CSW-20 Flash ETR Application Note

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L I M I T E D

Overview

In essence, a computer & software, connected to an approved weighing instrument that is 'used for trade purposes', will generally, either require its own approval or must ensure weight results are traceable to records maintained on the approved equipment.

This is a simplification of the requirements; more detailed information can be obtained from WELMEC guides on www.welmec.org

CSW-20 offers an Electronic Tally Record option, using flash memory, to provide the necessary store of 'alibi' weights. Without a doubt this is the simplest and quickest route to implementation of a computer linked weighing system for trade use.

Each time a computer asks to transact a 'legal' weight, the indicator ensures conditions are appropriate (for stability etc.), then stores the weight to flash memory and transmits it together with a reference number for the store location. As such any weight transacted in this way to the computer can subsequently be looked up and checked at the indicator.

The flash memory stores an enormous number of weight records (see Table 2). When eventually the memory fills, a small block of the oldest records is automatically cleared for storing to continue uninterrupted. The store references are seven digit numbers that run to greater than 9,000,000 before resetting to 0000000.

Description & Requirements

The 'Flash ETR' option can be applied on CSW-20 indicators fitted with baseboard PCB IFE1155 Revision E or later.

To check suitability, observe the program number displayed at power on. If program number displayed is PO6_1xx then the indicator will accept the option. (Firmware may require update)

Units displaying PO6_0xx contain earlier boards, which will not support the option.

The option is in the form of a small plug-in submodule (PCB IFE1232). If the module is not factory fitted and enabled, for firmware versions PO6.127 to 135, a secure enabling code, unique to the baseboard, is required. This must be entered into the flash enable parameter F L 5 H in the E n 9 _ C F 9 menu. From version PO6.136 the option may be enabled by simply setting F L 5 H =1 at level 2 access.

Flash memory
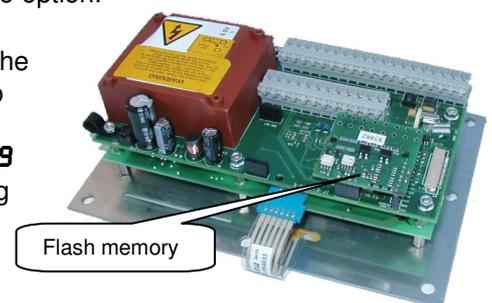
Configuration

Once the option is installed and enabled, a hidden F L A 5 H _ _ menu provides the following facilities

Table 1 - Flash Menu

FLA5H__		
parameter	command	description
r E A d	FR	to view stored records
d U Ξ P	FD	to transmit stored records to serial ports
Ξ o d E	FM	to select alternative operating modes

A choice of operating modes offer different formats, conditions and levels of storage.

Decide on the preferred mode of operation and fix it before commissioning the instrument.

Changes to Flash Mode require level 2 access.

The different modes are illustrated in the following table.

Internally all data is checksum protected to provide assurance of integrity of stored data. When stores are accessed, weights are only revealed if checksums prove ok. The internal checksum is not applied on the transmitted data packet. Integrity of transmitted data can be checked either by selecting a communication protocol with parity check and/or selecting the checksum option in the `SErIAL` menu.

Table 2 - Flash Modes

`FLASH` menu - `ƎodE` parameter (FM command) - level 2 access		
	Mode 0	**Mode 3**	**Mode 4**
Lucid Compatible	Yes (Gross weights only)	No	no
Operation	Gross mode only	Gross mode only	Net or gross mode Gross, Tare and Net weights all stored
No of Records*	131,072 (262,144*)	131,072 (262,144*)	65,536 (131,072*)
Data packet format	[ADDR] <STX> nnnnnnn <space> wwwwww0 <ETX> [CHK] <CR> [<LF>]	[ADDR] <STX> nnnnnnn <space> wwwwwwwuu <ETX> [CHK] <CR> [<LF>]	[ADDR] <STX> nnnnnnn <space> NNNNNNNuu <space><space> GGGGGGGuu <space><space> PPPPPPPuu <space><space> SSSSSSSuu <ETX> [CHK] <CR> [<LF>]
	nnnnnnn - 7 digit flash store reference number with leading zeros [ADDR] - address, only transmitted if in multidrop mode, `SErIAL_nEt` EM =1 (off by default) [CHK] - checksum, only transmitted if `SErIAL_CHSU` EC =1 (off by default) 8 bit sum of preceding characters EXCLUDING STX + Bit 7 marked [LF] - line feed chr transmitted if `SErIAL_CrLF` EL =1 (on by default) <STX> 02h <space> 20h <minus> 2Dh <ETX> 03h <CR> 0Dh <LF> 0Ah		
	FM0 weights are transmitted with - leading zeros - no decimal place - appended '0' as shown above Eg: 123.4kg sends as 0012340	FM3 & FM4 weights are transmitted with - leading zeros blanked (sent as spaces) - inc. decimal place - inc. units (uu) Eg: 123.4kg sends as 123.4kg	
			FM4 data: NNNNNNN=Net; GGGGGGG=Gross PPPPPPP=Preset Tare SSSSSSS=Semi-Auto Tare
*Number of records shown is for the standard option. Modules can also be produced for double storage capacity.		

NOTES
- Net weight transactions are permitted under Mode 4 only
- Negative weight transactions are not supported in any mode
- To permit transaction of weight below the minimum set `Pr_CFG   nnIn` (MW) =1
- By default weight is required to return to zero between transactions.
  To permit operation following only 20e shift between transactions set `Pr_CFG   CHGE` (FC) =1
  To permit operation with no interlock between transactions set `Pr_CFG   PntU` (PU) =1
- Operation is permitted in **TRADE MODE ONLY** and will accommodate all approved scale resolutions.

