

**Dresser Roots®**  
**Micro Series User Terminal**  
**Handbook**

**4-2821 Revision 2**

**PH031**

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## 1. Information

This handbook details the installation and operation of all varieties of the Dresser Roots ® Micro Series Corrector. The Micro Series Corrector and Micro Series Corrector User Terminal are manufactured by:

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All printed material contained within this handbook is for information only and is subject to change without notice. This handbook should be read in conjunction with firmware versions **1.86** and **1.86F** and user terminal software version **2.0.0.6**.

This handbook uses the words corrector, corrected and uncorrected throughout. The words corrector, corrected and uncorrected should be read in Europe as meaning convertor, converted and unconverted as defined by the most recent standards on volume conversion. The term *drive rate* should be read in Europe as meaning *meter pulse significance*.

In addition, the term *telemetry output pulse* should be read in the USA as meaning *pulse output*.

In the case of the MC T-Only and when a fixed line pressure is applied, the corrected and uncorrected volumes should be read as meaning compensated and uncompensated.

For the purpose of this document the terms PC and laptop should be considered as being interchangeable.

## 2. General Overview

The Dresser Roots® Micro Series Volume Corrector (MC) combines 2 devices; an electronic counter and a volume corrector. The MC is compatible with all Roots® meters and others (contact your distributor for further details). Volume is sensed from low frequency pulses provided by positive volume displacement meters such as the Dresser Roots® rotary meter or a reed switch.

The MC is designed to measure live pressure and temperature to calculate corrected volume. In addition optional features are available and include:

- Data and Audit Logging.
- Trim Table options.

Note: A temperature only version of the MC, the MC T-Only is also available. The MC T-Only measures live temperature and calculates supercompressibility. The operator is required to configure a fixed line pressure value. All functionality, with exception of the live pressure measurement is identical to that of the MC, and the details contained within this handbook should be read as being applicable to both.

The Micro Series Corrector User Terminal (user terminal) enables the operator to configure, calibrate, extract data and monitor alarms. A logging facility is also available; data logging and audit logging. The operator is able to specify which parameters are logged within the data log and the logging interval at which the logs are taken. The audit log provides a tracking facility detailing any parameter changes; only the parameter changes that will affect the billing are included within the audit log. To ensure the integrity of the billing period, the audit log cannot be deleted.

### 3. Safety

Where an MC installation must meet Intrinsic Safety requirements, ensure that installation is carried out in an appropriate manner in accordance with any National Codes of Practice dealing with Intrinsically Safe (I.S.) installations; refer to the *Micro Series Volume Corrector Handbook* (PH030) (sections 4 (*Safety*) and 5.2 (*Installation Safety Requirements*)).

Connection to intrinsically safe equipment must be properly assessed by the user and the manufacturer (Dresser) will not take responsibility for the overall safety of the system.

The serial port may only be connected to an intrinsically safe modem as shown by the system approval drawing. For commissioning and reading data the serial port may also be connected to a laptop computer under the following conditions:

1. Laptop computers, generally, are not intrinsically safe. Therefore, before using an uncertified laptop in the hazardous area, a gas test should be performed to prove that no potentially hazardous gas mixture exists in the area. If this is not possible the laptop must not be used in the hazardous area.
2. The laptop computer must be powered by batteries alone and these must be incapable of supplying more than 25 Volts. No connection is to be made to an external supply (e.g. charger) even if non-operational. (The presence of the connection can itself create a hazardous condition).

An intrinsically safe barrier (or Dresser Micro Modem) must be installed between a PC in a non-hazardous area and the MC in the hazardous area.

## 4. Installation and Getting Started

### 4.1 System Requirements

The Micro Corrector User Terminal is designed to run on Windows® based PC's running Windows 95, 98, 2000, ME, NT4 and XP. A CD-ROM drive is required for installation; however, it is possible for the software to be supplied on 3.5 ins diskette. Please contact your distributor for further details.

### 4.2 Installation

The Micro Corrector User Terminal software is supplied on CD as standard (please contact your distributor for further details if alternative installation media is required).

Insert the Micro Corrector User Terminal software installation CD into the CD-ROM drive of the PC. If the auto run facility is enabled on the PC, the set up program will start automatically the first time the CD is inserted.

If the set up program does not start automatically the following steps should be performed:

From the Start menu, locate Windows Explorer:

- For **Windows 95, 98 and NT4** this can be found from the Start menu by selecting *Programs*, then *Windows Explorer*.
- For **Windows 2000, ME and XP** this can be found from the Start menu by selecting *(All) Programs*, then *Accessories*, followed by *Windows Explorer*.
- Select the CD-ROM drive under *My Computer*.
- Double click SETUP.EXE from the contents list.
- Follow the on-screen instructions thereafter.

Note: Installation of the software on the PC is subject to the terms of the licence agreement displayed during the installation process. You should not use the software until you have read the licence agreement. By using the software you signify that you have read the licence agreement and accept its terms. Please refer to [Appendix B \(User Terminal Software Licence\)](#).

### 4.3. Operating the User Terminal

Communications to the MC can be carried out either directly or remotely. An intrinsically safe barrier (or Dresser Micro Modem) must be installed between a PC in a non-hazardous area and the MC in the hazardous area. It is possible to specify which communications port is to be utilised whilst operating in the direct mode. The procedures contained within this handbook are identical regardless of whether communications to the MC are carried out directly or remotely via the modem, however the operator will be prompted to enter some additional details if remote communications are to be established (e.g. select the type of PC modem, enter telephone numbers etc). Please refer to section [12 \(Modem Communications\)](#) for further details.

All of the procedures outlined below (with the exception of sections [9.7 \(Monitor Calls\)](#) and [12 \(Modem Communications\)](#)) are described using the direct method of communication and therefore assume that the communications cable (AW169) (supplied in the communications pack) is connected between the PC and MC.

### 4.3.1 Connecting the MC and PC via Direct Communications

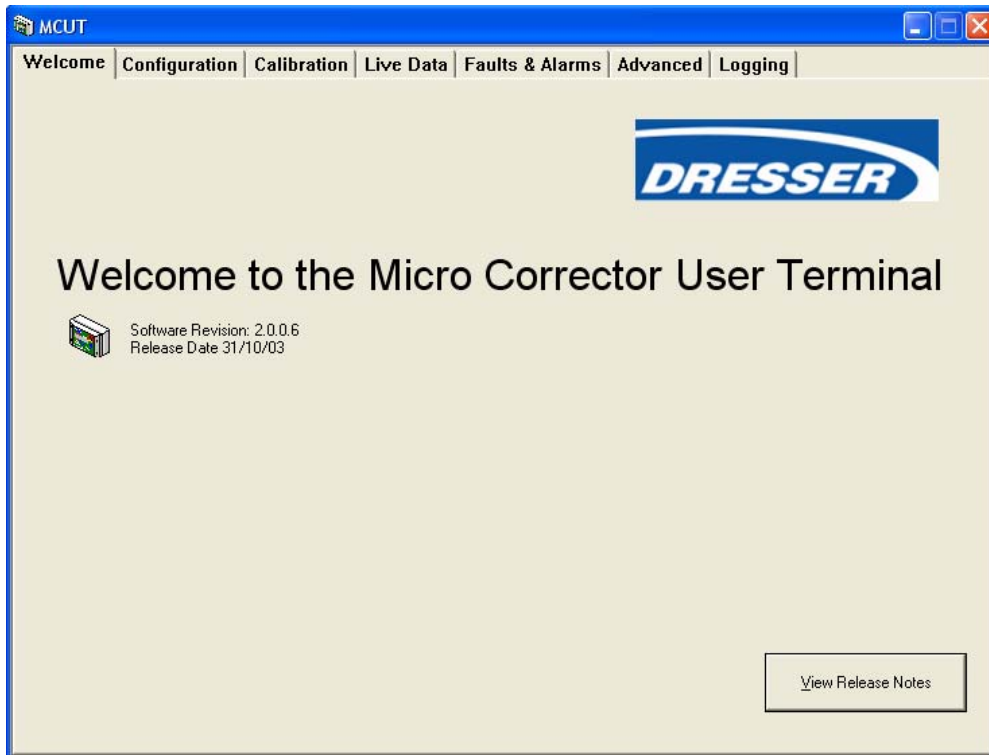
For direct communications connect the 9 way “D” type connector of the communications cable (AW169) to COM port 1 on the PC; connect the round connector to the serial port connector located in the right hand corner on the bottom of the MC. If COM port 1 is not available it is possible to specify which COM port is to be used within the user terminal for direct communication (COM 1 to COM 8).

#### To start the user terminal:

- Locate and run the icon created on the desktop during the installation process. Alternatively select the *MC UT* icon from the *Micro Series User Terminal* folder in the *Start, Programs* menu.
- Once either icon has been selected the *Welcome* screen will be displayed. Select the *Configuration* tab.
- Select the *UT Comms Settings* option. The *UT Comms Settings* dialog will be displayed.
- From within the *Direct* section select the *Com Port* drop down selection box. Select the appropriate COM port (that which the communications cable is connected to), default is COM 1.
- Select the *OK* option within the *UT Comms Settings* dialog. The *Configuration* screen will be displayed.
- Select the *Connect with MC* option.
- Communication will be established. A *progress bar* will begin to move from left to right across the screen as the data is downloaded.

## 5 Welcome Screen

The software version and release date of the user terminal is displayed within the *Welcome* screen. In order to connect to the MC it is necessary to select the *Configuration* tab to display the *Configuration Screen*.

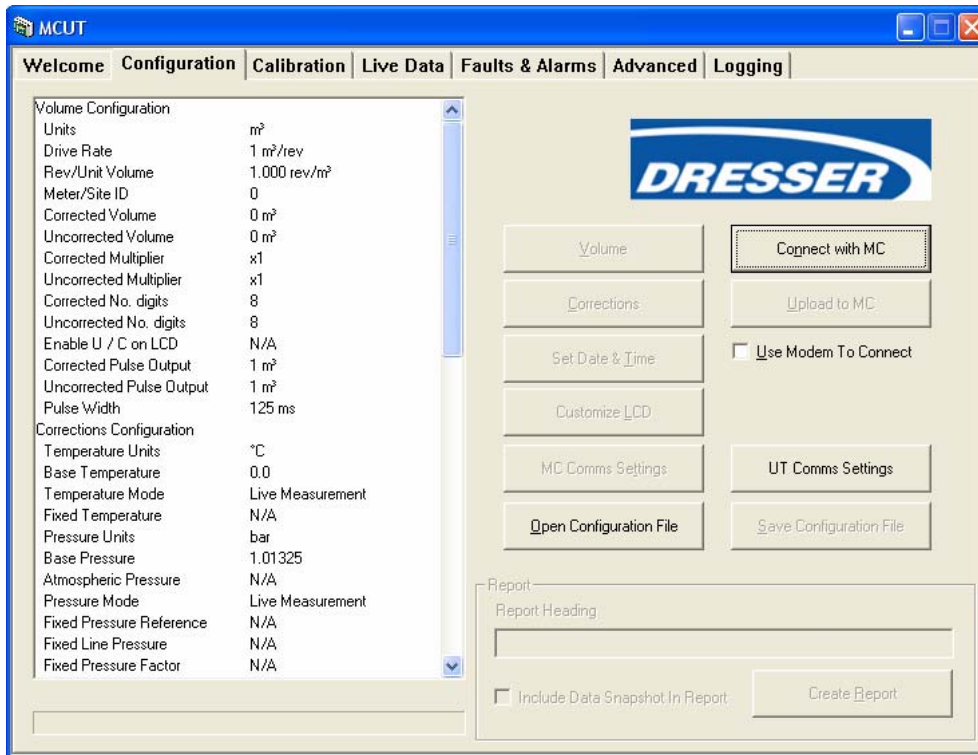


**Figure 1 - Welcome Screen**

Please note the software version if customer support is requested.

## 6 Configuration Screen

The *Configuration* screen is divided into 3 main sections; the left hand parameter selection list, 10 options which allow the operator to connect and configure the MC, and the report generation section.



**Figure 2 - Configuration Screen\***

\*The *Configuration* screen displayed in figure 2 may be displayed with different parameters listed within the parameter selection list than those shown above; before communications have been established between the PC and MC the default details shown within the parameter selection list are those parameters associated with the IMC/W. Once successful communications have been established the relevant list will be displayed.

Before communications have been established between the PC and MC several of the options within the *Configuration* screen will not be selectable, this is because the contents of these dialogs depend on the information stored within the MC. Incidentally, before changes can be made to the configuration data stored within the MC the existing configuration data must be downloaded from the unit. Therefore, once the PC and MC have successfully established communications the previously unavailable options within the *Configuration* screen will become available, and changes to the configuration data can be made and uploaded.

### To display the configuration screen:

- From within the user terminal select the *Configuration* tab. The *Configuration* screen will be displayed.
- The options available on this screen depend on the model and configuration of the MC.
- On first display of this screen (hence every time the user terminal is run) it is necessary to download the configuration data from the MC in order that the current settings stored within the MC are displayed within the user terminal.
- Select the *UT Comms Settings* option. The *UT Comms Settings* dialog will be displayed.
- From within the *Direct* section select the *Com Port* drop down select box. Select the appropriate com port (that which the communication cable is connected to).
- Select the *OK* option within the *UT Comms Settings* dialog. The *Configuration* screen will be displayed.
- Select the *Connect with MC* option. For further details refer to section [6.1 \(Connect with MC – Direct Connection to the MC\)](#).

## 6.1 Connect with MC – Direct Connection to the MC

To connect to the MC directly select the *Connect with MC* option (if no com port is otherwise specified COM1 will be used by default). Please refer to section [12 \(Modem Communications\)](#) for details about connection to the MC via a modem.

Once the download is complete a dialog will be displayed stating that *Configuration Downloaded OK*, select *OK*.

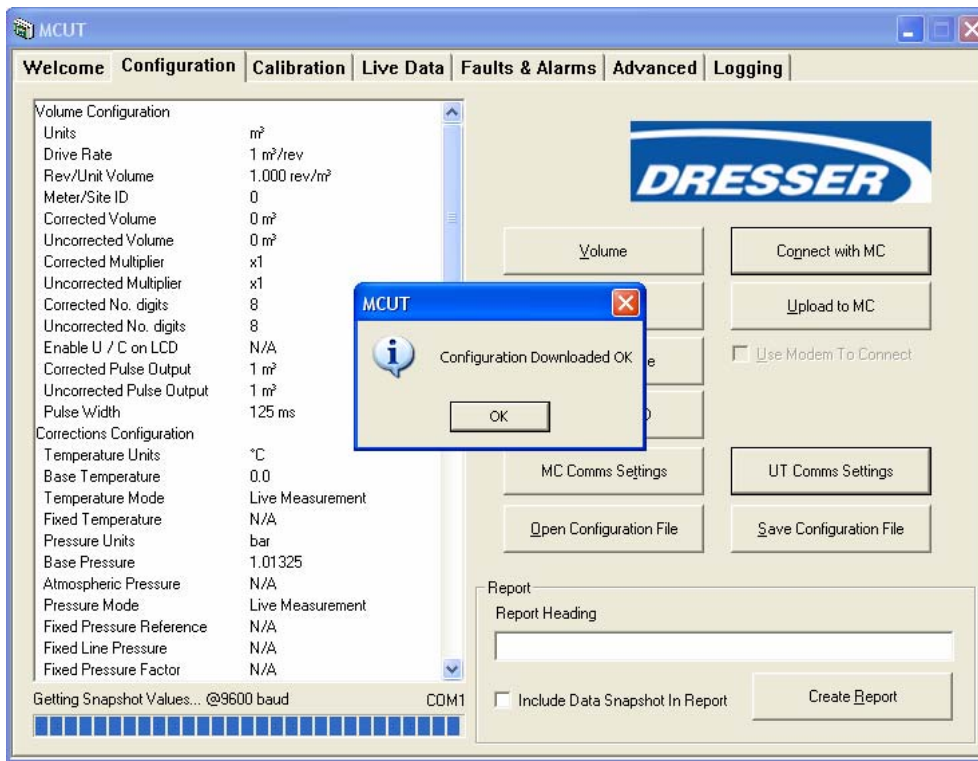


Figure 3 - Configuration Downloaded OK Dialog

Once *OK* is selected all options within the *Configuration* screen will become available; it is now possible to setup and configure the unit.

## 6.2 Upload to MC

When the configuration data has been changed within the user terminal it is necessary to upload the new parameter details to the MC. Prior to upload, any parameters that have been changed are highlighted yellow in the parameters selection list; after the parameters have been uploaded to the MC the yellow highlights will be removed.

If a parameter is highlighted red the value entered within that text box is out of range. If the operator attempts to proceed a dialog will be displayed informing them of the appropriate valid range that should be entered for that parameter.

To upload any changes made within the user terminal select *Upload to MC*.

Note: If the MC is password protected it may be necessary to enter the password in order to upload the changes; the default password is the numerical value 0. If the MC is protected by the hardware link (read / write link (*Weights and Measures* legislation)) it may not be possible to upload the changes made. Please refer to sections [13 \(Password Protection\)](#) and [14 \(Weights and Measures Link Protection\)](#) for further details.

### 6.3 Volume Configuration

The *Volume Configuration* dialog is divided 4 sections and the parameters that can be changed within this dialog:

- Volumes – enables the operator to specify corrected and uncorrected volume totals.
- Pulse Outputs – enables the operator to specify the ratio of input pulses to output pulses for corrected and uncorrected volumes, and the pulse width of both of these output pulses.
- Meter Data – enables the operator to specify the units in which the volumes should be recorded (ft<sup>3</sup> or m<sup>3</sup>) and the drive rate (pulse significance). In addition the operator is able to allocate a Meter / Site ID to each specific MC.
- Display – enables the operator to specify how the corrected and uncorrected volumes are displayed.

