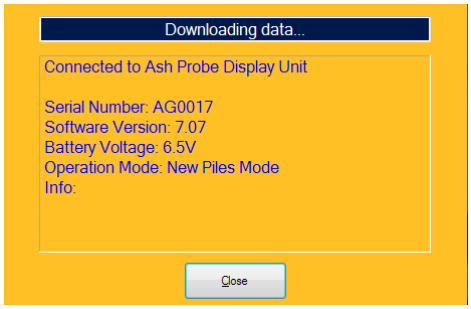

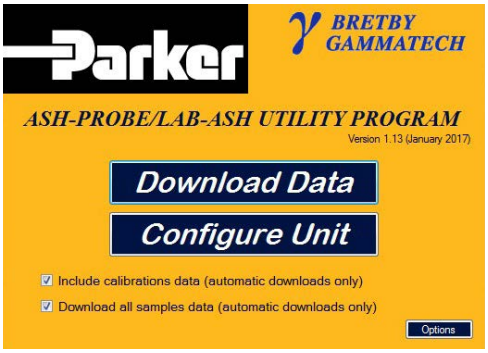

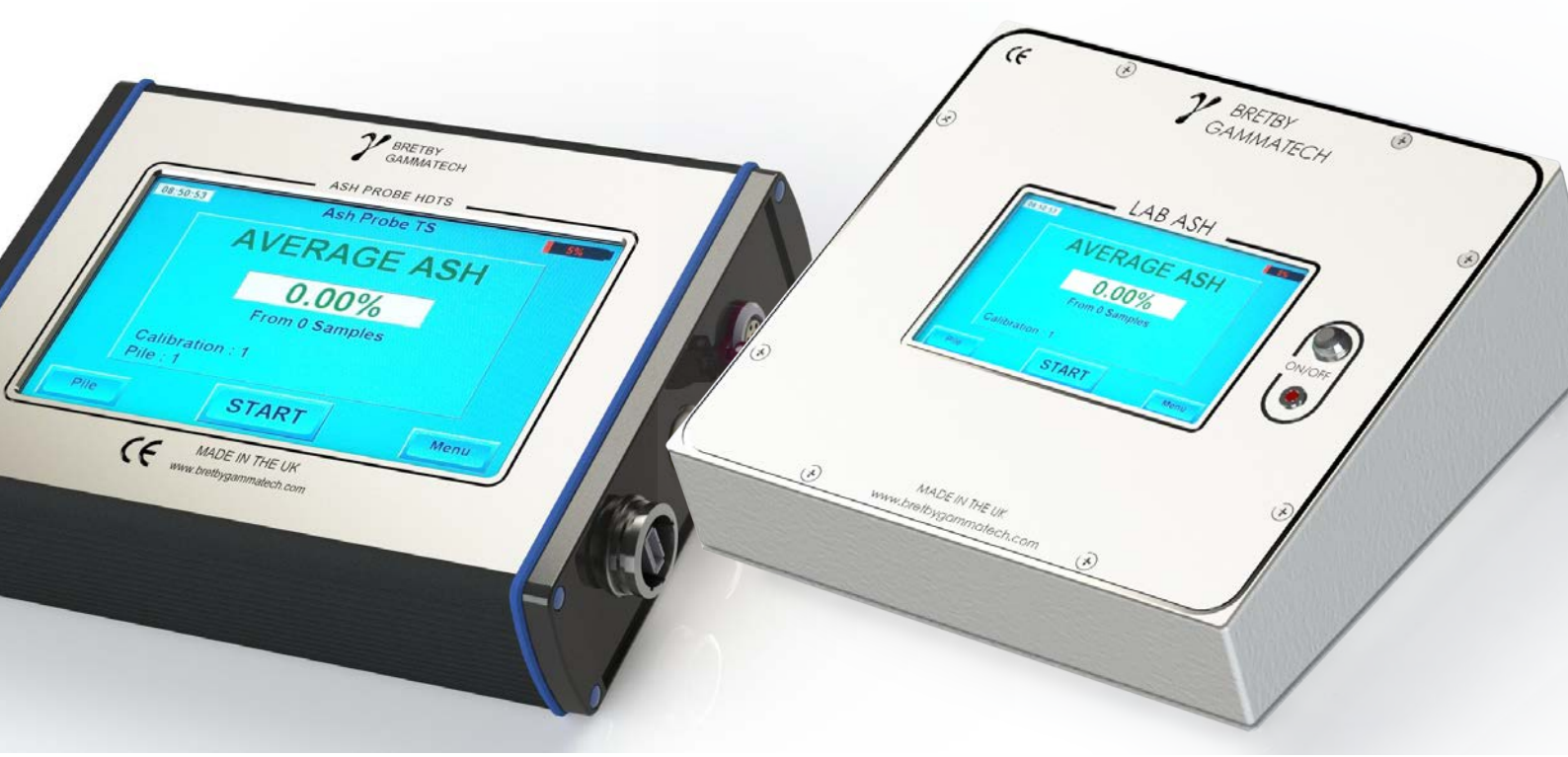

Ash Probe & Lab Ash Utility Software

User Manual

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VERSION HISTORY

Issue	Date	Author	Changes
1.00	January 2014	Kevin Corcoran	First publication
1.01	October 2014	Kevin Corcoran	Calibrations editing section modified in line with changes to software
1.02	November 2014	Kevin Corcoran	Note added to installation section to warn of requiring administrator level logon in order to install the USB cable driver.
1.03	March 2016	Kevin Corcoran	Company address and contact details updated
1.04	January 2017	Kevin Corcoran	Software and User Guide converted to Parker Hannifin colour scheme

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Bretby Gammatech
Parker Hannifin Manufacturing Limited
Instrumentation Products Division Europe
President Park, President Way, Sheffield, S4 7UR

United Kingdom

Tel: +44 (0)114 224 0000
Email: info@bretbygammatech.com
Web: www.parker.com/ipd

CONTENTS

1 INTRODUCTION

The Ash Probe Utility, APU, is a software application for use with the Bretby Gammatech Ash Probe and Lab Ash portable coal quality monitoring systems.

It allows the data recorded by the Display Units to be downloaded to a spreadsheet file for viewing/editing on a PC.

With the appropriate version of firmware in the Ash Probe/Lab Ash, the viewing and configuration of the unit's parameters can also be made using this utility software.

1.1 PROGRAM DESCRIPTION

The APU software connects to an Ash Probe or Lab Ash Display Unit using a serial communication cable, which allows data to be passed between the software and the Display Unit.

The cable and software is supplied by Bretby Gammatech as part of the Ash Probe or Lab Ash package. The cable itself is either an RS232 serial cable with a 9 pin D type connector on the computer side or USB serial cable, which connects directly from a computer USB port to the Display Unit.

