

### CHARGING THE TUFF / BATTERIES



Fit Battery and Connect Charger

- Insert pump into charging cradle as shown above.
- Fast charge starts and the red LED on the pump flashes.
- When fully charged the blue LED will illuminate. The pump can be left in the cradle on trickle charge or may be removed.
- Individual battery packs can also be charged / stored in the cradle. The battery pack's own red LED will indicate that charging is in progress.



Chapter 2 for more charging options.

### KEY LOCKED MODES

The keys can be set in a Partial Lock Mode or a fully Locked Mode.



PARTIAL LOCK MODE

Partial Lock Mode. This can be activated in Stop Mode and Run Mode. In this mode the pump can only be started and stopped. Press the ON/OFF key three times within 3 seconds to enter Partial Lock Mode. Repeat once to unlock in Stop Mode, repeat twice to unlock in Run mode.



LOCKED MODE

Fully Locked Mode. This can only be activated in Run Mode. In this mode all keys are disabled. From Partial Lock Mode press the ON/OFF key three times within 3 seconds to enter Locked Mode. Repeat to unlock.

### BATTERY GAUGE



Standard models – Battery gauge shows approximate estimate of available battery capacity.

TUFF Plus Model- Here the battery status bar indicates approximate % remaining.

PRO only - This screen shows the estimated life remaining based on the current battery loading.

### ERROR MESSAGES

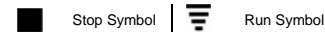


The pump stops and an error condition is indicated by a flashing '1' and red LED. Low Battery and Flow Blockage are shown here. After 1 minute stoppage the pump will try to restart. All error messages are displayed for 4 hours before the pump turns off.

This symbol is displayed if the Run Time exceeds 2500hrs or number of battery charge cycles exceeds 600.

### STOP / RUN SYMBOLS

The symbol in the top left hand corner of the screen displays the pump mode.



### POWER ON

Note: To Set Language go to Configuration.

If language is set, press the On/Off Key. The Firmware will run through the initialisation screens.



### POWERING OFF

Press and hold the On / Off Key. A "countdown" will be displayed and the pump will switch off.



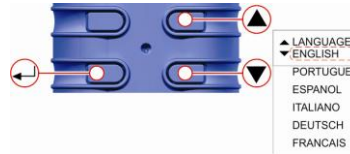
### CONFIGURATION

Immediately after powering up, press and hold the UP arrow. This allows access to the configuration screens. After approximately 8 seconds the Set Language screen is displayed.



### SET LANGUAGE

Use UP/DOWN keys to select the required language, then press ENTER.



### CONTRAST

Use UP/DOWN keys to adjust the contrast, then press ENTER.



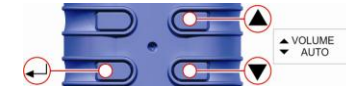
### TEMPERATURE

Use UP/DOWN keys to select the required unit for displaying the ambient air temperature (C or F) then press ENTER.



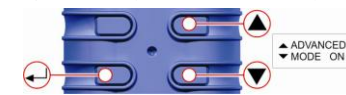
### VOLUME

TUFF PLUS AND PRO ONLY - Use UP/DOWN keys to select the preferred units to display the sampled volume (i.e. always cubic metres (m<sup>3</sup>) or AUTO to change automatically from Litres to m<sup>3</sup>), then press ENTER.



### ADVANCED MODE

TUFF PLUS AND PRO ONLY - Use UP/DOWN keys to set the Advanced Mode ON or OFF then press ENTER. (See PROGRAM OPTIONS).



### SERVICE LIFE AND SERIAL NUMBER

The 'Life' shown is the accumulated run time in hours. The Serial number is the unique number assigned to the pump. Press ENTER to continue.



### DEFAULT CALIBRATION

This allows the user to alter or check the default calibration of the pump. This facility is not available on the Tuff Standard unit. Please do not enter this menu option unless you intend to alter the basic calibration of the unit.



For more details on calibration / configuration options. Chapter 5.

### MAIN MENU / STARTING A RUN

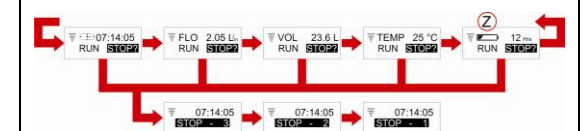
When on the Tuff pump will scroll through the Main Menu Options. The information displayed on the screens will be the saved data from the last time the pump was used. Press the ENTER key on any screen to start the pump. (Volume and Flow not displayed on Standard Model.)



### RUN MODE MAIN MENU

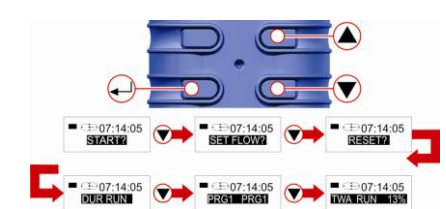
When the pump is running it will scroll through the Run Mode Menu options and the blue led will be flashing. Current run data will be displayed. To stop the pump, press and hold the ENTER key on any screen until the countdown is complete.

Note: PRO Model (Screen Z) is the remaining run time available based on the current flow and pressure loading. The 'Plus' model displays the % of remaining battery capacity only. Standard model only displays battery status bar and elapsed run time only. No flow rate or sampled volume are displayed.