The screenshot shows the 'Volume Configuration' dialog box with the following settings:

- Volumes:** Corrected Volume: 0 ft<sup>3</sup>; Uncorrected Volume: 0 ft<sup>3</sup>
- Pulse Outputs:** Corrected: 1 ft<sup>3</sup>; Uncorrected: 1 ft<sup>3</sup>; Pulse Width: 125 ms
- Pulse Output Allocation:** Pulse Output 1: Uncorrected; Pulse Output 2: Corrected; Pulse Output 3: Fault
- Meter Data:** Units:  ft<sup>3</sup>  m<sup>3</sup>; Drive Rate: 1 ft<sup>3</sup>/rev; 1.000000 rev/ft<sup>3</sup>; Meter/Site ID: 0
- Display:** Corrected Volume: 00000000, Multiplier: x1, Digits: 8; Uncorrected Volume: 00000000, Multiplier: x1, Digits: 8

Figure 4 - Volume Configuration Dialog

**To display the volume configuration dialog:**

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.

### 6.3.1 Volumes

It is possible to change the corrected and uncorrected volumes once the data within the MC has been downloaded to the user terminal.

The *Volumes* section on the *Volume Configuration* dialog contains 2 text boxes labelled *Corrected Volume* and *Uncorrected Volume*; these text boxes enable the operator to change the values of the corrected and uncorrected volumes.

#### To set the corrected and uncorrected volumes:

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Volumes* section enter the desired value in the appropriate text box. The new value will be highlighted yellow. A maximum of 9 digits can be entered in the user terminal for the corrected and uncorrected volumes. Note: The LCD of the MC can only display a maximum of 8 digits; the value that is to be displayed on the LCD is shown in the *Display* section of the *Volume Configuration* dialog.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white background. This colour change from yellow to white indicates that the values displayed on the screen matches the values in the unit, therefore the download was successful.

### 6.3.2 Pulse Outputs

The pulse output can be configured as 0.1, 1, 10, and 100 (m<sup>3</sup>) / 1, 10, 100 and 1000 (ft<sup>3</sup>), and describe the volume units per output pulse. In addition the pulse width of the output pulses can be set to 125, 187 or 315 milliseconds.

Note: The *Corrected Pulse Outputs* and *Uncorrected Pulse Outputs* are independent of one another; hence the corrected and uncorrected pulse outputs may be set as different values. This is particularly useful when working with high correction factors.

The *Pulse Outputs* section on the *Volume Configuration* dialog contains 3 drop down selection boxes labelled *Corrected*, *Uncorrected* and *Pulse Width*.

#### To set the pulse outputs:

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Pulse Outputs* section select the appropriate (*Corrected* or *Uncorrected*) drop down selection box and select the desired option. The new value will be highlighted yellow.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white background.

**To set the pulse width:**

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Pulse Outputs* section select the *Pulse Width* drop down selection box and select the desired option. The new value will be highlighted yellow.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

**6.3.3 Meter Data**

The *Meter Data* section on the *Volume Configuration* dialog contains 3 options; *Units* radio button ( $\text{ft}^3$  or  $\text{m}^3$ ), 1 drop down selection box labelled *Drive Rate*, a text box labelled *Meter/Site ID*.

The number of revolutions per  $\text{ft}^3$  ( $\text{rev}/\text{ft}^3$ ) /  $\text{m}^3$  ( $\text{rev}/\text{m}^3$ ) (dependant on drive rate selected) is automatically displayed when the appropriate *Drive Rate* (pulse significance) value is selected from the appropriate drop down selection box, these details should reflect the meter type and size that the MC is fitted to.

A second drop down selection box (labelled  $\text{rev}/\text{ft}^3$  or  $\text{rev}/\text{m}^3$ ) located below the *Drive Rate* field is displayed. This additional field remains uneditable until the *Manual* option within the *Drive Rate* field is selected; the user is then able to enter an alternate value for  $\text{REV}/\text{FT}^3$

If the appropriate *Drive Rate* (pulse significance) value required is not shown in the drop down selection box the *Manual* option from within the *Drive Rate* drop down selection box should be selected. If the *Manual* option is selected within the *Drive Rate* drop down selection box the text box below will be enabled, this will allow the operator to enter the desired number of revolutions per  $\text{cu ft} / \text{m}^3$ .

**To set the units:**

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Meter Data* section select the required *Units* ( $\text{ft}^3 / \text{m}^3$ ). If the *Units* are changed the new units will be displayed in the relevant positions on the *Volume Configuration* dialog.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

**To set the drive rate:**

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Meter Data* section select the *Drive Rate* drop down selection box and select the desired option. The new value will be highlighted yellow.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

**To set the meter / site ID:**

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Meter Data* section select the *Meter/Site ID* text box and enter the desired meter / site ID reference. The new value will be highlighted yellow.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

**6.3.4 Display**

The LCD is capable of displaying up to 8 digits for the various volumes, with a maximum volumes value equal to 99999999. On receipt of the next input pulse the LCD will display 00000000; if the configuration data within the MC is then uploaded to the user terminal the appropriate volume register will display 100000000 - the volume registers within the MC are capable of storing up to 9 digits. The user terminal will also display up to 9 digits; hence the maximum volumes value is equal to 999999999. On receipt of the next input pulse the volume register will be equal to 000000000.

It is possible to independently configure the corrected and uncorrected volumes on the LCD; both the multipliers and number of digits displayed on the LCD (between 5 and 8) can be altered. An increase to the *Multiplier* will effectively shift the appropriate volume value to the left on the LCD, revealing the most significant figure of the volumes value; if no further significant values are to be revealed a 0 is placed in front of the volumes value. A decrease to the *Digits* will effectively ‘remove’ the most significant figure of the volumes value. The affect of the various *Multiplier* and *Digits* options is detailed in table 1 (*Volume Multiplier and Digits Reference Table*), in addition a sample corrected and uncorrected volume value is displayed within the *Display* section on the *Volume Configuration* dialog.

**Table 1 – Volume Multiplier and Digits Reference Table**

Volume Reading	Multiplier Option	Digits Option	Volume Displayed on LCD
123456789	x1	8	23456789
	x10		12345678
	x100		01234567
	x1000		00123456
123456789	x1	7*	3456789
	x10		2345678
	x100		1234567
	x1000		0123456
123456789	x1	6*	456789
	x10		345678
	x100		234567
	x1000		123456
123456789	x1	5*	56789
	x10		45678
	x100		34567
	x1000		23456

\* When selected the *Display U / C on LCD* check box is displayed, by selecting this option a *U* will be displayed on the uncorrected volume and a *C* on the corrected volume on the LCD.

The *Display* section on the *Volume Configuration* dialog contains 4 drop down selection boxes; Corrected Volume Multiplier, Corrected Volume Digits, Uncorrected Volume Multiplier and Uncorrected Volume Digits.

#### To set the corrected and uncorrected volume multiplier:

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Display* section select the appropriate *Multiplier* drop down selection box and select the desired option. The new value will be highlighted yellow.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

#### To set the corrected and uncorrected volume digits:

- From within the *Configuration* screen select the *Volume* option, the *Volume Configuration* dialog will be displayed.
- From within the *Display* section select the appropriate *Digits* drop down selection box and select the desired option. The new value will be highlighted yellow.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

### 6.3.5 Pulse Output Allocation

- From within the *Configuration* screen select the *Pulse Output 1 or 2 or 3* option, the required *Pulse Output Allocation Configuration* dialog will be displayed.
- From within the *Pulse Output Allocation* section select the required *Pulse Output* drop down selection box and select the desired option i.e. *Uncorrected*, *Corrected* or *Fault*. The new value will be highlighted yellow.
- Select the *OK* option within the *Volume Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the IMC/W. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

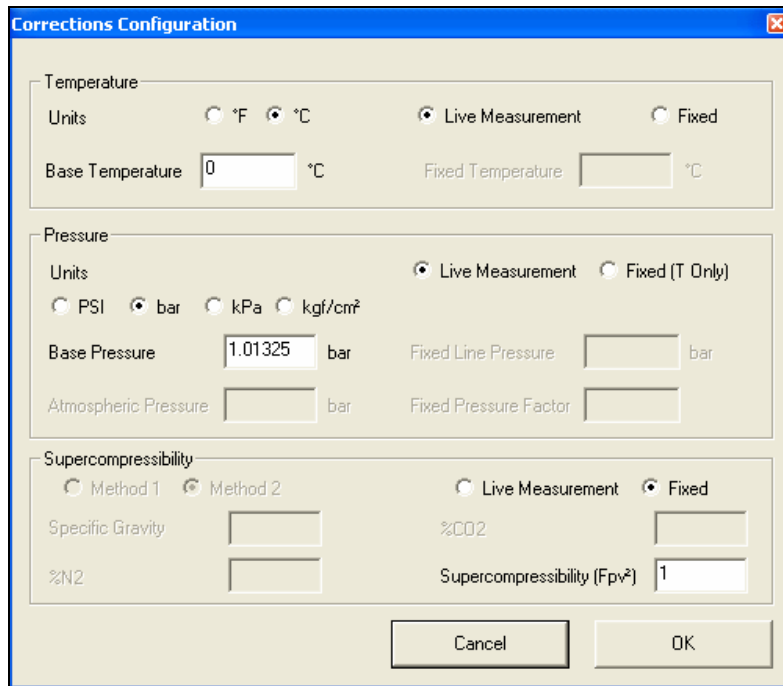
## 6.4 Corrections Configuration

To display the *Corrections Configuration* dialog select the *Corrections* option from within the *Configuration* screen. [Table 2 \(Correction Configuration Parameter Reference Table\)](#) is provided as a quick reference indicating the accepted ranges for the correction configuration parameters.

The *Corrections Configuration* dialog is divided 3 sections and the parameters that can be changed within this dialog are those associated with volume correction:

- Temperature – the operator is able to specify the temperature units, base temperature value, and whether to utilise either live temperature measurement via the temperature probe or a specified fixed temperature value. For temperature probe installation instructions please refer to the *Micro Series Volume Corrector Handbook* (PH030).
- Pressure – the operator is able to specify the pressure units, base pressure value, and whether to utilise either live pressure measurement via the pressure transducer or values for specified fixed line pressure and fixed pressure factor values. If the fixed line pressure value option is utilised it is also necessary to specify whether the value is absolute or gauge (in the case of gauge, an atmospheric pressure value will need to be entered). For pressure transducer installation instructions please refer to the *Micro Series Volume Corrector Handbook* (PH030).

Supercompressibility – the operator is able to specify whether a fixed Supercompressibility value is to be utilised or calculated using gas constituent values supplied by the operator.



**Figure 5 - Corrections Configuration Dialog**

**Table 2 – Correction Configuration Parameter Reference Table**

Parameter	Minimum	Maximum	Minimum	Maximum
Base Temperature	32 °F	68 °F	0 °C	20 °C
Fixed Temperature	-40 °F	140 °F	40 °C	60 °C
Base Pressure	9 PSI	15 PSI	0.621 bar	1.034 bar
	-	-	62.052 kPa	103.420 kPa
	-	-	0.63293 kgf/cm <sup>2</sup>	1.05488 kgf/cm <sup>2</sup>
Atmospheric Pressure	8 PSI	15 PSI	0.552 bar	1.034 bar
			55.157 kPa	103.420 kPa
			0.56260 kgf/cm <sup>2</sup>	1.05489 kgf/cm <sup>2</sup>
Fixed Line Pressure*	See note below			
Fixed Pressure Factor*	See note below			
Heating Value	509.9 BTU/ft <sup>3</sup>	1288.3 BTU/ft <sup>3</sup>	19.0 MJ/m <sup>3</sup>	48.0 MJ/m <sup>3</sup>
Supercompressibility (Fpv <sup>2</sup> )	0.9	1.2	-	-
Specific Gravity	0.6	0.9	-	-
% CO <sub>2</sub>	0.0	30.0	-	-
% N <sub>2</sub>	0.0	50.0	-	-
* The acceptable ranges for <i>Fixed Line Pressure</i> and <i>Fixed Pressure Factor</i> are variable and depend on the pressure transducer reference type.				

#### 6.4.1 Temperature Measurement

Live temperature measurement is performed by a 4-wire Class A 100 ohm platinum resistance thermometer (supplied as an option with the MC), for further details refer to the *Micro Series Volume Corrector Handbook* (PH030) or contact your distributor for further details. Alternatively, if live temperature readings can not be taken, the operator is able to specify a fixed temperature; this constant value is then used for calculating supercompressibility.

It is possible to set the temperature units to enable the display of temperature readings in either °C or °F.

**To set the temperature units:**

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Temperature* section select the desired *Units* radio button option (°C or °F). The new option will be implied as the *Base Temperature* value will be highlighted yellow, and the new temperature unit will be displayed to the right of the *Base Temperature* text box.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

**To set the base temperature:**

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Temperature* section select the *Base Temperature* text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

**To set a fixed temperature value:**

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Temperature* section select the *Fixed* radio button option. The new option will be implied as the *Fixed Temperature* text box will be enabled.
- Select the *Fixed Temperature* text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

Note: When a fixed temperature value is used the temperature alarm limits and settings (accessible through the *Faults & Alarms* screen) are disabled.

**To utilise live temperature measurement:**

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Temperature* section select the *Live Measurement* radio button option. The new option will be implied as the *Fixed Temperature* text box will be disabled.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

## 6.4.2 Pressure Measurement

Live pressure measurement (where fitted) is conducted via a factory fitted pressure transducer (pressure transducer range is order specific). For further details regarding the pressure transducer and alternative ranges refer to the *Micro Series Volume Corrector Handbook* (PH030) or contact your distributor for further details. If a gauge transducer is fitted, an additional text box is enabled to enable the operator to specify the appropriate value for the *Atmospheric Pressure*. Alternatively, if live pressure readings can not be taken, the operator is able to specify a fixed line pressure value; this constant value is then used for calculating supercompressibility.

It is possible to set the pressure units to enable the display of pressure readings in either bar, kgf/cm<sup>2</sup>, kPa or PSI.

### To set the pressure units:

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Pressure* section select the desired *Units* radio button option (bar, kgf/cm<sup>2</sup>, kPa or PSI). The new option will be implied as the *Base Pressure* value will be highlighted yellow, and the new pressure unit will be displayed to the right of the *Base Pressure* text box.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).

The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

### To set the base pressure:

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Pressure* section select the *Base Pressure* text box and enter the desired value. The new value will be highlighted yellow.
- Note: See [table 2 \(Correction Configuration Parameter Reference Table\)](#) for accepted range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

### To set a fixed line pressure value:

- The value entered for the *Fixed Line Pressure* determines the value for the *Fixed Pressure Factor* and vice versa; these values are automatically updated when either of the two parameters is changed.
- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Temperature* section select the *Fixed (T Log)* radio button option. The new option will be implied as the pressure reference (*Absolute* and *Gauge*) radio button options will be enabled.
- Select the appropriate pressure reference radio button option.
- Note: If the *Gauge* radio button option is selected an additional text box labelled *Atmospheric Pressure* will be enabled, the appropriated value should be entered. See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the *Fixed Line Pressure* text box and enter the desired value. The new value will be highlighted yellow.
- Note: The accepted *Fixed Line Pressure* range will depend on other parameter settings; if an invalid value is entered the operator will be advised of the acceptable range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

Note: When a fixed temperature value is used the temperature alarm limits and settings (accessible through the *Faults & Alarms* screen) are disabled.

#### To set a fixed pressure factor value:

- The value entered for the *Fixed Pressure Factor* determines the value for the *Fixed Line Pressure* and vice versa; these values are automatically updated when either of the two parameters is changed.
- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Temperature* section select the *Fixed (T Only)* radio button option. The new option will be implied as the pressure reference (*Absolute* and *Gauge*) radio button options will be enabled.
- Select the appropriate pressure reference radio button option.
- Note: If the *Gauge* radio button option is selected an addition text box labelled *Atmospheric Pressure* will be enabled the appropriated value should be entered. See [table 2 \(Correction Configuration Parameter Reference Table\)](#) for accepted range.
- Select the *Fixed Pressure Factor* text box and enter the desired value. The new value will be highlighted yellow.
- Note: The accepted *Fixed Pressure Factor* range will depend on other parameter settings; if an invalid value is entered the operator will be advised of the acceptable range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

Note: When a fixed temperature value is used the temperature alarm limits and settings (accessible through the *Faults & Alarms* screen) are disabled.

#### To utilise live pressure measurement:

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Pressure* section select the *Live Measurement* radio button option. The new option will be implied as the *Fixed Line Pressure* and *Fixed Pressure Factor* text boxed will be disabled.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

### 6.4.3 Supercompressibility

Volume correction is calculated on the basis of live pressure and temperature measurement, fixed pressure and temperature measurement or any combination of fixed and / or live pressure and / or temperature measurement. Where volume correction is not fitted the supercompressibility value is static, but can be changed within the user terminal by the operator.

The operator is able to specify whether supercompressibility is to be calculated using gas constituents selected by the operator and from the live pressure and temperature readings, or if a fixed “Z” value is to be used with the pressure and temperature.

The gas compressibility calculations depend on the composition of the gas; this information is entered when utilising the *Live Measurement* method. There are two methods available for calculating the live supercompressibility; *Method 1* and *Method 2*. The *Method 1* option allows the value of supercompressibility to be calculated from the gas relative density (specific gravity), Heating Value and % CO<sub>2</sub>. The *Method 2* option allows the value of supercompressibility to be calculated from the gas relative density (specific gravity), %N<sub>2</sub> and % CO<sub>2</sub>.

The measured volume at line conditions is corrected to the volume at base conditions using the following formula:

$$V_n = V \times (P/P_n) \times (T_n/T) \times (Z_n/Z)$$

Where:

V is the metered volume  
P is the absolute pressure\* at line conditions.  
T is the absolute temperature (Rankine or Kelvin)  
Z is the compressibility

\*For gauge transducers, P is determined by  $P_g + P_a$ , where  $P_g$  is the pressure from the gauge transducer and  $P_a$  is the entered atmospheric pressure value.