In the case of a USB connector, a suitable software driver is required for the cable, which can be installed when the application itself is installed. The driver is included on the installation CD and can be installed manually at any later point if required.

NOTE: When using an RS232 cable, if the computer does not have an RS232 serial port, it will need a USB to RS232 convertor, which will also require a driver to be installed. Please follow the manufacturer's instructions to install this.

The exact facilities that are provided by the APU software depend upon the version of firmware in the Ash Probe/Lab Ash display unit. Later versions allow the computer to interrogate the unit and provide full configuration facilities. However, earlier version for the firmware were not designed to communicate with an external program and instead are only capable of transmitting data out of the display unit's communication port in a fixed format. In this case, the APU program is not able to access the parameters of the connected display unit, but is capable of interpreting the information sent by the unit when the user elects to transmit data and converting it into a more useable spreadsheet format.

1.2 DISPLAY UNIT COMPATIBILITY

Different versions of the Ash Probe Display Unit or Lab Ash Display Unit firmware allow different levels of functionality with the APU utility program.

Later versions of the firmware have been specifically designed with the APU program in mind, but the earlier versions were created before the existence of any such software and therefore, the facilities can be limited.

The firmware version can be determined when the Display Unit is switched on. The first screen displayed shows the version on the top line of the display.

The tables below show the level of available functionality of each version of firmware.