### MENU OPTIONS

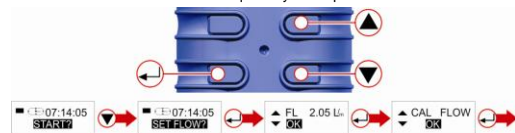
Use the UP/DOWN keys to step through the Menu Options. Press ENTER to access a Menu Option when it is displayed. Menu option not available in partial lock mode. (Note: screens shown below may vary depending upon model.)



### FLOW (CALIBRATE FLOW)

Attach the pump to the external calibration equipment as detailed in the Operator's Manual (Chapter 6.)

From menu press UP/DOWN to go to SET FLOW. Press ENTER to access Set Flow options. Use UP/DOWN keys to adjust the flow setting required. Press ENTER to continue. Cal Flow will be displayed. Use the UP/DOWN keys to adjust the flow indicated on external calibration device until required value is reached. Press Enter when flow indicated is equal to your required flow rate.

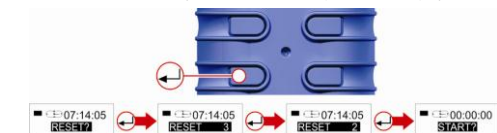


### RESET

(Used to reset all the previous run details from display).

Press and hold ENTER. Release ENTER when counter is at zero.

Note: If the counter is already at zero, the Reset option is not displayed.

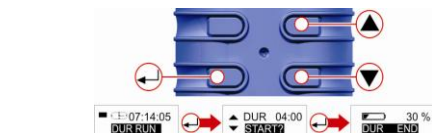


### RUN DURATION (PRO and PLUS ONLY)

Press ENTER to access Run Duration setup screen.

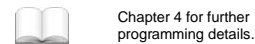
Use the UP/DOWN keys to set run duration in hours and minutes.

Press ENTER again to start the pump. The duration will be counted down as a percentage of duration time remaining. The pump will stop when the duration end time is reached.



### PROGRAM OPTIONS (PRO ONLY)

(Note: The Advanced Mode must be set to ON via the configuration menu to enable this feature.) The program is configured on a PC and then uploaded to the Pump.



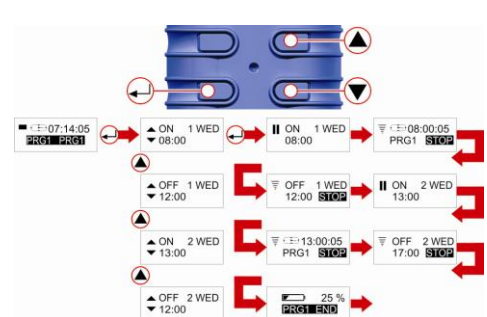
Chapter 4 for further programming details.

Note: If the pump is programmed to start sampling at 08:00 on Monday and the pump is not switched ON until 08:10 on Monday it will not run until the next Monday at 08:00.

This example assumes the intention is to run the pump for 4 hours, then pause for 1 hour, and then resume running for another 4 hours. Use the UP/DOWN keys to step through the Stop Mode Menu Options until PRG1 screen is displayed.

Press ENTER to continue to the 'ON 1' screen. Use the UP/DOWN keys to review the program set parameters.

ON1 is 08:00. OFF1 is 12:00. START2 is 13:00. PROGRAM END is 17:00.



### TIME WEIGHTED AVERAGE (TWA) (PRO and Plus ONLY)

Use the UP/DOWN keys to step through the Menu Options until the TWA screen is displayed.

Press ENTER to continue to the TWA Run screen. Use the UP/DOWN keys to set the total sampling duration, e.g. 8 hours.

Press ENTER to continue to the Exposure time setting. Use the UP/DOWN keys to set the Exposure Time, e.g. 1 hour.

The settings entered will provide 1 hours exposure time evenly spaced over the 8 hours running time.

Press ENTER to Start.

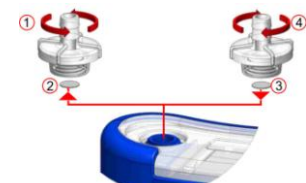


Chapter 4 for comprehensive operating details.

### RENEWING THE INLET FILTER

Note: The filter element should be replaced every 3 months. The pump running time and the operating environment can reduce this time considerably.

1. Remove the Inlet Nozzle.
2. Discard the Filter Element.
3. Fit a new Filter Element.
4. Fit and hand tighten the Inlet Nozzle.



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TUFF Field Guide SM08013

### HB3344-02 FIELD GUIDE FOR TUFF™



### INTRODUCTION

This field guide is to familiarise you with the TUFF Personal Air Sampling Pump range and get you 'up and running' quickly. It is assumed this is the first time you have used the instrument. (It covers all three variants, TUFF Standard, Plus and Pro.)

Please make sure the TUFF™ and associated equipment supplied by Casella CEL are not damaged and the Inlet Nozzle is not obstructed before attempting to use this instrument.

We want you to get the best performance from the equipment and recommend you refer to the Operator's Manual for detailed information.

### Notes:

1. Refer to the Operator's Manual when the "book" symbol is displayed.
2. Multi-language field guides and full handbooks can be downloaded from: <http://www.casellameasurement.com/tuff/downloads.htm>