$V_n$  is the volume  
 $P_n$  is the absolute pressure at base (or reference) conditions.  
 $T_n$  is the absolute temperature (Rankine or Kelvin)  
 $Z_n$  is the compressibility

Calculation accuracy is typically better than 0.01%.

**To set a fixed supercompressibility value:**

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Supercompressibility* section select the *Fixed* radio button option. The new option will be implied as the *Supercompressibility (Fpv<sup>2</sup>)* text boxed will be enabled.
- Select the *Supercompressibility (Fpv<sup>2</sup>)* text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

### To utilise Method 1 for Live Measurement:

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Supercompressibility* section select the *Live Measurement* radio button option. The new option will be implied as the *Method 1* and *Method 2* radio button options will be enabled.
- Select the *Method 1* radio button option. The new option will be implied as the *Heating Value* text box will be displayed.
- Select the *Specific Gravity* text box and enter the desired value. The new value will be highlighted yellow.
- Note: See [table 2 \(Correction Configuration Parameter Reference Table\)](#) for accepted range.
- From within the *Supercompressibility* section select the desired *Heating Value* Units radio button option (BTU/ft<sup>3</sup> or MJ/m<sup>3</sup>). The new option will be implied as the *Heating Value* value will be highlighted yellow.
- Select the *Heating Value* text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the % CO<sub>2</sub> text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

### To utilise Method 2 for Live Measurement:

- From within the *Configuration* screen select the *Corrections* option, the *Corrections Configuration* dialog will be displayed.
- From within the *Supercompressibility* section select the *Live Measurement* radio button option. The new option will be implied as the *Method 1* and *Method 2* radio button options will be enabled.
- Select the *Method 2* radio button option. The new option will be implied as the %N<sub>2</sub> text box will be displayed.
- Select the *Specific Gravity* text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the % N<sub>2</sub> text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the % CO<sub>2</sub> text box and enter the desired value. The new value will be highlighted yellow.
- Note: See table 2 (*Correction Configuration Parameter Reference Table*) for accepted range.
- Select the *OK* option within the *Corrections Configuration* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.

## 6.5 Set Date & Time

It is possible to set the date and time stored in the MC from within the user terminal; this may be required if the unit has been left in storage for a period of time without the battery connected. It is also possible to set Date Format.

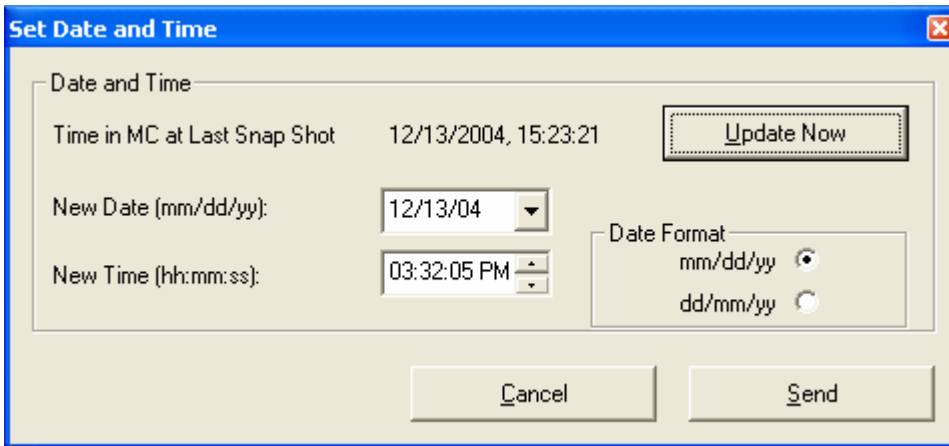


Figure 6 - Set Date and Time Dialog

### To set the date and time:

- From within the *Configuration* screen select the *Set Date & Time* option, the *Set Date and Time* dialog will be displayed.
- The date and time stored within the MC is displayed within the dialog and is identified as *Time in MC at Last Snap Shot*.
- Select the *Update Now* option; the *Time in MC at Last Snap Shot* value, *New Date (mm/dd/yy)\** and *New Time (hh:mm:ss)* selection boxes will all be updated.
- If an update to the date is required select the *New Date (mm/dd/yy)* drop down selection box. A calendar dialog will be displayed. Select the appropriate date. To change the month displayed select the appropriate arrow option located at the top of the calendar dialog. Once a date has been selected the dialog will close and the new date will be displayed within the drop down selection box.
- If an update to the time is required select the *New Time (hh:mm:ss)* selection box. Each time unit (hours / minutes / seconds) is changed individually, by highlighting the relevant section then selecting either the up or down arrow located at the right hand side of the selection box. Alternatively the new setting for each section may be entered via the keyboard.
- Select the *Send* option to upload the new date and time to the MC.
- If the unit has not made any data log entries the new date and time will be uploaded. If data log entries exist the operator will be advised to download the data logs prior to updating the date and time.

Note: All data logs will be cleared when the date and / or time are updated to the MC. It is therefore recommended that all data logs are downloaded from the MC before the new data and / or time settings are uploaded. For information regarding the download of data logs refer to section [11.2 \(Download Data Log\)](#).

\*The user terminal will display the date format in the same format as configured within the PC it is operating, for example if the default PC setting is DD/MM/YY the user terminal will display the date format in DD/MM/YY. The LCD will always display the date format in MM/DD/YY.

## 6.6 Customize LCD

Depending on the particular model options chosen the front panel selector button of the MC will enable the following parameters to be displayed on the LCD:

- *Corrected Volume.*
- *Uncorrected Volume.*
- *Flow Rate.*
- *Correction Factor.*
- *Drive Rate.*
- *Line Pressure.*
- *Temperature.*
- *Uncorrected Volume Under Fault.*
- *Corrected Residual.*
- *Uncorrected Residual.*
- *Firmware version.*
- *Atmospheric Pressure.\**
- *Base Pressure.*
- *Pressure Factor.*
- *Supercompressibility.*
- *Battery Voltage.*
- *Current Date.*
- *Current Time.*
- *Configurable Screens* – Three additional parameters connected with Daily Consumption could be selected from seven options:
  - *Accumulated Corrected Volume previous day,*
  - *Accumulated Corrected Volume current day,*
  - *Accumulated Corrected Volume previous month,*
  - *Accumulated Corrected Volume current month,*
  - *Highest daily volume in the previous month,*
  - *Highest daily volume in the current month,*
  - *Date when it happened.*
- *(Test Screen).*

\*Only where applicable, i.e. if transducer is gauge – Figure 7 (*Customize LCD Dialog*) below represents an MC with an absolute transducer.

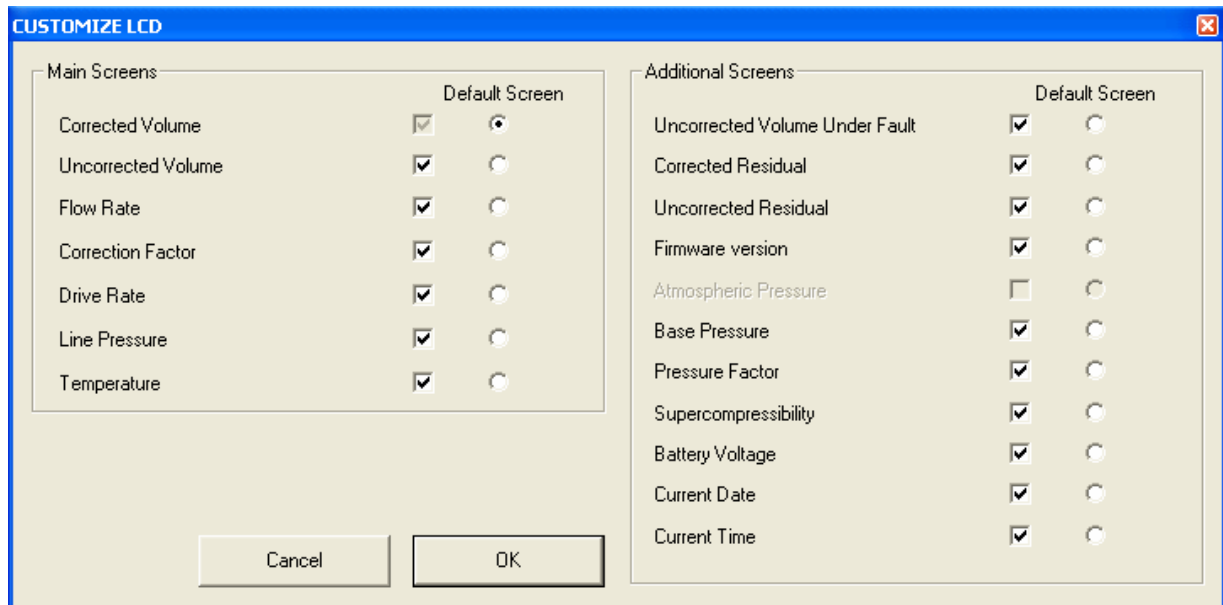
It is possible to *switch* the displayed parameters *on* and *off*, in addition the operator is able to specify which parameter should be displayed as the default parameter displayed on the LCD. At least one of the first 7 (*Main Screen*) parameters must be *switched on*.

By default all available parameters (dependent on model chosen at time of order) will be displayed, the *switched on* parameter check boxes have a check placed in the associated check box indicating that the parameter is to be displayed on the LCD.

### To set the default screen parameter on the LCD:

- From within the *Configuration* screen select the *Customize LCD* option, the *Customize LCD* dialog will be displayed.
- Select the appropriate *Default Screen* radio button option. If the parameter was previously *switched off* selection of that parameter as the *Default Screen* will cause the parameter to be *switched on*.
- Select the *OK* option within the *Customize LCD* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.

Select *Upload to MC*. The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*.



**Figure 7 - Customize LCD Dialog**

**To switch off parameters on the LCD:**

- From within the *Configuration* screen select the *Customize LCD* option, the *Customize LCD* dialog will be displayed.
- Select the parameter(s) that is / are not required to be displayed on the LCD, ensure that the check is removed from the check box. Parameters that are set to be *switched off* of the LCD (not displayed) are disabled.
- Note: It is not possible switch the default screen parameter off. If this screen is not required to be displayed on the LCD the *Default Screen* radio button option must be set to a parameter that is required to be displayed on the LCD.
- Select the *OK* option within the *Customize LCD* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*.

**To switch on parameters on the LCD:**

- From within the *Configuration* screen select the *Customize LCD* option, the *Customize LCD* dialog will be displayed.
- Select the parameter(s) that is / are required to be displayed on the LCD, ensure that a check is displayed in the appropriate check box. If a parameter is disabled it may be because it is not available on the MC in question (dependent on model chosen at time of order), for further details contact your distributor.
- Select the *OK* option within the *Customize LCD* dialog.
- The *Configuration* screen will be displayed and any changed parameters will be highlighted yellow within the parameters selection list.
- Select *Upload to MC*. The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*.

## 6.7 MC Comms Settings

When utilising the remote method of communications it is possible to specify the fixed baud rate of the modem that the MC is connected to (i.e. not the PC modem). Please refer to your modem manual for the baud rate details. For further details please consult your distributor for further details.

Note: If the correct baud rate is not selected the remote communication process will not be successful.

### To specify the MC modem baud rate:

- From within the *Configuration* screen select the *MC Comms Settings* option. The *MC Comms Settings* dialog will be displayed.
- Select the *Baud Rate* drop down selection box, select the appropriate baud rate.
- Select the *OK* option. The *Configuration* screen will be displayed.

## 6.8 Save Configuration File

The user terminal provides the facility to save configuration files. This may be beneficial when it is necessary to configure several MC's with the same configuration data, as the file can be opened within the user terminal and then uploaded to the MC. It is possible to save both uploaded parameters (displayed with white background) and changed parameters (highlighted yellow).

### To save a configuration to a file:

- From within the *Configuration* screen select the *Save Configuration File* option, the *Save As* dialog will be displayed.
- Locate the location in which the configuration file is to be saved.
- Enter the desired file name that the configuration file is to be saved to. A default file name will be displayed which may also be used.
- Select the *Save* option.
- On completion a dialog will be displayed stating *Configuration Saved*, select *OK*.
- The configuration data is now saved to the file. All configuration files are of the type *.mc*.

## 6.9 Open Configuration File

The user terminal provides the facility to open a previously saved configuration file to an MC. This may be beneficial when it is necessary to configure several MC's with the same configuration data.

### To open a previously saved configuration file:

- From within the *Configuration* screen select the *Open Configuration File* option, the *Open* dialog will be displayed.
- Locate and select the configuration file required to be uploaded to the MC. The configuration file will be of the type *.mc*.
- Select *Open*.
- On completion a dialog will be displayed stating *Configuration Restored*, select *OK*.
- The configuration details will now be restored within the user terminal. Any changed parameters will be highlighted yellow within the parameters selection list.
- To ensure that the configuration details are uploaded to the MC select the *Upload to MC* option. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white background.

## 6.10 UT Comms Settings

Communications to the MC may be conducted directly or remotely, via modem. The operator is able to specify which communications port is to be used for direct communications (com 1 to com 8), and the modem configuration for remote communications. The recommended modem settings are detailed in [table 3 \(Modem Settings Reference Table\)](#).

### To specify the communications port for within the user terminal:

- From within the *Configuration* screen select the *UT Comms Settings* option, the *UT Comms Settings* dialog will be displayed.
- From within the *Direct* section select the *Com Port* drop down selection box. Select the appropriate com port.
- Select OK within the *UT Comms Settings* dialog.
- The modem is now ready for remote communications. In order to connect to the MC via the modem it is necessary to re-launch the user terminal, and specify that the modem should be used to connect (within the *Configuration* screen), before selecting *Connect with MC*. See section [12 \(Modem Communications\)](#) for further details.

### To configure the PC modem settings within the user terminal:

- From within the *Configuration* screen select the *UT Comms Settings* option, the *UT Comms Settings* dialog will be displayed.
- From within the *Modem* section select the *Modem* drop down selection box. Select the PC modem that is to be used for remote communications to the MC.
- Select the *Configure Modem* option. The connection details will be displayed along with the *Modem Settings* dialog.
- Set the modem settings to the required configuration (as described in the *Modem Settings* dialog or table 3 (*Modem Settings Reference Table*)), and select *OK*.
- Select OK within the *UT Comms Settings* dialog.
- The modem is now ready for remote communications. In order to connect to the MC via the modem it is necessary to re-launch the user terminal, and specify that the modem should be used to connect (within the *Configuration* screen), before selecting *Connect with MC*. See section [12 \(Modem Communications\)](#) for further details.

**Table 3 – Modem Settings Reference Table**

<b>Windows 95, 98</b>		
General Tab	Speed	1200
Connection Tab	Data bits	8
	Parity	None
	Stop bits	1
	Wait for dial tone before dialling	Off
Advanced Option	Use Error Control	Off
	Use Flow Control	Off
	Modulation Type	Standard
<b>Windows XP</b>		
General Tab	Port speed	1200
Advanced Tab	Data bits	8
	Parity	None
	Stop bits	1

## 6.11 Create Report

The MC user terminal provides a *Create Report* facility; a read only report is generated which details the configuration of the MC. The operator is able to enter a report heading via the keyboard; this could reflect the meter location reference (e.g. south 1). The report can include a *data snapshot* of the data stored within the MC, the additional information displayed within this report is listed below, and includes data specific to the MC that the user terminal is in communication with.

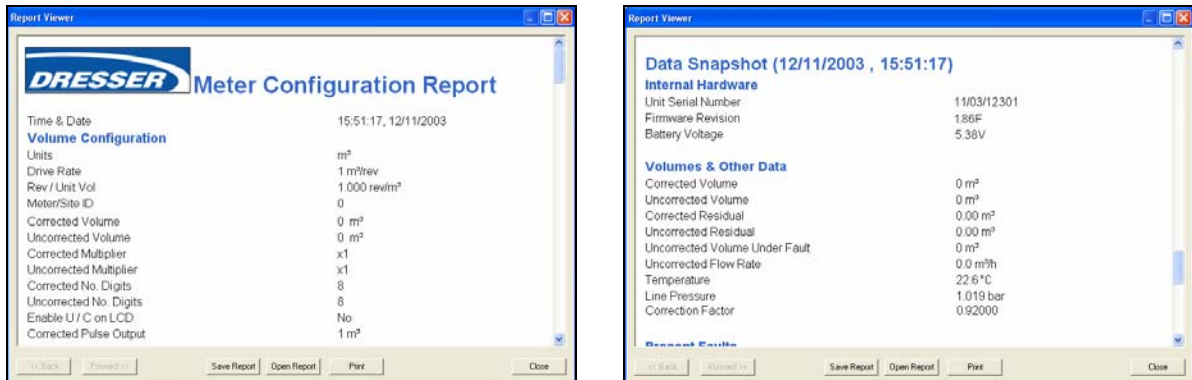


Figure 8 – Configuration Report

The information provided in the report includes (dependent on model and configuration of the MC):

- Volume configuration screen parameters.
- Corrections configuration screen parameters.
- Display Configuration.
- Alarm limits.
- Fault Dialout settings.
- Alarm Dialout settings.
- Logged parameters (including details of log 1, log 2 and log 3).

When a *data snapshot* is included within the report the following additional information is displayed (dependant on model and configuration of the MC):

- Unit serial number.
- Firmware revision.
- Battery Voltage.
- Volumes data (including temperature, pressure and correction factor).
- Present fault(s) details (including line pressure, temperature, volume, internal operation and low battery).
- Occurred fault(s) details (including line pressure, temperature, volume, internal operation and low battery).
- Present alarm(s) details (including high and low pressure, temperature and flow).
- Occurred alarm(s) details (including high and low pressure, temperature and flow).

### To create a configuration report:

- From within the Report section of the *Configuration* screen select the *Report Heading* text box. Enter the desired heading of the report.
- To include a data snapshot select the *Include Data Snapshot In Report* check box (ensure that a check is displayed in the appropriate check box).
- Select the *Create Report*.
- A report viewer will be displayed, containing all the required data. If the *data snapshot* is included the details can be found in the second half of the report, and will be entitled *Data Snapshot* along with the date and time that the data was retrieved.