Operation

For general communication information consult the CSW-20 Operation Manual.

Connection to the indicator is through the 'serial' port

RS232 - terminals P3.9, P3.8, P3.7 or RS485 - terminals P3.7, P3.6, P3.5

Default line settings 9600,N,8,1. Communication is half duplex (Wait reply before next send). No handshake.

Transact & store to flash memory

Command **FS** (Flash Store)

When ready to transact weight, PC issues command to CSW-20:   **FS<CR>**
(46h 52h 0Dh)

The CSW-20 will respond with

EITHER   **Data Packet** containing flash store number and weight as in table above

OR   **Error Response** see below

Alternatively the PRINT button, remote print input or autoprint feature can all be used to trigger transmission of the data packet.

Note - Print command PR applies legacy Lucid ENQ/ACK protocol. Consult factory for advice if considering using this command.

Table 3 - Error Responses

ERROR RESPONSES	Display message	Description
?B	too Lo	Below Minimum Weight
?P	UnLoAd	Insufficient weight change since last store operation
?H	too HI	Above maximum weight (over-range)
?G	nEg	Negative weight
?T	oUt_toL	Out of tolerance
?M		In motion (Weight unstable)
??		Command not accepted (may be for various reasons)

View/Read from Memory   FLASH__ menu - rEAd parameter

Permits examination of the stored weight for any reference number on the indicator display.

Using Menus

- Access the rEAd parameter. If current reference number is less than 99 it will be seen at the right hand side. (Higher values will be seen when MODE is pressed)
- Press MODE
- This displays the current reference number with its right digit flashing.
- Edit using arrow keys to display the required reference number then press ENTER.
- The stored weight is now displayed with flashing annunciators, complete with sign and decimal place as displayed when the weight was recorded.
- With the stored weight displayed, other stores can be stepped through by pressing the up and down arrows. The transaction number is displayed while the key is pressed.
- In Mode 4 (FM4) operation, the additional weight fields can be examined by pressing the side arrow button.

Net LED flashing	Stored Net Weight
Gross LED flashing	Stored Gross Weight
Net and Gross LED flashing	Stored Preset Tare
Net and Gross and Set Zero LED flashing	Stored Semi auto tare

Serial command **FR** (Flash Recall) permits a computer to read stored weights.

- FR sent without a value returns next available Transaction Store Reference
- FRxxxxxxx returns weight from specified transaction store
- For Mode 4 the menu (or dump, see below) must be used to examine all weights.

<u>Transmit memory stores</u>   F L A S H _ _ **menu -** d U Ξ P **parameter**
                          Command **FD** (Flash Dump)

Permits transmission of report containing all or part of the stored data

- By default output is transmitted to the printer port. It can be redirected to the serial port by setting the printer port baud rate parameter to 0
  Commands - PW1 (for access level1), PV0(to redirect), PL1 (for CR&LF)

- Reports include Date, device (baseboard) serial number, flash mode and number of records capacity for the current configuration. It will also report any faulty (checksum) stores if applicable.

Using Menu

- Access the d U Ξ P   parameter. If current reference number is less than 99 it will be seen at the right hand side. (Higher values will be seen when MODE is pressed)
- Press MODE
- This displays the current reference number with its right digit flashing.
- Edit using arrow keys to display the required reference number from which the dump is to commence, then press ENTER to start transmission.

Using Serial Command

- FD sent without a value returns next available Transaction Store
- FDxxxxxxx initiates dump from specified store

- The dump range can be limited by setting the F o r Ξ parameter in the P r _ F o r menu to a value from 1-99 (Command FF). The dump will then only transmit the set number of records following the starting value selected. For default (FF=0), it transmits all records from specified start point to end of store.
- The dump can be aborted by pressing SEMI-AUTO TARE key
- When transmitting to the serial port, the transmission can be paused by sending any character, then BS (08h) to abort, or any other character to proceed. (i.e. XON/XOFF will control flow)

Example:

Electronic Tally Record
Device ID No. 1048576 Date 18/11/03
FM4   Net   Gross   Preset +Semi-Auto Tares 65,536 Stores
0000000   0.28kg   1.28kg   1.00kg   0.00kg
0000001   0.52kg   1.80kg   0.00kg   1.28kg
Terminated @ END
OK

Header information is not transmitted if multidrop communication (EM1) has been selected.

Diagnostics and Troubleshooting

During warm up tests at power on, if flash is enabled (FE1) the system detects and checks the installed flash memory.

If all ok displays brief message $FLASH?1$ or $FLASH?2$ depending on the hardware configuration.

If checks fail, the display will show error messages:

$FLASH?E$ store at current Transaction No. address is not erased

$FLASH?o$ current Transaction No. > Device capacity

$FLASH?S$ 1st device status failed

Check flash module is correctly installed

With error message displayed

Pressing MODE+TEST - will step past the error message with all Flash ETR facilities disabled.

Pressing MODE+SET ZERO will reset and attempt to reinitialise the memory.

To disable and remove the Flash ETR option (level 2 access required) for firmware versions PO6.127 to 135, set the Flash Enable parameter $FLSH$ in the Eng_CFg menu to 3 then Enter. $FLSH$ will then show as zero.
From version PO6.136 the option may be disabled by simply setting $FLSH$ =0.