Ash Probe Display Unit Compatibility

Version	Facilities Description
4.29 or later	All facilities are available
4.28	Readings/samples data can be downloaded, but configuration data cannot be viewed or changed by the APU program. The download of data can be started by the APU software (the user does not need to press buttons on the Display Unit itself to start this). The APU can automatically detect the presence of a connected Display Unit.
4.00 to 4.27	Readings/samples data can be downloaded, but configuration data cannot be viewed or changed by the utility program. The user must initiate the download of data on the Display Unit itself. The utility program cannot start this. The APU can automatically detect the presence of a connected Display Unit.
3.xx	Readings/samples data can be downloaded, but configuration data cannot be viewed or changed by the utility program. The user must initiate the download of data on the Display Unit itself. The utility program cannot start this The APU cannot automatically detect the presence of a connected Display Unit and instead the user most configure the APU software to determine what communications port and speed the software must use to connect to the unit.

Lab Ash Display Unit Compatibility

Version	Facilities Description
3.20 or later	All facilities are available
3.11 or earlier	Readings/samples data can be downloaded, but configuration data cannot be viewed or changed by the utility program. The user must initiate the download of data on the Display Unit itself. The utility program cannot start this The APU cannot automatically detect the presence of a connected Display Unit and instead the user most configure the APU software to say what communications port and speed the software must use to connect to the unit.

1.3 PC REQUIREMENTS

The APU software requires a PC with the following minimum specification:

- Microsoft Windows XP/Vista/7/8 Operating System
- 10MB Free Disk Space
- 1 free USB port or RS232 serial port.

The program also requires Microsoft .Net Framework 3.5 to be installed. This will be downloaded from Microsoft and installed automatically during the APU software installation if it is not already present on the PC.

If a USB to RS232 serial port convertor is used, then the associated driver for that convertor cable must be installed.

If a USB cable is supplied by Bretby Gammatech, then the driver can be installed during the APU software installation, where the option is given to install it or the driver can be installed directly from the APU Installation CD at a later stage.

Some computers running the Windows 7 or 8 operating system may already have the driver installed by default.

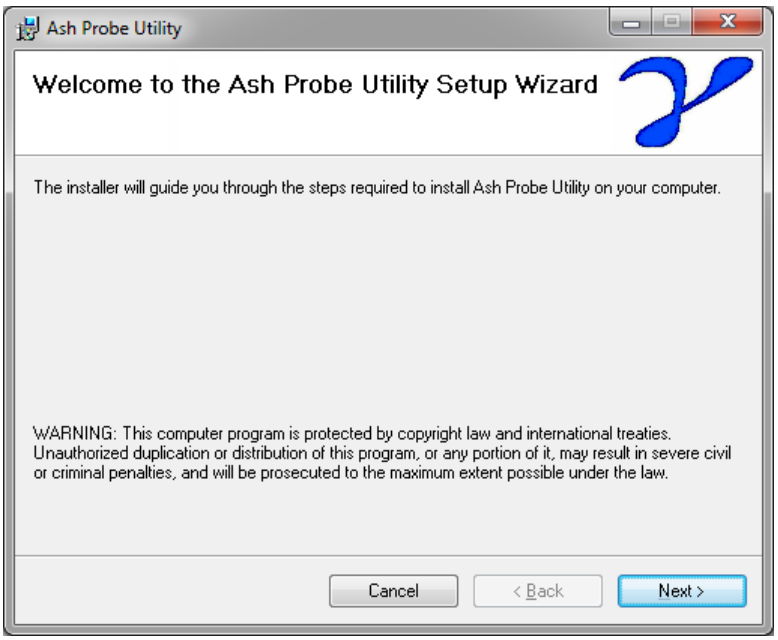
2 INSTALLATION

The software is provided either on a CD or as a single file, ***Ash Probe Utility Setup.msi***, a Microsoft Windows installation file.