## **6.12 Report Viewer / View Release Notes**

The report viewer contains 6 options; these will enable the operator to *Save Report*, *Open Report* and *Print* reports. Selection of the *Save Report*, *Open Report*, and *Print* options will display the *Save As*, *Open* and *Print* dialogs common to the PC. If more than one report is opened in the report viewer the operator is able to navigate between files via the *Forward >>* and *<< Back* options. The *>> Forward* and *<< Back* options will only be enabled once more than one configuration file is displayed within the viewer.

Once selected the *View Release Notes* option on the *Welcome* screen will display a report detailing the changes / new features added to the latest release of the UT. The report is displayed within the *Report Viewer*: please note that the only options available when viewing the release notes in the *Report Viewer* are *Print* and *Close*.

## 7 Calibration Screen

Temperature and pressure recalibration should not be required, however the MC may be temperature and pressure calibrated by the operator, using direct communications between the PC and MC. Various methods may be used and additional equipment is required. If there is reason to suspect that the temperature or pressure transducers are reading erroneously, or if an authorising body (e.g. as required by *Weights and Measures* legislation) requires periodic checks on the transducers, the MC meter should be taken out of the line and transported to a calibration factory. At this point the procedures outlined in the following sections should be followed ([7.1 \(Temperature Single Point Calibration\)](#), [7.2 \(Temperature Zero and Span Calibration\)](#), [7.3 \(Pressure Single Point Calibration\)](#) and section [7.4 \(Pressure Zero and Span Calibration\)](#)).

Note: If using the modem to connect the options within the *Calibration* screen will be disabled.

To obtain temperature calibration points use one of the following methods:

1. Use temperature controlled baths with the MC temperature probe and a calibrated thermometer for determining the bath temperatures. The thermometer's stated accuracy should be  $\pm 0.1$  degree.

OR

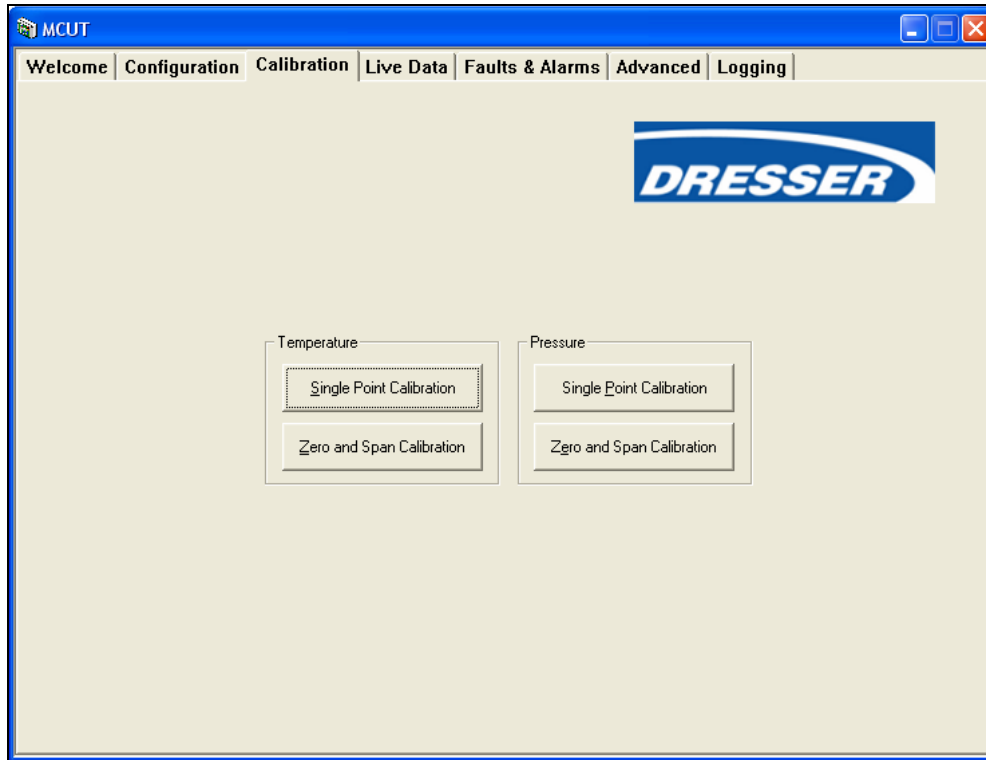
2. Simulate the temperature probe using a calibrated resistance box set to values corresponding to 2 different temperatures. If this option is chosen the thermometer probe must be disconnected from the MC and the resistance box must be connected as a 4 wire resistor in its place.

Note: During calibration multiple temperature readings are automatically compared over a period to ensure that the readings are stable. If stability is not obtained the calibration process will not be successful.

To obtain pressure calibration points a dead weight tester (or other recognised pressure reference equipment) may be used to as a pressure reference. Additionally a barometer is required for absolute pressure transducer testing and calibration.

Note: It is generally a requirement that there should be a certificate of calibration traceable to national standards, for all devices used in the calibration process.

Upon selection of the *Calibration* tab the *Calibration* screen will be displayed. This screen is divided into 2 sections; *Temperature* and *Pressure*. Assuming connection with the MC has already been established (see section [6.1 \(Connect with MC – Direct Connection to the MC\)](#)), then it is possible to calibrate both the temperature and pressure.



**Figure 9 - Calibration Screen**

**To display the Calibration screen:**

- From within the user terminal select the *Calibration* tab. The *Calibration* screen will be displayed.
- The options available on this screen depend on the model and configuration of the MC.
- Note: Pressure calibration of an MC T-Only unit is not possible as no pressure transducer is fitted. If the MC is configured to read a fixed pressure or temperature the associated calibration options will not be available. If a fixed temperature or pressure is used, the measurement modes must be set to live measurement within the user terminal for the appropriate parameter in order to calibrate the desired transducer.

Both *Single Point* and *Zero and Span* calibration can be conducted via the user terminal; this process is only possible via direct communication between the PC and MC.

**7.1 Temperature Single Point Calibration**

**To calibrate a single point temperature:**

- Ensure a calibrated predetermined temperature source is connected to the TB2 terminals of the MC (methods outlined above).
- From within the *Calibration* screen select the temperature *Single Point Calibration* option. The *Temperature Calibration* dialog will be displayed.
- Select the *Update Live Temperature* option. The MC temperature reading will be updated, displayed as read only text and labelled within the dialog as *Live Temperature*.
- Select the *Offset Reference Temperature* text box, and enter the new temperature probe value.
- Select the *Upload Temperature Changes* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Offset Calibration Successful*, select *OK*. The *Temperature Calibration* dialog will be displayed.
- Note: The difference between the *Offset Reference Temperature* and *Live Temperature* reading should be  $\pm 9^{\circ}\text{F}$  /  $< \pm 5^{\circ}\text{C}$ .
- From within the *Temperature Calibration* dialog select the *Return to Calibration Screen* option. The *Calibration* screen will be displayed

**To restore single point temperature calibration factory defaults:**

- From within the *Calibration* screen select the temperature *Single Point Calibration* option. The *Temperature Calibration* dialog will be displayed.
- Select the *Restore Factory Defaults* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Factory temperature calibration restored*. Select *OK*.
- The *Temperature Calibration* dialog will be displayed. Select the *Return to Calibration Screen* option; the *Calibration* screen will be displayed.

For further details please contact your distributor.

## **7.2 Temperature Zero and Span Calibration**

**To calibrate the temperature zero and span:**

- Ensure a calibrated predetermined temperature source is connected to the TB2 terminals of the MC (methods outlined above).
- From within the *Calibration* screen select the temperature *Zero and Span Calibration* option. The *Temperature Calibration* dialog will be displayed.
- Select the *Update Live Temperature* option. The MC temperature reading will be updated, displayed as read only text and labelled within the dialog as *Live Temperature*.
- Select the *Zero Reference Temperature* text box and enter the desired zero reference temperature value. If necessary the operator will be informed of the accepted range.
- Select the *Send Zero Calibration* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Zero Calibration Successful*, select *OK*.
- The *Send Span Calibration* option will now be available.
- Select the *Span Reference Temperature* text box and enter the desired span reference temperature. If necessary the operator will be informed of the accepted range
- Select the *Send Span Calibration Option*. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Span Calibration Successful*, select *OK*. The *Temperature Calibration* dialog will be displayed.
- From within the *Temperature Calibration* dialog select the *Return to Calibration Screen* option. The *Calibration* screen will be displayed.

**To restore temperature zero and span calibration factory defaults:**

- From within the *Calibration* screen select the temperature *Zero and Span Calibration* option. The *Temperature Calibration* dialog will be displayed.
- Select the *Restore Factory Defaults* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Factory temperature calibration restored*. Select *OK*.
- The *Temperature Calibration* dialog will be displayed. Select the *Return to Calibration Screen* option; the *Calibration* screen will be displayed.

For further details please contact your distributor.

### 7.3 Pressure Single Point Calibration

#### To calibrate a single point pressure:

- Ensure a calibrated predetermined pressure source is connected to pressure transducer of the MC (methods outlined above).
- From within the *Calibration* screen select the pressure *Single Point Calibration* option. The *Pressure Calibration* dialog will be displayed.
- Select the *Update Live Pressure* option. The MC pressure reading will be updated, displayed as read only text and labelled within the dialog as *Live Pressure*.
- Select the *Offset Reference Pressure* text box, and enter the new pressure transducer value.
- Select the *Upload Pressure Changes* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Offset Calibration Successful*, select *OK*. The *Pressure Calibration* dialog will be displayed.
- Note: The difference between the *Offset Reference Pressure* and *Live Pressure* reading should be  $< \pm 1.74 \text{ PSI} / \pm 0.12 \text{ bar}$ .
- From within the *Pressure Calibration* dialog select the *Return to Calibration Screen* option. The *Calibration* screen will be displayed.

#### To restore single point pressure calibration factory defaults:

- From within the *Calibration* screen select the pressure *Single Point Calibration* option. The *Pressure Calibration* dialog will be displayed.
- Select the *Restore Factory Defaults* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Factory temperature calibration restored*. Select *OK*.
- From The *Pressure Calibration* dialog will be displayed. Select the *Return to Calibration Screen* option; the *Calibration* screen will be displayed.

For further details please contact your distributor.

### 7.4 Pressure Zero and Span Calibration

#### To calibrate the pressure zero and span:

- Ensure a calibrated predetermined pressure source is connected to the pressure transducer of the MC (methods outlined above).
- From within the *Calibration* screen select the pressure *Zero and Span Calibration* option. The *Pressure Calibration* dialog will be displayed.
- Select the *Update Live Temperature* option. The MC pressure will be updated, displayed as read only text and labelled within the dialog as *Live Pressure*.
- Select the *Zero Reference Pressure* text box and enter the desired zero reference pressure value. If necessary the operator will be informed of the accepted range.
- Select the *Send Zero Calibration* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Zero Calibration Successful*, select *OK*.
- The *Send Span Calibration* option will now be available.
- Select the *Span Reference Pressure* text box and enter the desired span reference pressure. If necessary the operator will be informed of the accepted range
- Select the *Send Span Calibration Option*. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Span Calibration Successful*, select *OK*. The *Pressure Calibration* dialog will be displayed.
- From within the *Pressure Calibration* dialog select the *Return to Calibration Screen* option. The *Calibration* screen will be displayed.

**To restore temperature zero and span calibration factory defaults:**

- From within the *Calibration* screen select the pressure *Zero and Span Calibration* option. The *Pressure Calibration* dialog will be displayed.
- Select the *Restore Factory Defaults* option. Enter the password if appropriate and select *OK*, otherwise select *Cancel*.
- Once complete a dialog will be displayed stating *Factory temperature calibration restored*. Select *OK*.
- The *Pressure Calibration* dialog will be displayed. Select the *Return to Calibration Screen* option; the *Calibration* screen will be displayed.

For further details please contact your distributor.

## 8 Live Data Screen

Upon selection of the *Live Data* tab the *Live Data* screen is displayed. This read only function provides the operator with a *read only* screen from which it is possible to view a *data snapshot* (which may be updated as often as required). The information provided by the *data snapshot* includes (dependent on model selected):

- Unit serial number.
- Meter / Site ID.
- Firmware and PCB revision.
- Battery Voltage
- Corrected and uncorrected volumes.
- Corrected and uncorrected residual.
- Uncorrected flow rate volume.
- Uncorrected under fault volume.
- Temperature reading.
- Line pressure reading.
- Supercompressibility.
- Correction factor.
- Details of all present faults and alarms.
- Details of all occurred faults and alarms.

In a fault condition the appropriate *Present Fault* indicator is displayed as a red square with a *1*. Figure 10 (*Live Data Screen*) displays the *Present Faults* register as clear, i.e. there are no faults present; the appropriate indicators are displayed as a green square with a *0*. Please refer to section [9 \(Faults & Alarms Screen\)](#) for further details.



Figure 10 - Live Data Screen

**To display the live data screen:**

- From within the user terminal select the *Live Data* tab. The *Live Data* screen will be displayed.
- The options available on this screen depend on the model and configuration of the MC.

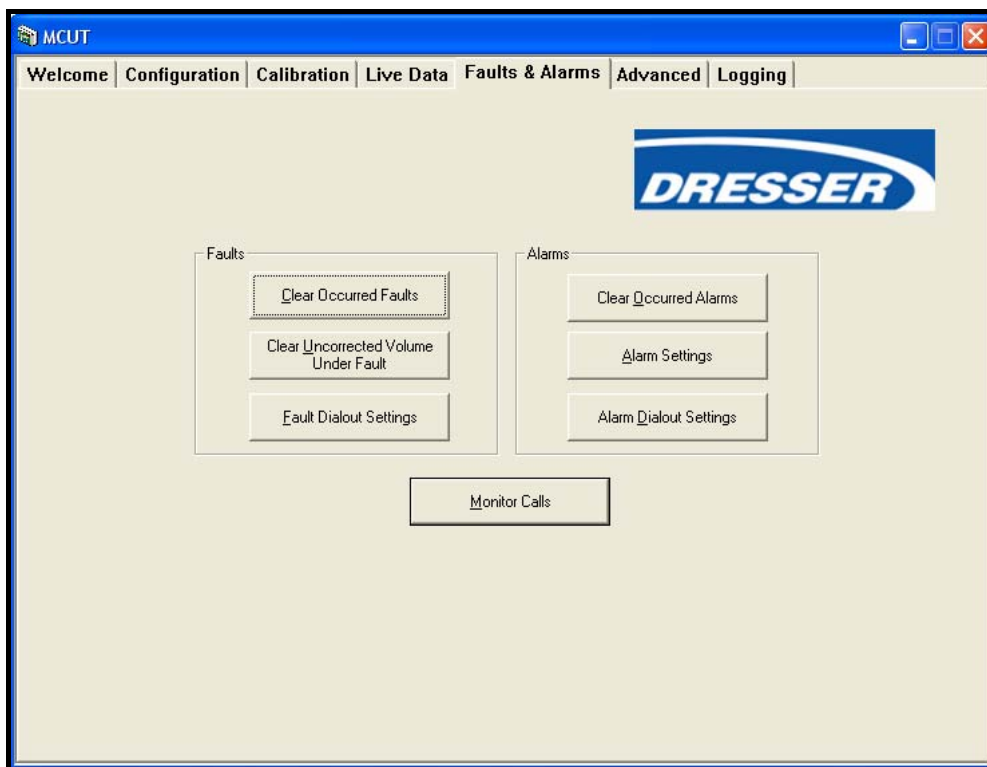
**To update values:**

- From within the *Live Data* screen select the *Update Values* option.
- The values within the screen will be updated.

## 9 Faults & Alarms Screen

Upon selection of the *Fault & Alarms* tab the *Faults & Alarms* screen is displayed. This screen is divided into 2 sections; *Faults* and *Alarms*. From within the various dialogs within this screen it is possible to set the alarm limits, specify the information to be displayed on the LCD in an alarm condition, specify whether telemetry pulse output is to be generated in alarm conditions, clear the uncorrected volume under fault, clear occurred alarms and faults.

A *Monitor Calls* facility is also provided which enables the user terminal to run in *call monitor* mode. Whilst in this mode the user terminal may receive telephone calls via the modem from the MC (subject to operator configuration); such dialouts from the MC are invoked in specified alarm conditions. The information displayed within the *Call Monitor* dialog contains information regarding the alarm condition – date and time, MC serial number, meter / site ID and type of alarm / fault. The call monitor facility required the use of a PC modem along with a Dresser Micro Modem that should be connected to the MC. For further details refer to section [9.7 \(Call Monitor\)](#).



**Figure 11 - Faults and Alarms Screen**

**To display the faults and alarms screen:**

- From within the user terminal select the *Faults & Alarms* tab. The *Faults & Alarms* screen will be displayed.
- Note: The *Monitor Calls* function requires the use of a modem, with both the PC and MC (the modem used in conjunction with the MC must be intrinsically safe (e.g. Dresser Micro Modem)).

## 9.1 Clear Occurred Faults

A fault is described as a measurement reading that exceeds its acceptable range. This may be caused, for example, by exceeding the stated pressure range of the transducer. When a fault condition occurs, an intuitive indication is displayed on the LCD indicating the nature of the fault (see table 4 (*Fault Code Reference Table*)). A download from the unit via the user terminal will show that the appropriate icon(s) within *Present Faults* and *Occurred Faults* section of the *Live Data* screen are displayed with a red square with a 1. When the nature of the problem is ascertained, and resolved the icon within the *Present Faults* section of the *Live Data* screen will return to green with a 0, the fault code on the LCD will cease to be displayed. The appropriate icon within the *Occurred Faults* will remain red with a 1 until the occurred faults register has been cleared. This process can be carried out via the *Faults & Alarms* screen, alternatively, by scrolling through the LCD parameters until the test screen is displayed (scrolling 8's), remain on the test screen until the CLr FLt is displayed. A further press of the MC selector button will clear the occurred faults register, following the selection of the *Update Values* options within the *Live Data* screen the icon within the *Occurred Faults* section will return to green with a 0.

