<tr>
<td><strong>Calibration Switch Access Location</strong></td>
<td><strong>Calibration Switch Access Location</strong></td>
<td><strong>Calibration Switch Access Location</strong></td>
</tr>
<tr>
<td></td>
<td>P1</td>
<td>P1</td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td>DAC</td>
</tr>
<tr>
<td></td>
<td>P3</td>
<td>Serial Communications</td>
</tr>
<tr>
<td></td>
<td>P4</td>
<td>I/O</td>
</tr>
<tr>
<td><strong>Revision C baseboard</strong></td>
<td><strong>Revision E baseboard</strong></td>
<td><strong>Revision E baseboard</strong></td>
</tr>
<tr>
<td></td>
<td><strong>(or earlier)</strong></td>
<td>Identified by REV E</td>
</tr>
<tr>
<td></td>
<td>Note: Firmware version prompted at power on will be PO6.0xx</td>
<td>printed on terminal connection label.</td>
</tr>
<tr>
<td></td>
<td>Revisions to the IFE1131 baseboard mean that the I/O terminal positions on P4 connector are different to earlier revisions, not directly interchangeable.</td>
<td>All revision E baseboards will be fitted with a 'polarising' pin and a mating connector.</td>
</tr>
</tbody>
</table>
| | Note: Firmware version prompted at power on will be PO6.1xx | Note: Firmware version prompted at power on will be PO6.1xx | }

**Revision E baseboard**

**Revision C baseboard**

**Revision E baseboard**

**Revision C baseboard**

**Revision E baseboard**