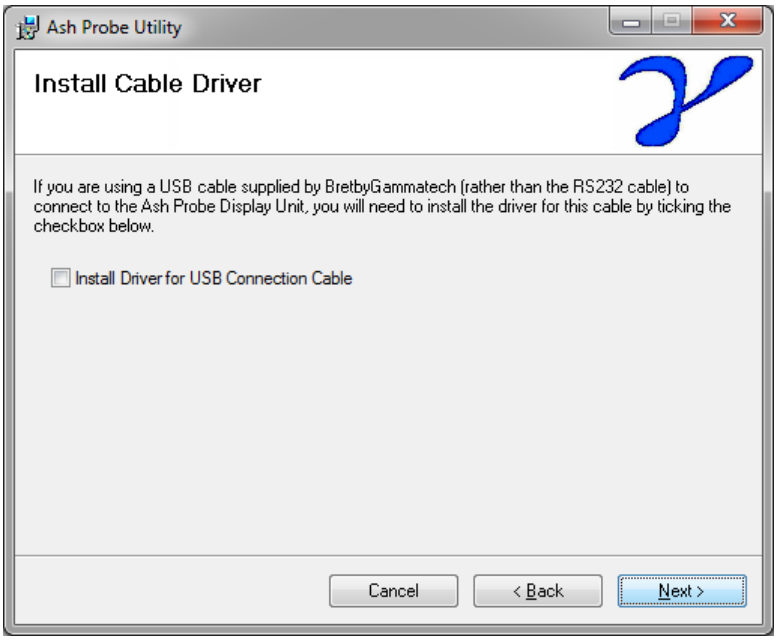
In the case of a CD, the installation program should run automatically when the CD in inserted, but if this facility has been disabled on the PC (which is the default for modern computers), then run the program **Setup.exe** from the disk.

To install from the single file, simply double-click on the file in Windows Explorer or *Run* the file from the Start menu.

Once the installation program starts, it will display the opening screen below.

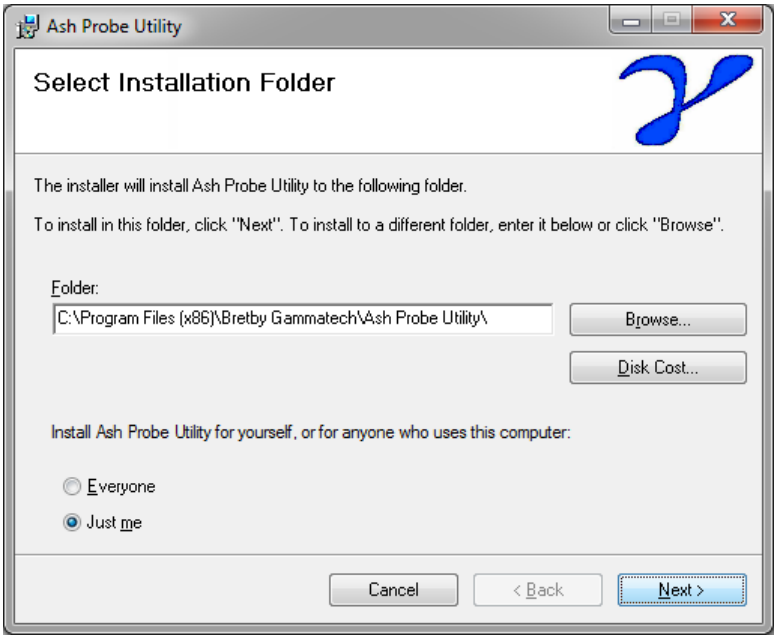


Select **Next** and the following screen is displaying, giving the option to install the driver for the Bretby Gammatech supplied USB connection cable. If intenting to use the Bretby USB cable, tick the option box to install the driver and press **Next**.