**Table 4 – Fault Code Reference Table**

LCD Fault Code	Fault Condition
Lo Batt	Low Battery
Int FLt	Internal Operations Fault
P FLt	Pressure Fault
t FLt	Temperature Fault

### To clear occurred faults register:

- From within the *Faults & Alarms* screen select the *Clear Occurred Faults* option.
- The faults will be cleared. A dialog will be displayed stating *Faults Cleared OK*, select *OK*.
- The cleared fault can be confirmed by selecting the *Update Values* option within the *Live Data* screen. Providing the fault condition has been cleared and the occurred faults register has been cleared all icons within the *Present Faults* and *Occurred Faults* sections will be green with a 0.

## 9.2 Clear Uncorrected Volume Under Fault

In all fault conditions the *Uncorrected Under Fault* volume register will be activated showing the total number of accumulated uncorrected volume units during the period in which the fault was present. Only faults which have an effect on the correction factor will cause the *Uncorrected Under Fault* register to be activated. Under such conditions both the *Uncorrected Volume* and the *Uncorrected Under Fault* volume will continue to increment, however the *Corrected Volume* register will no longer be activated (this register will be re-activated once the fault condition has been cleared). This allows the operator to calculate the average correction factor for that period from the 3 readings, which could then be applied to the fault counts to give an estimated corrected volume for the fault period.

### To clear uncorrected volume under fault register:

- From within the *Faults & Alarms* screen select the *Clear Uncorrected Volume Under Fault* option.
- The uncorrected volume under fault volume register is password protected will be cleared. A dialog will be displayed stating *Faults Cleared OK*, select *OK*.
- Enter the password if appropriate, and select *OK*, otherwise select *Cancel*.
- The uncorrected volume under fault register will be cleared.
- The cleared register can be confirmed by selecting the *Update Values* option within the *Live Data* screen. The *Uncorrected Under Fault* register value within the *Volumes* section will be set to 0.

### 9.3 Fault Dialout Settings

The call monitor facility enables the MC to dial a PC modem, via the Micro Modem fitted to the MC, in the event of specific operator configured circumstances. The operator is able to specify therefore in which fault conditions the MC should dialout. The fault conditions in which the MC is able to dialout include (dependent on model and configuration):

- Line pressure fault.
- Temperature fault.
- Internal operations fault.
- Low battery.

The operator is also able to specify the telephone number that the MC should dialout to (i.e. the modem connected to the PC that the MC should connect to).

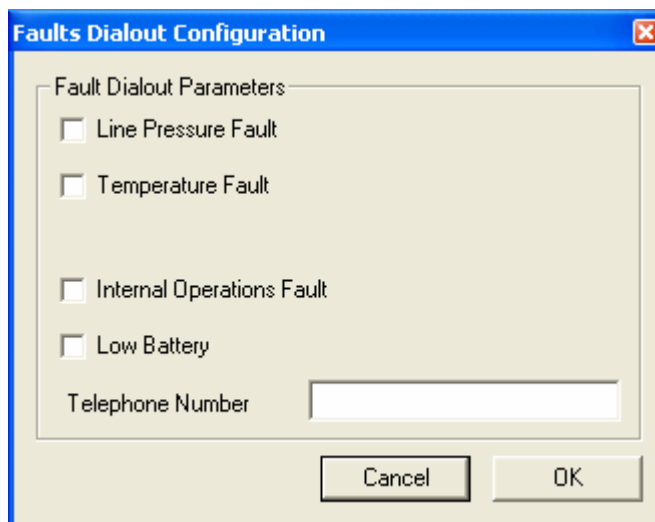


Figure 12 - Faults Dialout Configuration Dialog

#### To specify the dialout under fault condition parameters:

- From within the *Faults & Alarms* screen select the *Fault Dialout Settings* option, the *Fault Dialout Configuration* dialog will be displayed.
- The available parameters that can be set to dialout when a fault condition arises are displayed within the dialog.
- Select the parameter that is required to dialout under a fault condition; ensure that a check is displayed in the appropriate check box. If a parameter is disabled it may be because it is not available.
- Note: If the MC is set to read a fixed pressure or temperature the respective parameters will be disabled. To enable the dialout on these parameters the measurement mode must be switched to Live Measurement.
- Select the *Telephone Number* text box and enter the desired telephone number. (The new parameters will need to be uploaded to the MC via the *Configuration* screen).
- Select the *OK* option within the *Fault Dialout Configuration* dialog.
- Select the *Configuration* tab; the *Configuration* screen will be displayed.
- The changed parameters will be highlighted yellow in the parameter selection list on the *Configuration* screen.
- Select *Upload to MC*.
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.
- Note: To disable the fault dialout, select the appropriate parameter; ensure that the check is removed from the check box. Select *OK*, within the *Alarm Settings* dialog. Within the *Configuration* screen select the *Upload to MC* option. On display of the *Sent OK* message select *OK*.

## 9.4 Clear Occurred Alarms

An alarm can be described as a measurement reading exceeding operator configurable limits. This is not a fault on the unit. It may be used as a means of monitoring the system remotely removing the requirement for continual monitoring. When an alarm condition occurs, an appropriate alarm code is displayed on the LCD (see table 5 (*Alarm Code Reference Table*)). The appropriate icon(s) within *Present Alarms* and *Occurred Alarms* section of the *Live Data* screen are displayed with a red square with a 1. When the nature of the problem is ascertained, and resolved the icon within the *Present Alarms* section of the *Live Data* screen will return to green with a 0, the alarm code on the LCD will cease to be displayed. The appropriate icon within the *Occurred Alarms* will remain red with a 1, until the occurred alarms register has been cleared. Following the selection of the *Update Values* options within the *Live Data* screen, once the occurred alarms have been cleared the icon within the *Occurred Alarms* section will return to green with a 0.

**Table 5 – Alarm Code Reference Table**

LCD Alarm Code	Alarm Condition
HF AL	High Flow Rate Alarm
LF AL	Low Flow Rate Alarm
Ht AL	High Temperature Alarm
Lt AL	Low Temperature Alarm
HP AL	High Pressure Alarm
LP AL	Low Pressure Alarm
Vol AL	High Consumption Alarm

### To clear occurred alarms register:

- From within the *Faults & Alarms* screen select the *Clear Occurred Alarms* option.
- The alarms will be cleared. A dialog will be displayed stating *Alarms Cleared OK*, select *OK*.
- The cleared alarm can be confirmed by selecting the *Update Values* option within the *Live Data* screen. Providing the alarm condition has been cleared and the occurred alarms register has been cleared all icons within the *Present Alarms* and *Occurred Alarms* sections will be green with a 0.

## 9.5 Alarm Settings

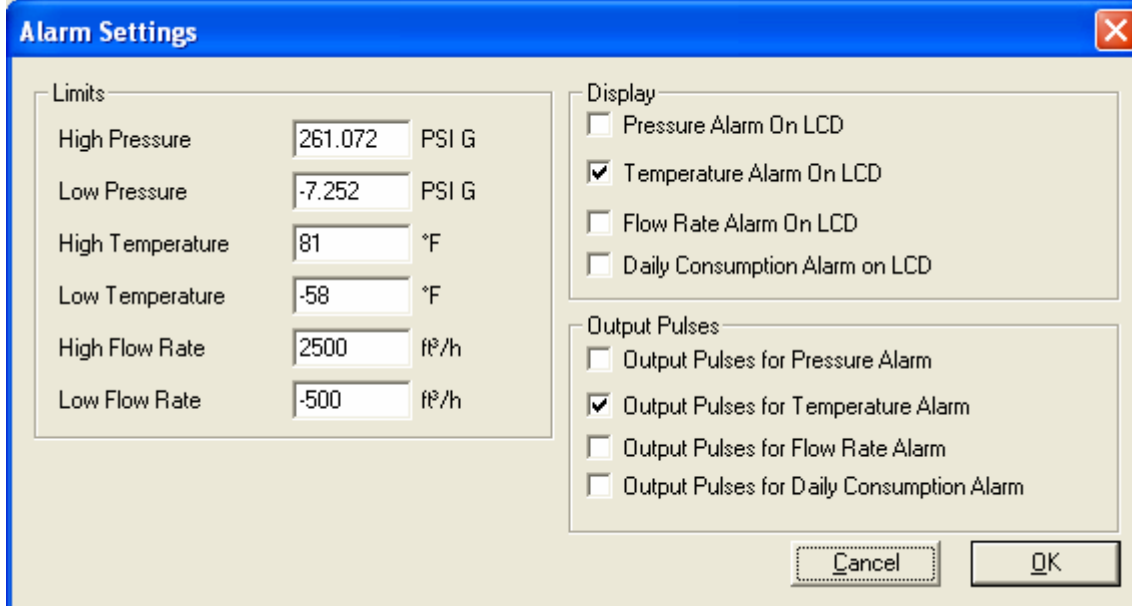
The operator is able to specify alarm limits within the user terminal for the following:

- High pressure.
- Low pressure.
- High temperature.
- Low temperature.
- High flow rate.
- Low flow rate.

The operator is also able to specify which alarms should be displayed on the LCD, and whether or not output pulses should be induced for the various alarm conditions.

### To set the alarm limits:

- From within the *Faults & Alarms* screen select the *Alarm Settings* option, the *Alarm Settings* dialog will be displayed.
- Select the appropriate text box and enter the desired alarm limit; if an invalid value is entered the operator will be advised of the acceptable range. (The new parameters will need to be uploaded to the MC via the *Configuration* screen).
- Select the *OK* option within the *Alarm Settings* dialog.
- Select the *Configuration* tab; the *Configuration* screen will be displayed.
- The changed parameters will be highlighted yellow in the parameter selection list on the *Configuration* screen.
- Select *Upload to MC*. (Enter the password if appropriate, and select *OK*, otherwise select *Cancel*).
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.



**Figure 13 - Alarm Settings Configuration**

**Table 6 – Alarm Parameter / Alarm Limits Reference Table.**

Alarm Parameter	Alarm Limit	
High Pressure	1.5 x maximum pressure of transducer	
Low Pressure	0.5 bar Absolute	7.252 PSI Absolute
	-0.5 bar Gauge	-7.525 PSI Gauge
High Temperature	70°C	158°F
Low Temperature	-50°C	-58°F
High Flow Rate	3750 m <sup>3</sup> /h	150000 ft <sup>3</sup> /h
Low Flow Rate	0 m <sup>3</sup> /h	0 ft <sup>3</sup> /h

**To specify the parameters to be displayed on the LCD in alarm conditions:**

- From within the *Faults & Alarms* screen select the *Alarm Settings* option, the *Alarm Settings* dialog will be displayed.
- From within the *Display* section select the parameter(s) that is / are required to be displayed on the LCD, ensure that a check is displayed in the appropriate check box. (The new parameters will need to be uploaded to the MC via the *Configuration* screen). If a parameter is disabled it may be because it is not available on the MC in question (dependent on model chosen at time of order), for further details contact your distributor.
- Note: If the MC is set to read a fixed pressure or temperature the respective parameters will be disabled. To enable these parameters the measurement mode must be switched to Live Measurement.
- Select *OK* within the *Alarm Settings* dialog.
- Select the *Configuration* tab; the *Configuration* screen will be displayed.
- Select *Upload to MC*.
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.
- Note: To switch a LCD displayed parameter off (so that it is not displayed in an alarm condition), select the appropriate parameter; ensure that the check is removed from the check box. Select *OK*, within the *Alarm Settings* dialog. Within the *Configuration* screen select the *Upload to MC* option. On display of the *Sent OK* message select *OK*.

**To specify output pulses for alarm conditions:**

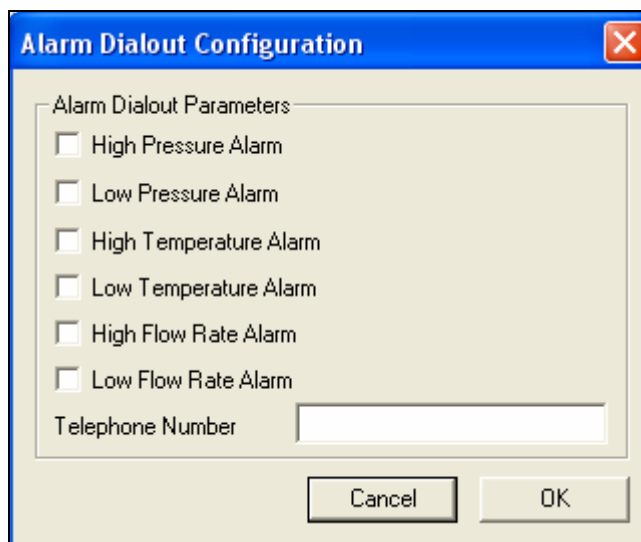
- From within the *Faults & Alarms* screen select the *Alarm Settings* option, the *Alarm Settings* dialog will be displayed.
- From within the *Output Pulses* section select the parameter(s) that is / are required to invoke output pulses during an alarm condition, ensure that a check is displayed in the appropriate check box. (The new parameters will need to be uploaded to the MC via the *Configuration* screen). If a parameter is disabled it may be because it is not available on the MC in question (dependent on model chosen at time of order), for further details contact your distributor.
- Note: If the MC is set to read a fixed pressure or temperature the respective parameters will be disabled. To enable these parameters the measurement mode must be switched to Live Measurement.
- Select *OK* within the *Alarm Settings* dialog.
- Select the *Configuration* tab; the *Configuration* screen will be displayed.
- Select *Upload to MC*.
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.
- Note: To disable output pulse in an alarm condition, select the appropriate parameter; ensure that the check is removed from the check box. Select *OK*, within the *Alarm Settings* dialog. Within the *Configuration* screen select the *Upload to MC* option. On display of the *Sent OK* message select *OK*.

**9.6 Alarm Dialout Settings**

The operator is able to specify in which alarm conditions the MC should dialout; this is achieved in the same manner as specifying the dialout fault conditions (section [9.3 \(Fault Dialout Settings\)](#)). The alarm condition in which the MC is able to dialout include (dependent on model and configuration):

- High pressure alarm
- Low pressure alarm
- High temperature alarm
- Low temperature alarm
- High flow rate alarm
- Low flow rate alarm

The operator is also able to specify the telephone number that the MC should dialout to (i.e. the modem connected to the PC that the MC should connect to).



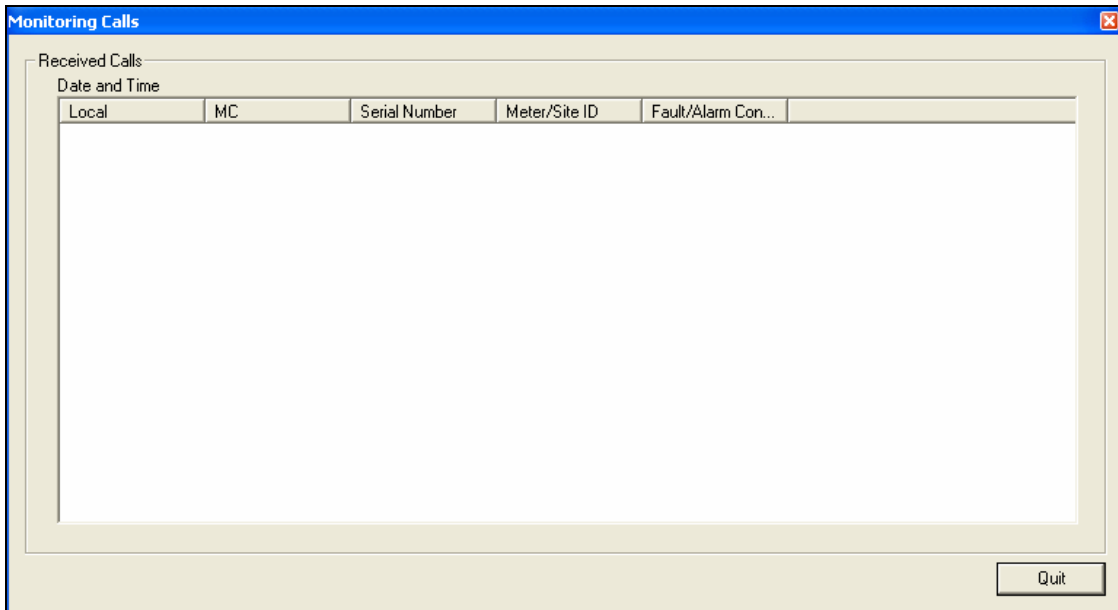
**Figure 14 - Alarm Dialout Configuration Dialog**

**To specify the dialout under alarm condition parameters:**

- From within the *Faults & Alarms* screen select the *Alarm Dialout Settings* option, the *Alarm Dialout Configuration* dialog will be displayed.
- The available parameters that can be set to dialout when an alarm condition arises are displayed within the dialog.
- Select the parameter that is required to dialout under an alarm condition; ensure that the check is display in the appropriate check box. If a parameter is disabled it may be because it is not available.
- Note: If the MC is set to read a fixed pressure or temperature the respective parameters will be disabled. To enable the dialout on these parameters the measurement mode must be switched to Live Measurement.
- Select the *Telephone Number* text box and enter the desired telephone number. (The new parameters will need to be uploaded to the MC via the *Configuration* screen).
- Select the *OK* option within the *Alarm Dialout Configuration* dialog.
- Select the *Configuration* tab; the *Configuration* screen will be displayed.
- The changed parameters will be highlighted yellow in the parameter selection list on the *Configuration* screen.
- Select *Upload to MC*.
- The new details will be uploaded to the MC. On completion a dialog will be displayed stating *Sent OK*, select *OK*, and the uploaded parameters will be displayed with the default white back ground.
- Note: To disable the fault dialout, select the appropriate parameter; ensure that the check is removed from the check box. Select *OK*, within the *Alarm Dialout Configuration* dialog. Within the *Configuration* screen select the *Upload to MC* option. On display of the *Sent OK* message select *OK*.

**9.7 Monitor Calls**

The call monitor facility provides the operator with a facility to accept incoming telephone calls from an MC in the event of alarm conditions (operator configurable limits) and fault conditions. When a call is received by the monitoring calls facility the information displayed details any fault or alarm condition, date and time the details were received, the serial number, and meter / site ID of a specific MC. Several MC's may be configured to dial the same PC in the event of an alarm or fault condition.



**Figure 15 - Monitoring Calls Dialog**

The set up procedure (entering of telephone numbers and specifying the dialout parameters) can be carried out directly; however the actual call monitor facility requires remote communication (via modem). Therefore this procedure assumes that the MC is connected to an intrinsically safe barrier between the MC and the PC in the non-hazardous area; in addition the steps outlined below assume that no previous connection has been made with the MC in this period.

### To setup the call monitor facility:

- Ensure that the MC is connected to the Dresser Micro Modem (ensure that all required safety tests have been carried out, see section [3 \(Safety\)](#)), and the PC modem is installed.
- Locate and run the icon created on the desktop during the installation process. Alternatively select the *MC UT* icon from the *Micro Series User Terminal* folder in the *Start, Programs* menu.
- Once either icon has been selected the *Welcome* screen will be displayed. Select the *Configuration* tab, the *Configuration* screen will be displayed.
- From within the *Configuration* screen select the *Use Modem To Connect* option. Ensure that a check is displayed within the appropriate check box.
- Select the *UT Comms Settings* option. The *UT Comms Settings* dialog will be displayed.
- From within the *UT Comms Settings* dialog select the appropriate modem (PC modem) from the *Modem* drop down selection box. Select the *Configure Modem* option; ensure that the modem is configured as described in section [6.10 \(UT Comms Settings\)](#). Once the modem configuration setup is complete select *OK* within the modem connections preferences dialog.
- From within the *Modem Settings* dialog select *OK*.
- From within the *Configuration* screen select the *Connect with MC* option. The *Telephone Number* dialog will be displayed.
- Select the drop down selection box within the *Telephone Number* dialog. Enter the telephone number of the Dresser Micro Modem (i.e. that which the MC is connected to). (During subsequent use of the modem facility the drop down selection box can be selected and the previously entered telephone numbers will be displayed as a possible selection. Note: The drop down selection box will always display a blank entry).
- Select *OK*. The communication process will commence.
- Once complete a dialog will be displayed stating that *Configuration Downloaded OK*. Select *OK*.
- Select the *Faults & Alarms* tab. The *Faults & Alarms* screen will be displayed.
- Select the *Fault Dialout Settings* option. Ensure that the required parameters are checked within the *Faults Dialout Configuration* dialog (see section [9.3 \(Fault Dialout Settings\)](#)).
- Ensure that the correct telephone number is displayed within the *Telephone Number* text box. This should be the telephone number that the PC modem is connected to (i.e. the telephone number that the MC should dialout to). Select *OK*.
- Select the *Alarm Dialout Settings* option. Ensure that the required parameters are checked within the *Faults Dialout Configuration* dialog (see section [9.6 \(Alarm Dialout Settings\)](#)).
- Ensure that the correct telephone number is displayed within the *Telephone Number* text box. This should be the telephone number that the PC modem is connected to (i.e. the telephone number that the MC should dialout to). Select *OK*.
- Any parameter changes will need to be uploaded to the MC. Select the *Configuration* tab.
- Select *Upload to MC*. The communication process will commence.
- Once complete a dialog will be displayed stating *Sent OK*, select *OK*.

### To activate the call monitor facility:

- Note: The steps outlined in this process assume that the above section, explaining how to *setup the call monitor facility*, has been carried out and should therefore be read as a continual process.
- Select the *Faults & Alarms* tab. The *Faults & Alarms* screen will be displayed.
- Select the *Monitor Calls* option. A dialog will be displayed stating *Please Select An Existing File to add to or a new file to write the calls to*, select *OK*. The *Save As* dialog will be displayed.
- Locate the location in which the monitor calls file is to be saved.
- Enter the desired file name that the monitor calls file is to be saved to, select *Save*.
- The *Monitoring Calls* dialog will be displayed.
- The user terminal is now in *standby* mode and ready to accept incoming calls from any MC that is configured to dial the appropriate telephone number of that PC.
- When an incoming call is detected the user terminal will accept the call and the relevant details will be displayed within the call monitor dialog.

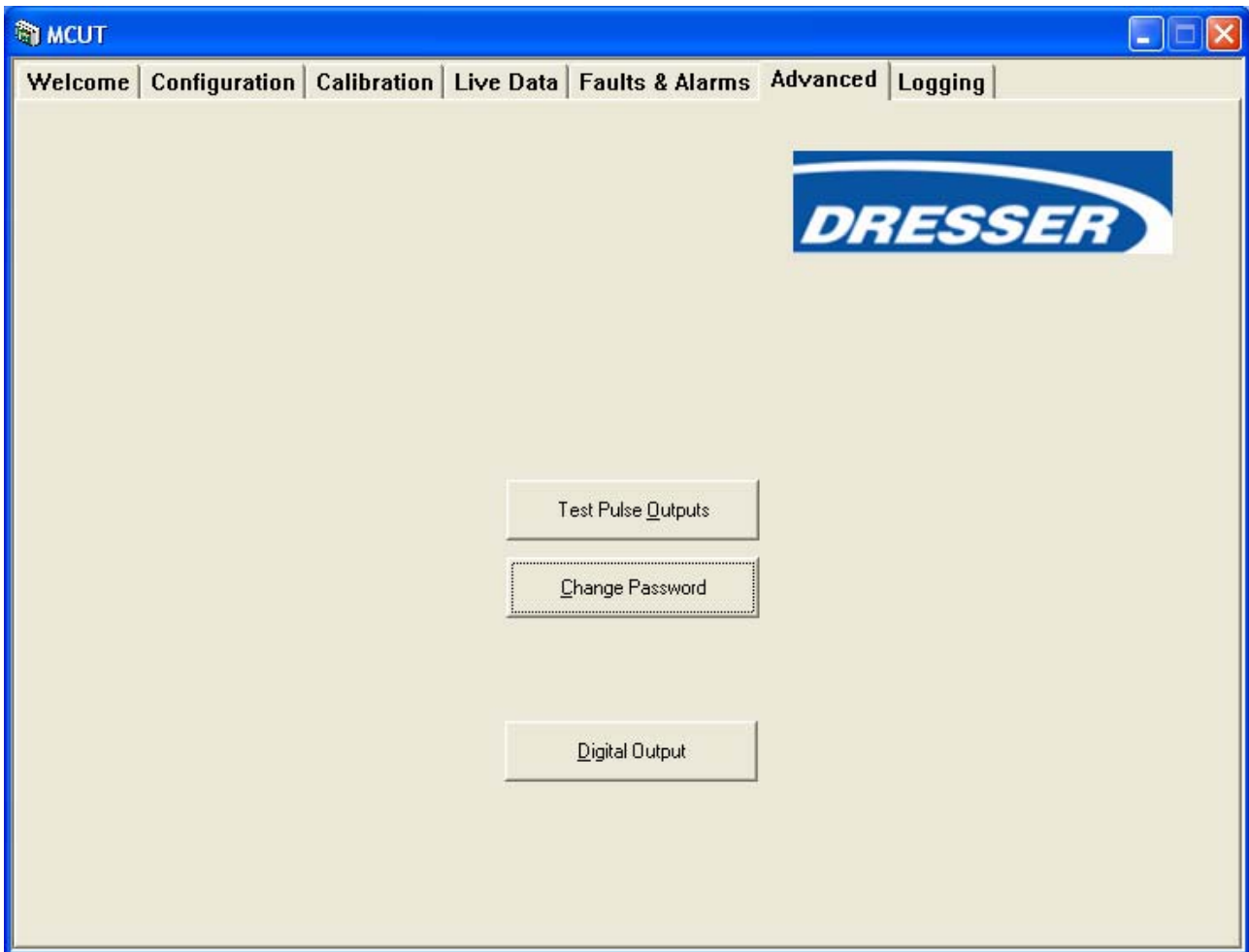
**The MC and the dialout facility:**

- When the MC is configured to dialout in an alarm or fault condition (setup procedure outlined above) several messages may be displayed on the LCD. This may include the type of alarm, type of fault, and *dIAL Out*.
- The dIAL Out message on the LCD indicates that the call process has commenced.
- The MC will continue to dialout until a successful call has been received by the PC. No further calls will be made in this period unless a new fault / alarm condition arises. If a fault / alarm condition is cleared but the fault / alarm registers have not been cleared (via the *Clear Occurred Faults* and *Clear Occurred Alarms* options within the *Faults & Alarms* screen, or by pressing the selector button on the MC when the CLr FLt message is displayed on the LCD (fault register only)) no new calls will be made for that fault / alarm.

## 10 Advanced Screen

The *Advanced* screen contains up to 2 options (model dependant); these are used less frequently than those shown on other screens.

The *Change Password* option is only available when the MC is password protected (model dependant). It is possible to change the password from this screen.



**Figure 16 - Advanced Screen**

### To display the advanced screen:

- From within the user terminal select the *Advanced* tab. The Advanced tab will be displayed.
- Note: The options available on this screen depend on the model and configuration of the MC. If a required option is not available please contact your distributor for further details.

## 10.1 Test Pulse Outputs

The user terminal provides a *Test Pulse Outputs* facility. This allows a verification of the corrected and uncorrected pulse output connections that are used for either telemetry and / or proving purposes. A total of 30 pulses are generated at the pulse width specified within the *Volume Configuration* dialog (accessed via the *Configuration* screen). The activation of the test pulse outputs facility will not cause any disruption to the metered gas; volumes recorded by the meter will be added to the corrected and uncorrected totals, in addition the test pulses produced will be added to the total number of pulses generated. The operator is informed of the test pulse output conditions on selection of the *Test Pulse Outputs* option.

### To activate the test pulse output facility:

- From within the *Advanced* screen select the *Test Pulse Outputs* option. The *Send Test Pulses* dialog will be displayed.
- The operator will be asked to confirm if it is OK to continue. If appropriate select *OK*, otherwise select *Cancel*. The password
- Enter the advanced password if known and select *OK*, otherwise select *Cancel*. A dialog will be displayed stating *Test pulse mode entered successfully*. Select *OK*.
- The LCD on the MC will display PULSES. The *Advanced* screen will be displayed.
- The output pulses will be generated. On completion of the test pulse outputs facility *normal operation* will resume.

## 10.2 Change Password – Model dependant

All password protected parameters are those that, when changed, will affect the customer's bill. The default password is the number 0. Any new password must be numerical and between 1 and 8 digits long.

### To change the password:

- From within the *Advanced* screen select the *Change Password* option, the *Change Password* dialog will be displayed.
- Select the *Existing Password* text box and enter the existing password. The factory default password is the number 0.
- Select the *New Password* text box and enter the desired new password (must be numerical and between 1 and 8 digits long).
- Select the *Verify Password* text box and verify the new password.
- Select the *OK* option. A dialog will be displayed stating *Password changed successfully*. Select *OK*. The *Advanced* screen will be displayed.

## 10.6 Digital Output

The *Digital Output* facility provides digital signal i.e. HIGH or LOW signal level on digital output terminal. If *Maximum Daily Consumption* of gas is reached than *Alarm State* is set for digital output. Refer to Figure 17, operator could set value of *Maximum Daily Consumption*, *Start Time for Daily Billing* and the signal level in *Alarm State*. Operator could also enable or disable Digital Output facility.

If *Maximum Daily Consumption* is reached than:

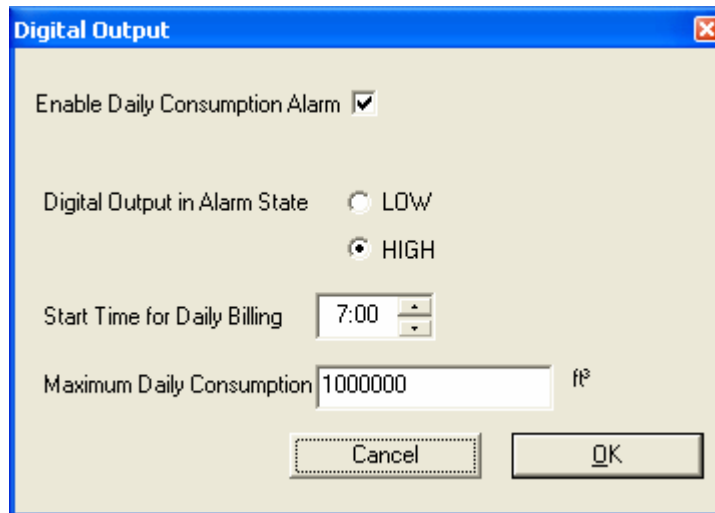
- *Alarm State* is set on digital output terminal.
- Daily Consumption Alarm is set in *Live Data* screen,
- Vol\_AL is indicated on LCD if it was selected in Alarm Setting screen (Display),
- Fault Pulse is generated on Output Pulse if it was selected in Alarm Setting screen (Pulses).

Daily Consumption Register is always reset for Start Time for Daily Billing.

Depending from selection in Customize LCD screen the following parameters could be presented with abbreviated description on LCD:

- Accumulated Corrected Volume current day (Cd),
- Accumulated Corrected Volume previous day (Pd),
- Accumulated Corrected Volume current month (Co),
- Accumulated Corrected Volume previous month (Po),
- Highest daily volume in the current month (Ch),
- Highest daily volume in the previous month (Ph),
- Date when it happened mm\_dd\_yy (blinking dot).

*Date when it happened* is the last date when *Daily Maximum Consumption* was reached.



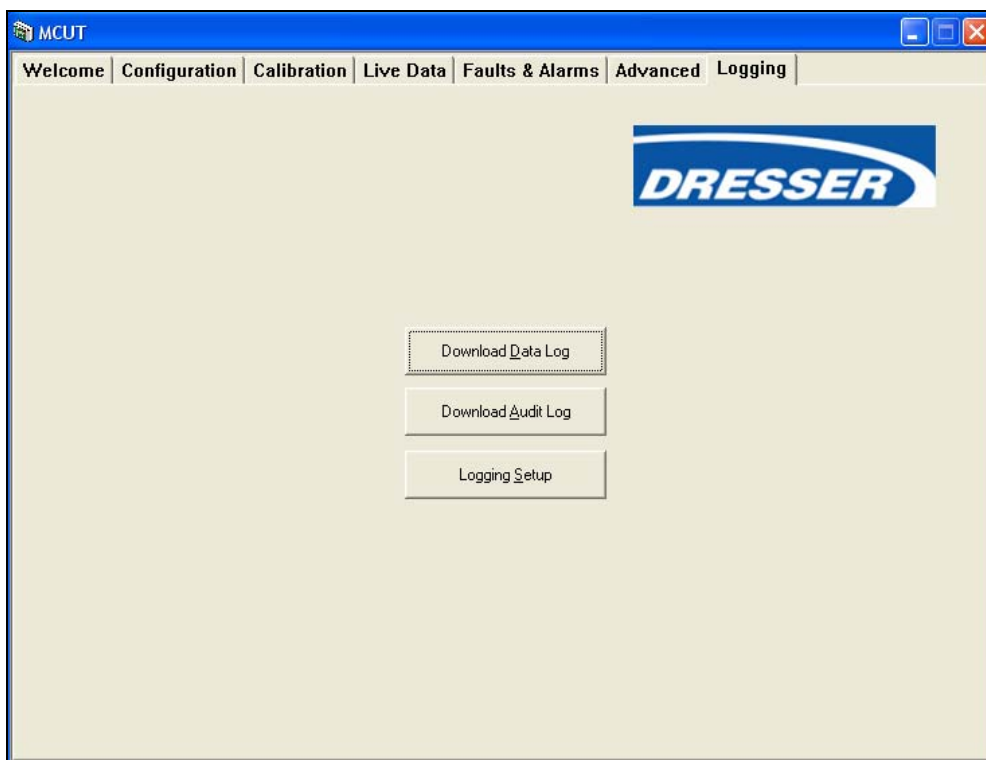
**Figure 17 – Digital Output Dialog**

## 11 Logging Screen

The user terminal provides audit and data logging facilities (where fitted). The audit log provides a record of 32 (maximum) changes to parameters that will affect the billing. The data log provides approximately 1600 data log records (although this figure is determined by the required logged parameters and frequency of logged parameters, both are operator configurable) of recorded parameters, for example the corrected and uncorrected volumes.

Both the audit and data logs are saved as CSV files (comma-delimited). This enables easy import into spreadsheets such as Microsoft Excel or Lotus 123. Once into spread sheet format the data can be manipulated as required.

The *Logging* screen contains 3 options which enable the operator to configure the logging setup of the data log, download the data log and download the audit log.



**Figure 18 - Logging Screen**

### To display the logging screen:

- From within the user terminal select the *Logging* tab. The *Logging* screen will be displayed.
- Note: The options available on this screen depend on the model and configuration of the MC. If a required option is not available please contact your distributor for further details.

## 11.1 Logging Setup

The *Logging Setup* dialog is divided into 4 sections; the *Logged Parameters*, *Log1*, *Log2*, and *Log3*; from within these sections the operator is able to configure what data is logged and the frequency of these logs.

**Figure 19 - Logging Setup Dialog**

The logged parameters available for selection include:

- Corrected Volume.
- Uncorrected Volume.
- Correction Factor.
- Uncorrected Volume Under Fault.
- Line Pressure.
- Temperature.
- Average Corrected Flow Rate.
- Peak Corrected Flow Rate.
- Supercompressibility.

The logging frequency is distributed over a maximum of 3 different logging intervals; these are described as *Log1*, *Log2* and *Log3* within the *Logging Setup* dialog. By default the MC will log 523 hourly logs (*Log1*), 523 daily logs (*Log2*) at 18:00 hours, and 523 monthly logs (*Log3*) taken on the first day of every month at 18:00 hours. For the purpose of the monthly data log all months are assumed to have a maximum of 28 days. The default logged parameters are: corrected volume, uncorrected volume, correction factor, uncorrected volume under fault, line pressure, temperature, average corrected flow rate, peak corrected flow rate and supercompressibility.

If the configuration of *Logged Parameters* is changed the number of logs available will also change; by reducing the number of parameters to be logged the number of available logs recorded will increase. Any change to the maximum number of logs available is displayed within the relevant section(s) within the *Logging Setup* dialog e.g. *Maximum 523*.

**To display the logging setup dialog:**

- From within the user terminal select the *Logging* tab. The *Logging* screen will be displayed.
- From within the *Logging* screen select the *Logging Setup* option. The *Logging Setup* dialog will be displayed.

### 11.1.1 Logged Parameters

The *Logged Parameters* are operator configurable; by default all available parameters are *switched on*, if the details of a parameter are not required within the data log it is possible to switch it off.

**To switch off unwanted logged parameters:**

- From within the *Logging* screen select the *Logging Setup* option. The *Logging Setup* dialog will be displayed.
- From within the *Logged Parameters* section select the appropriate parameter(s) whose details are not required within the data log. Ensure that the check is removed from the appropriate check box.
- Select the *Upload Logging Setup* option.
- Note: By changing the configuration of the logged parameters any existing log entries will be cleared from the data log. Therefore it is recommended that any existing data log is downloaded prior to any changes to the data log configuration.
- If it is not required to download the existing data log select the *Upload Logging Setup*, otherwise select *Go To Data Log Download Screen* or *Cancel*.
- On completion a dialog will be displayed stating *New Logging Settings Successfully Uploaded*. Select *OK*. The *Logging* screen will be displayed.

**To switch on required logged parameters:**

- From within the *Logging* screen select the *Logging Setup* option. The *Logging Setup* dialog will be displayed.
- From within the *Logged Parameters* section select the appropriate parameter(s) whose details are required within the data log. Ensure that a check is displayed in the appropriate check box.
- Select the *Upload Logging Setup* option.
- Note: By changing the configuration of the logged parameters any existing log entries will be cleared from the data log. Therefore it is recommended that any existing data log is downloaded prior to any changes to the data log configuration.
- If it is not required to download the existing data log select the *Upload Logging Setup*, otherwise select *Go To Data Log Download Screen* (to download the data log) or *Cancel*.
- On completion a dialog will be displayed stating *New Logging Settings Successfully Uploaded*. Select *OK*. The *Logging* screen will be displayed.

### 11.1.2 Log1, Log2 and Log3

The method for changing the *Logging Frequency* is the same for *Log1*, *Log2* and *Log3*; therefore the methods described below apply to all 3 logging frequencies (Note: to change *Log1* the settings must be changed within the *Log1* section, *Log2*, the *Log2* section and *Log3*, the *Log 3* section).

### To specify the logging frequency:

- From within the *Logging* screen select the *Logging Setup* option. The *Logging Setup* dialog will be displayed.
- From within the appropriate section (*Log1*, *Log2* or *Log3*) select the desired frequency (*Minutes*, *Hour*, *Daily* or *Monthly*).
- Once selected a further, more specific selection is required;
  - Minutes – specify how frequent the logs should be taken, accepted range 1 – 59 (if 2 is selected a log will be taken every 2 minutes).
  - Hour – specify how frequent the logs should be taken, accepted range 1 – 4, 6, 8, 12. In addition the operator should also specify how many minutes after the hour the log should be taken, accepted range 0 – 59 (if 4 is selected in the first drop down selection box and 53 in the second, the logs will be taken every 4 hours at 53 minutes past the hour).
  - Daily – specify the *Time of Day* that the logs should be taken, accepted range 0:00 – 23:00.
  - Monthly – specify the *Day of Month*, accepted range 1 – 28. In addition the operator should specify the *Time of Day*, accepted range 0:00 – 23:00 (if 28 is selected in the first selection box and 23:30 in the second, a log will be taken on the 28 day of every month at 23:30).
- Repeat for each *Log* as required.
- Select the *Upload Logging Setup* option.
- Note: By changing the configuration of the logged parameters any existing log entries will be cleared from the data log. Therefore it is recommended that any existing data log is downloaded prior to any changes to the data log configuration.
- If it is not required to download the existing data log select the *Upload Logging Setup*, otherwise select *Go To Data Log Download Screen* (to download the data log) or *Cancel*.
- On completion a dialog will be displayed stating *New Logging Settings Successfully Uploaded*. Select *OK*. The *Logging* screen will be displayed.

## 11.2 Download Data Log

When downloading the data log it is possible to select the specific data that is to be retrieved; which log to be downloaded, the range of data for that log, and the manner in which the logged data should be displayed within the log file. The *Download Data Log* dialog is divided into 4 sections; *Log1*, *Log2*, *Log3* and an *Options* section.

Log1		Time	Date
Logging Frequency	Every 1 Minutes	15:49	12/11/03
Logs Acquired	3	Download Logs From	
Logs Available	3	Download Logs To	
Time/Date of First Log Available	15:49:00 12/11/2003		
Time/Date of Last Log Available	15:51:00 12/11/2003		
Download Log 1			

Log2		Time	Date
Logging Frequency	Every 2 Minutes	15:50	12/11/03
Logs Acquired	1	Download Logs From	
Logs Available	1	Download Logs To	
Time/Date of First Log Available	15:50:00 12/11/2003		
Time/Date of Last Log Available	15:50:00 12/11/2003		
Download Log 2			

Log3		Time	Date
Logging Frequency	Every 3 Minutes	15:51	12/11/03
Logs Acquired	1	Download Logs From	
Logs Available	1	Download Logs To	
Time/Date of First Log Available	15:51:00 12/11/2003		
Time/Date of Last Log Available	15:51:00 12/11/2003		
Download Log 3			

Options			
<input checked="" type="radio"/> Cumulative/ Index Read Log	<input type="radio"/> Consumption Per Log	<input type="checkbox"/> Download From Last Log	
<input checked="" type="radio"/> Reverse Chronological	<input type="radio"/> Chronological	View Last Log	
Refresh Data		Close	

Figure 20 - Download Data Log Dialog

### 11.2.1 Download Log1, Log2 and Log3

The method for downloading the data logs is the same for *Log1*, *Log2* and *Log3*; therefore the methods described below apply to all 3 logging frequencies (Note: to download *Log1* the download options must be changed within the *Log1* section, *Log2*, the *Log2* section and *Log3*, the *Log 3* section). A *Refresh Data* option is provided to ensure that the latest time and date of log entries available for download are displayed to the operator. Once a data log has been downloaded the *View Last Log* option will become available.

#### To download all available data log entries:

- From within the *Logging* screen select the *Download Data Log* option. The *Download Data Log* dialog will be displayed.
- The time and date of the first available log are displayed within the relevant section, along with the time and date of the last available log. By default the all available data logs will be downloaded.
- Select the *Refresh Data* option to ensure that the very latest available log time and date are displayed. If appropriate the read only details associated with each log period will be updated.
- From within the appropriate section (*Log1*, *Log2* or *Log3*) select the *Download Log* option. The *Save As* dialog will be displayed.
- Locate the location in which the data log file is to be saved.
- Enter the desired file name that the data log file is to be saved to. A default file name will be displayed which may also be used. Select the *Save* option.
- Once complete a dialog will be displayed stating *Log File Saved OK*. Select *OK*.

#### To view a downloaded data log:

- Once downloaded from within the user terminal select the *View Last Log* option. The default program (e.g. Excel, Lotus 123 etc) used to open CSV files will be launch and the data log file open. The data can then be manipulated as required.
- To return to the *Logging* screen select the *Close* option.

#### Alternatively:

- Open the appropriate data log file (all data log files saved from within the user terminal are of the type .CSV) from within the spreadsheet (e.g. Excel, Lotus 123 etc) in the usual manner.

### 11.2.2 Options

Various options are available within the *Download Data Log* dialog within the *Options* section, an explanation of the functionality they offer is provided below. If any of these options are required they should be selected prior to selection of the appropriate *Download Log* option.

#### Cumulative / Index Read Log:

- Selection of this radio button option will display the volumes within the data log as per the volumes displayed on the LCD of the MC.

#### Consumption Per Log:

- Selection of this radio button option will display the volumes logged within each logging period (i.e. the difference between the new and last volume reading)

#### Download From Last Log:

- Selection of this check box option will include only the data log entries that have been logged since the last data log was retrieved.

#### Chronological and Reverse Chronological:

- Selection of the *Chronological* check box option will ensure that the data log entries within the data log file are displayed with the oldest entry first. If the *Reverse Chronological* option is selected the data log entries within the data log file will be displayed with the oldest entry last.

### 11.3 Download Audit Log

An audit log facility is provided to ensure that all changes to parameters that could affect the customer's bill are recorded. All audit log files saved from within the user terminal are of the type *.CSV*. A *Refresh Data* option is provided to ensure that the latest log entry details available for download are included. Once an audit log has been downloaded the *View Last Log* option will become available.

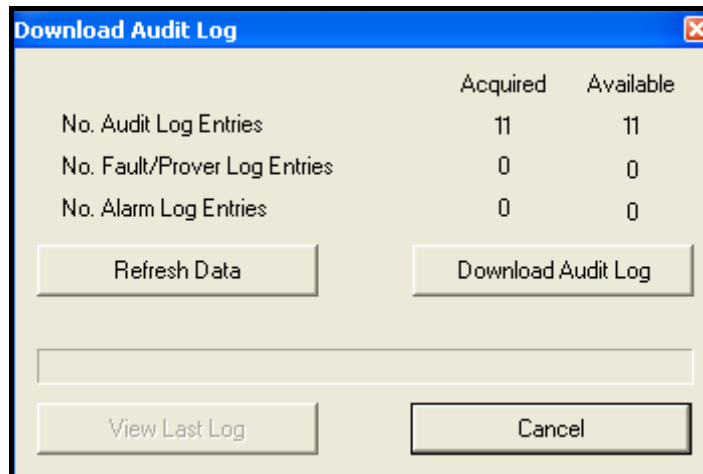


Figure 21 - Download Audit Log Dialog

**Table 7 – Audit Log Parameters Reference Table**

<b>Audit Log Parameter</b>	
<b>Volume Configuration</b>	Drive Rate
	Corrected Multiplier
	Uncorrected Multiplier
	Corrected Pulse Output
	Uncorrected Pulse Output
	Pulse Output Allocation
	Pulse Width
	Corrected Volume
	Uncorrected Volume
	Uncorrected Volume under Fault
<b>Corrections Configuration</b>	Temperature Units
	Base Temperature
	Temperature Mode (Fixed or Live)
	Fixed Temperature
	Pressure Units
	Base Pressure
	Atmospheric Pressure
	Fixed Pressure Factor
	Fixed Line Pressure
	Pressure Mode (Fixed or Live)
	Supercompressibility
	Fixed Pressure Type (Gauge or Absolute)
<b>Calibration</b>	Temperature Calibration Offset
	Temperature Calibration Span
	Pressure Calibration Offset
	Pressure Calibration Span
<b>Alarm Settings</b>	High Pressure Alarm Limit
	Low Pressure Alarm Limit
	High Temperature Alarm Limit
	Low Temperature Alarm Limit
	High Flow Rate Alarm Limit
	Low Flow Rate Alarm Limit
<b>Advanced Options</b>	Test Pulses Output

**To download the audit log:**

- From within the *Logging* screen select the *Download Audit Log* option. The *Download Audit Log* dialog will be displayed.
- The number of available log entries will be displayed within the dialog under the *Available* heading. For operator informational purposes the available logs are categorised under the following headings; audit log entries, fault / Prover log entries and alarm entries.
- Select the *Refresh Data* option to ensure that the very latest available log entry details are included. If appropriate the read only details associated with each audit log category will be updated.
- Select the *Download Audit Log* option. The *Save As* dialog will be displayed.
- Locate the location in which the audit log file is to be saved.
- Enter the desired file name that the audit log file is to be saved to. A default file name will be displayed which may also be used. Select the *Save* option.
- Once complete a dialog will be displayed stating *Log File Saved OK*. Select *OK*.

**To view a downloaded audit log:**

- Once downloaded from within the user terminal select the *View Last Log* option. The default program (e.g. Excel, Lotus 123 etc) used to open CSV files will be launch and the audit log file will open. The data can then be manipulated as required.
- To return to the *Logging* screen select the *Cancel* option.

**Alternatively:**

- Open the appropriate data log from within the spreadsheet (e.g. Excel, Lotus 123 etc) in the usual manner (e.g. File, Open), alternatively locate the file and double click. All data log files saved from within the user terminal are of the type *.CSV*.

## 12 Modem Communications

Note: An intrinsically safe barrier (or Dresser Micro Modem) must be installed between a PC in a non-hazardous area and the MC in the hazardous area. Please refer to section [3 \(Safety\)](#) for more details.

### To initialise communications via modem:

- Locate and run the icon created on the desktop during the installation process. Alternatively select the *MC UT* icon from the *Micro Series User Terminal* folder in the *Start, Programs* menu.
- Select the *Configuration* tab, the *Configuration* screen will be displayed.
- From within the *Configuration* screen, select the *Use Modem To Connect* option. Ensure a check is displayed within the check box.
- Select the *UT Comms Settings* option. The *UT Comms Settings* dialog will be displayed.
- From within the *Modem* section select the *Modem* drop down box, and select the appropriate modem (ensure that the PC modem that will be used by the PC to dial out is selected).
- Ensure the modem is configured as specified. Please refer to section [6.10 \(UT Comms Settings\)](#) for further details.
- Note: It is important to specify the correct modem baud rate from within the *MC Comms Settings* option while in direct communications (accessed via the *Configuration* screen). This will ensure that the MC and modem communicate at the speed specified by the modem. If the incorrect modem baud rate is specified modem communications will not be possible.
- From within the *UT Comms Settings* dialog select the *OK* option.
- From within the *Configuration* screen select the *Connect with MC* option. The *Telephone Number* dialog will be displayed.
- Enter the telephone number of the Dresser Micro Modem that the MC is connected to. Select *OK*.
- Once communications has been established a dialog will be displayed stating *Configuration Downloaded OK*. Select *OK*.
- Continue to configure the MC as required. Please refer to the relevant sections above as required.

### 13 Password Protection

Parameters that are password protected are detailed in table 8 (*Password Protected Parameters*). If the operator attempts to change a protected password a password dialog will be displayed, the appropriate password should be entered; following a successful password entry the changed parameters will be uploaded to the MC.

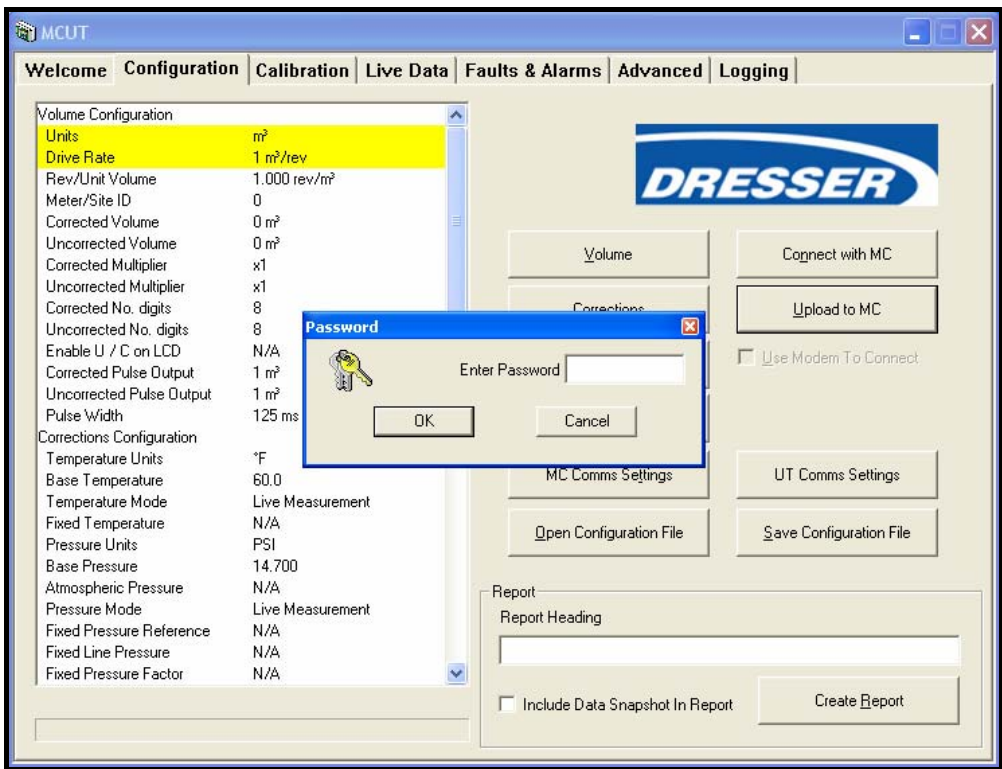


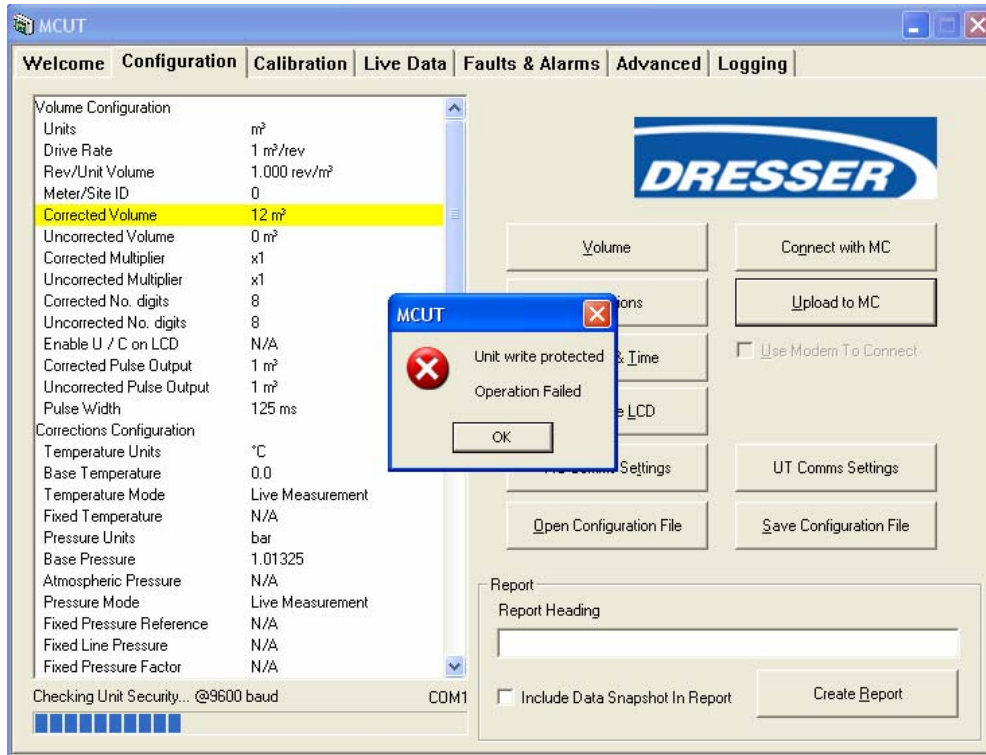
Figure 22 - Password Dialog

**Table 8 – Password Protected Parameters Reference Table**

<b>Password Protected Parameters</b>	
<b>Volume Configuration</b>	Units
	Drive Rate
	Corrected Multiplier
	Uncorrected Multiplier
	Pulse Output Allocation
	Corrected Pulse Output
	Uncorrected Pulse Output
	Corrected Volume
	Uncorrected Volume
	Clear Uncorrected Volume under Fault Register
<b>Corrections Configuration</b>	Temperature Units
	Base Temperature
	Temperature Mode (Fixed or Live)
	Fixed Temperature
	Pressure Units
	Base Pressure
	Atmospheric Pressure
	Fixed Pressure Factor
	Fixed Line Pressure
	Pressure Mode (Fixed or Live)
	Supercompressibility
	Supercompressibility Mode
	Fixed Pressure Type (Gauge or Absolute)
<b>Calibration</b>	Temperature Calibration
	Pressure Calibration
<b>Other</b>	Test Pulse Outputs
	Change Password
	Digital Output

## 14 Weights and Measures Link Protection

The *Weights and Measures* link protection is provided to meet various legislation requirements. When the *Weights and Measures* link is in place the parameters that it protects (see table 9 (*Weights and Measure Link Protection*)) are not operator configurable. For further details regarding the setting of the weights and measures link refer to the *Micro Series Volume Corrector Handbook* (PH030) as shipped with the MC. Note: The configuration set up of the MC will need to be carried out prior to setting the *Weights and Measures* link.



**Figure 23 - Weights and Measures Link Protection Dialog**

If the operator attempts to change a parameter protected by the *Weights and Measures* link, a dialog will be displayed (see figure 22 (*Weights and Measure Link Protection Dialog*)) once the *Upload to MC* option is selected.

**Table 9 – Weights and Measures Link Protected Parameters Reference Table**

<b>Weights and Measures Link Protected Parameters</b>	
<b>Volume Configuration</b>	Units
	Drive Rate
	Corrected Multiplier
	Uncorrected Multiplier
	Pulse Output Allocation
	Corrected Pulse Output
	Uncorrected Pulse Output
	Corrected Volume
	Uncorrected Volume
	Clear Uncorrected Volume under Fault Register
<b>Corrections Configuration</b>	Temperature Units
	Base Temperature
	Temperature Mode (Fixed or Live)
	Fixed Temperature
	Pressure Units
	Base Pressure
	Atmospheric Pressure
	Fixed Pressure Factor
	Fixed Line Pressure
	Pressure Mode (Fixed or Live)
	Supercompressibility
	Supercompressibility Mode
	Fixed Pressure Type (Gauge or Absolute)
<b>Calibration</b>	Temperature Calibration
	Pressure Calibration
<b>Advanced Options</b>	Test Pulse Outputs
	Digital Output

## 15 The MC LCD Displayed Messages

The parameters displayed on the LCD of the MC can be accessed via the selector push button on the front panel of the MC. In addition to the parameters listed in section 6.6 ([Customize LCD](#)) further *messages* are displayed for informational purposes (see table 10 (*LCD Displayed Messages*)). Note: Some of these *messages* are dependent on the configuration of the unit.

**Table 10 – LCD Displayed Messages Reference Table**

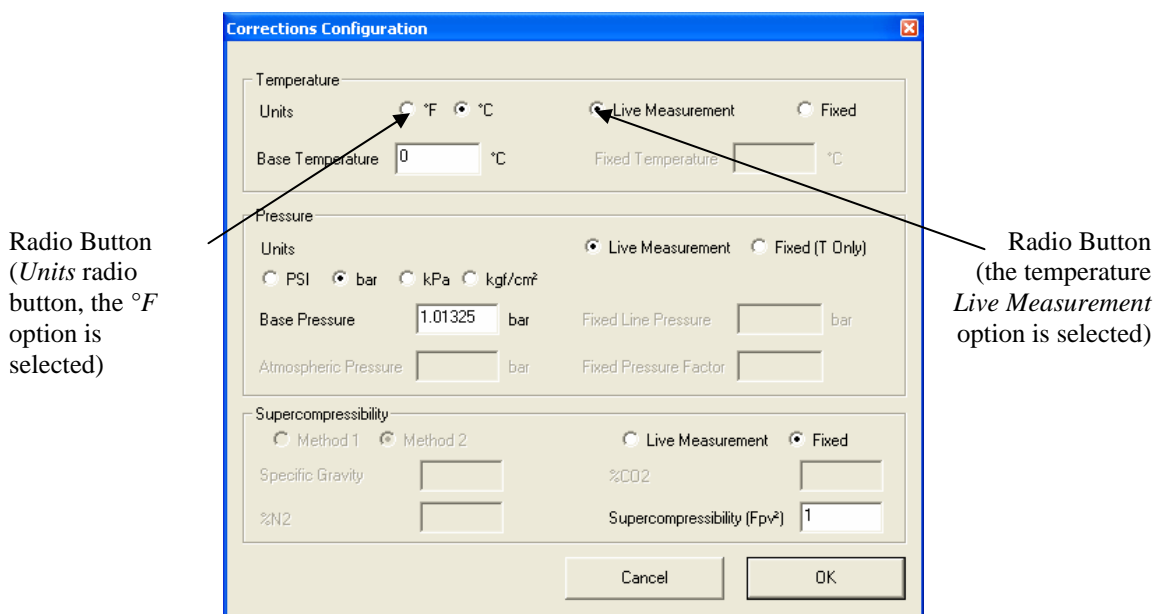
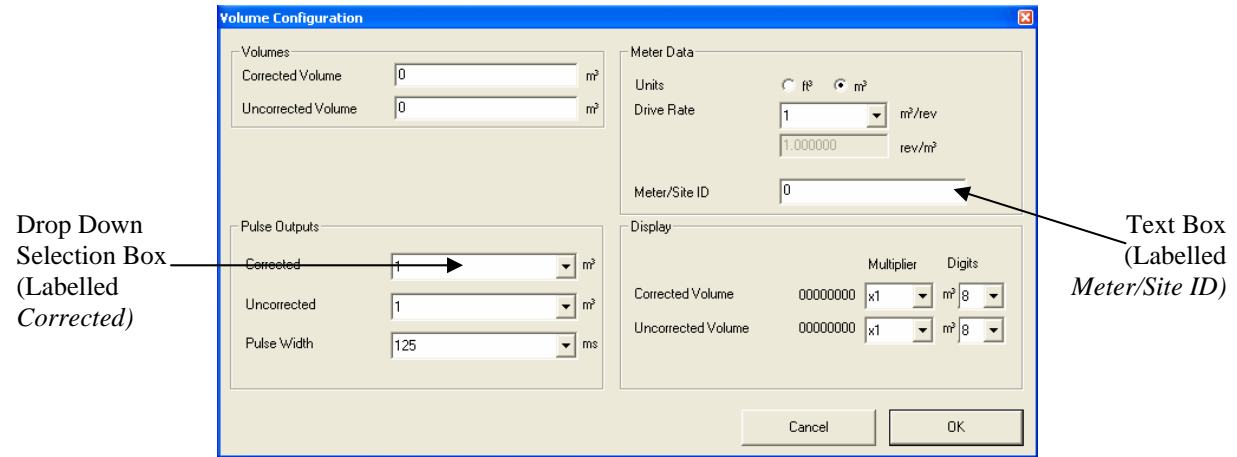
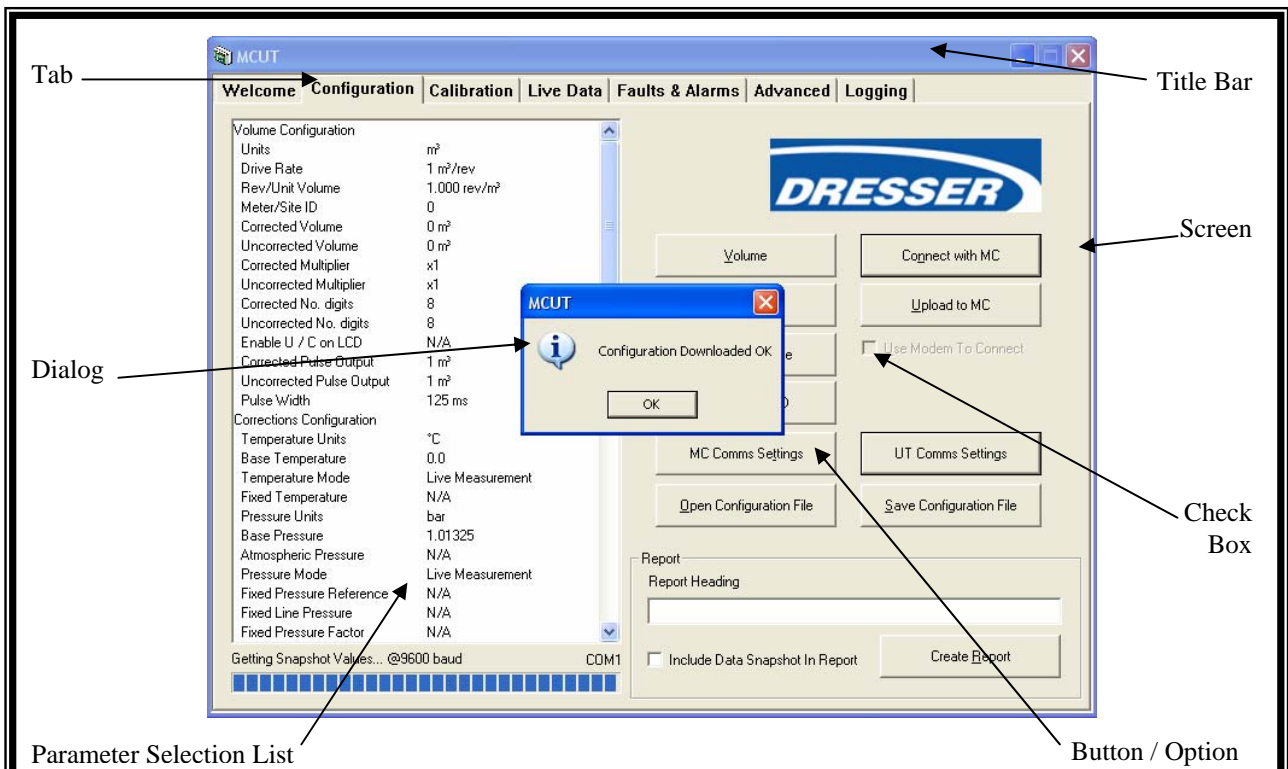
LCD Parameter	Additional Information	Example
Corrected Volume	Maximum 9 digits. The display multiplier and volume units are also displayed.	999999999 <sub>x1</sub> m <sup>3</sup>
Uncorrected Volume	Maximum 9 digits. The display multiplier and volume units are also displayed	999999999 <sub>x</sub> m <sup>3</sup>
Flow Rate	In addition to the flow rate value the volume units will be displayed.	0.0 m <sup>3</sup>
Correction Factor	Value only.	
Drive Rate	Dirve rate reference and drive rate value	Dr 1
Line Pressure	Pressure reading and pressure units displayed.	1.001b
Temperature	Temperature reading and temperature units displayed.	50.1C
Uncorrected Volume Under Fault	Maximum 5 digits. The letters <i>UF</i> are displayed to signify <i>Uncorrected</i> volume under <i>Fault</i> . The display multiplier and volume units are also displayed.	99999UF <sub>x1</sub> m <sup>3</sup>
Corrected Residual	Maximum 3 digits (and 2 decimal places). The letters <i>Cr</i> are displayed to signify <i>Corrected Residual</i> . The display multiplier and volume units are also displayed.	199.99Cr <sub>x1</sub> m <sup>3</sup>
Uncorrected Residual	Maximum 3 digits (and 2 decimal places). The letters <i>Ur</i> are displayed to signify <i>Uncorrected Residual</i> . The display multiplier and volume units are also displayed.	199.99Cr <sub>x1</sub> m <sup>3</sup>
Firmware version	Firmware version followed by <i>Fr</i> .	1.86Fr
Atmospheric Pressure	Atmospheric pressure reading followed by <i>PA</i> .	1.01 PA
Base Pressure	Base pressure reading followed by <i>Pb</i> .	1.01 Pb
Pressure Factor	Pressure factor value followed by <i>PF</i> .	1.00 PF
Supercompressibility	Supercompressibility value followed by <i>Zb</i>	1.002b Zb
Battery Voltage	Indication of battery voltage followed by <i>Ub</i>	5.39 Ub
Current Date	Date is displayed with an underscore separator. MM/DD/YY format.	05_01_03
Current Time	Time is displayed with a dash separator. HH/MM/SS	10-30-59
Test Screen	LCD will display each section (as an 8) individually and all symbols (battery icon, display multiplier and volume units)	
Units	Explanation	
x0.1	0.1 Display multiplier	
x1	1 Display multiplier	
x10	10 Display multiplier	
x100	100 Display multiplier	
x1000	1000 Display multiplier	
cu ft	Cubic feet	
m <sup>3</sup>	Cubic meters	
b	bar	
P	PSI	
-PA	kPa/cm <sup>2</sup>	
-9F	kgf/cm <sup>2</sup>	
P FLt	MC has entered the Pressure Fault condition.	
t FLt	MC has entered the Temperature Fault condition.	
Int FLt	MC has entered the Internal Operation fault condition.	
Lo bAtt	MC has entered low battery condition.	
HP AL	High Pressure alarm present.	
LP AL	Low Pressure alarm present.	
Ht AL	High Temperature alarm present.	
Lt AL	Low Temperature alarm present.	
HF AL	High Flow alarm present.	
LF AL	Low Flow alarm present.	
dIAL Out	MC has entered dial out mode.	
CLr Flt	Clear fault, a further press of the MC selector button will clear any occurred faults.	
PULSES	MC is in test pulse output mode.	

## Appendix A – Terminology Used

The terminology used within this handbook is listed, for quick reference, in table 11 (*Terminology and Abbreviation Quick Reference Table*); in addition the abbreviations used are described within the body of this handbook on the first use in the relevant section. Subsequent instances will be abbreviated.

**Table 11 – Terminology and Abbreviation Quick Reference Table**

Terminology / Abbreviation	Explanation
User terminal	Micro Series Corrector User Terminal software
MC / Unit	Micro Series Volume Corrector.
Select / Selecting	Place the mouse cursor over an item and press the left mouse button.
Title Bar	The title bar displays the name of the main screen / dialog box. These names are used to cross refer throughout this handbook.
Tab	The following tab options are available; Welcome, Configuration Calibration, Live Data, Faults & Alarms, Advanced, Logging.
Button / Option	A selectable icon that the operator is required to <i>select</i> . Selection of a button / option will either signify the operator's response (e.g. selecting <i>OK</i> to acknowledge a message) or an operator request (e.g. selecting the <i>Configuration</i> tab to display the <i>Configuration</i> screen). See figure 23 ( <i>Identification Guide</i> ).
Screen	When a <i>Tab</i> is selected the associated <i>Screen</i> is displayed. Figure 23 shows the <i>Configuration</i> screen.
Dialog	There are numerous dialogs that may be displayed within the user terminal. These are displayed when selecting a button / option from within a screen. See figure 23 ( <i>Identification Guide</i> ); the dialog requires a response from the operator to acknowledge a successful configuration download. In this instance the operator should <i>select</i> the <i>OK</i> option to continue.
Check Box	When a check box is enabled a 'tick' or 'check' is placed in the box. See figure 23 ( <i>Identification Guide</i> ); the check box should be enabled if communication to the MC is to be carried out via a modem.
Parameter Selection List	The parameter selection list is located on the left hand side of the <i>Configuration</i> screen and contains the list of parameters that are changeable within a dialog (e.g. <i>Volume Configuration</i> dialog). By double clicking an item within the parameter selection list the appropriate dialog (including those from other screens) will be displayed, and where applicable the specific parameter will be highlighted within that dialog. If any parameter is changed it will be highlighted yellow within the parameter selection list until it is <i>Uploaded to MC</i> .
Text Box	A text box is an operator editable field which enables the operator to enter a new value. Figure 23 ( <i>Identification Guide</i> ) contains a text box which allows the operator to specify a name for a given MC.
Drop Down Selection Box	The drop down selection box provides the operator with a pre-determined selection of options. To view the options available select the arrow located on the right hand side of the selection box. The available options are then displayed; if required a scroll bar is displayed to enable viewing of all options. Figure 23 ( <i>Identification Guide</i> ) contains the <i>Flow Sense</i> drop down selection box.



**Figure 24 - Identification Guide A**

## Appendix B – User Terminal Software Licence Agreement

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