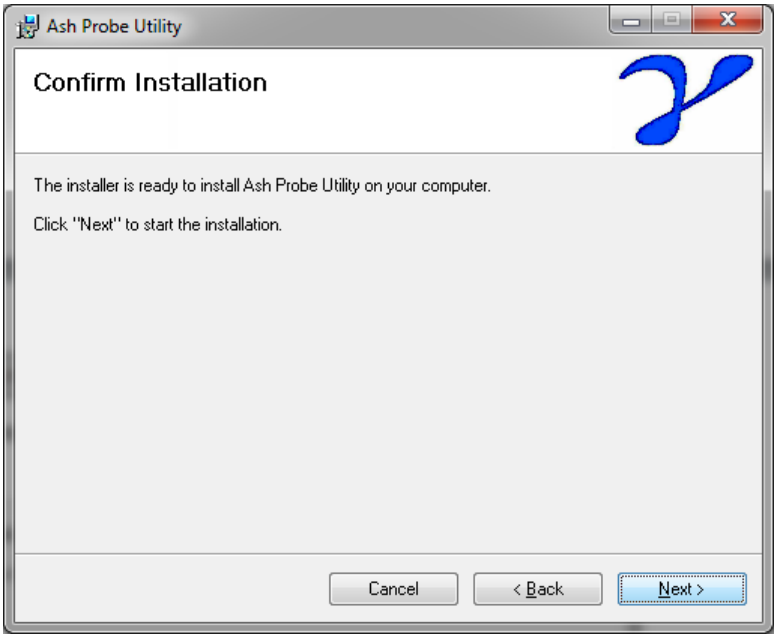


IMPORTANT NOTE: IF installing the USB cable driver, the user need to have logged on with Administrator Access to be able to do this. Otherwise, the installation of the driver will fail.

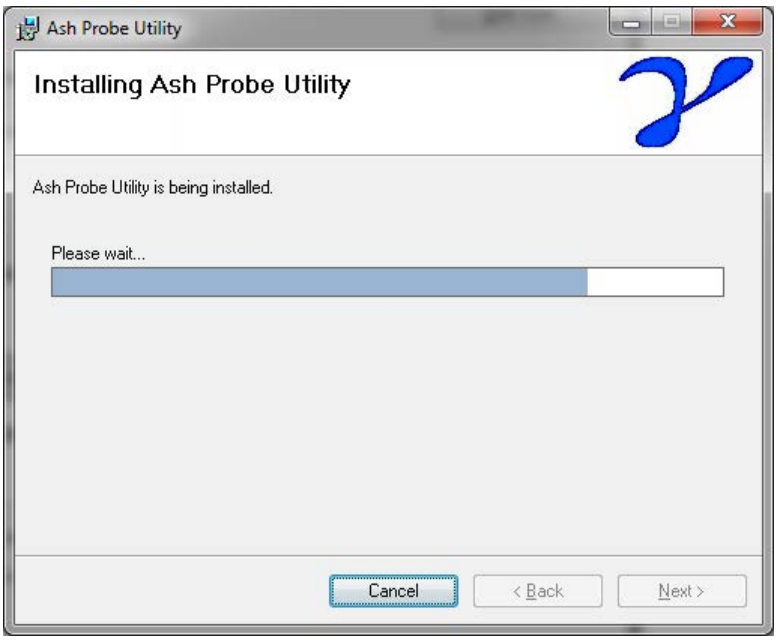
Select the desintation folder to install the software in (or accept the default) and select whether the software should be installed on just the account that the user is logged onto at present or whether it should be available to all users of the computer (i.e. other users who have different log-ons to access the PC).



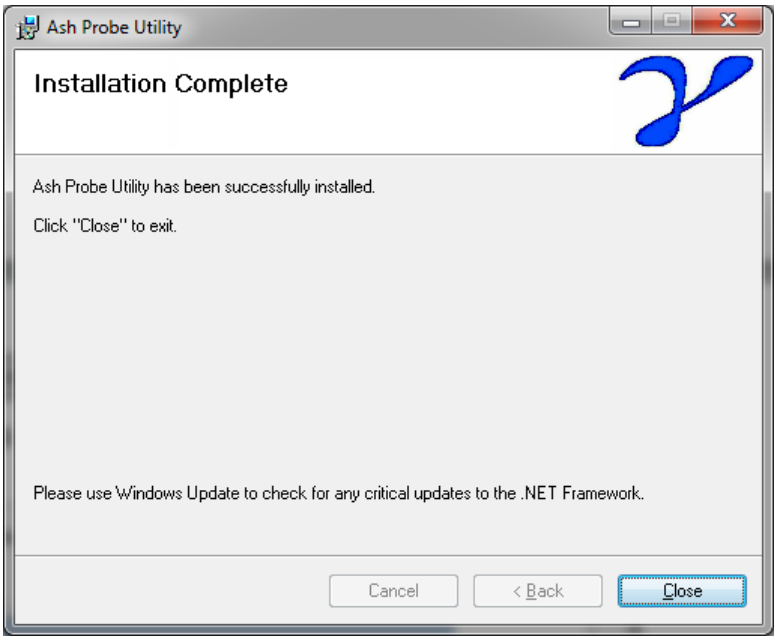
Press **Next** to display the confirmation screen below.



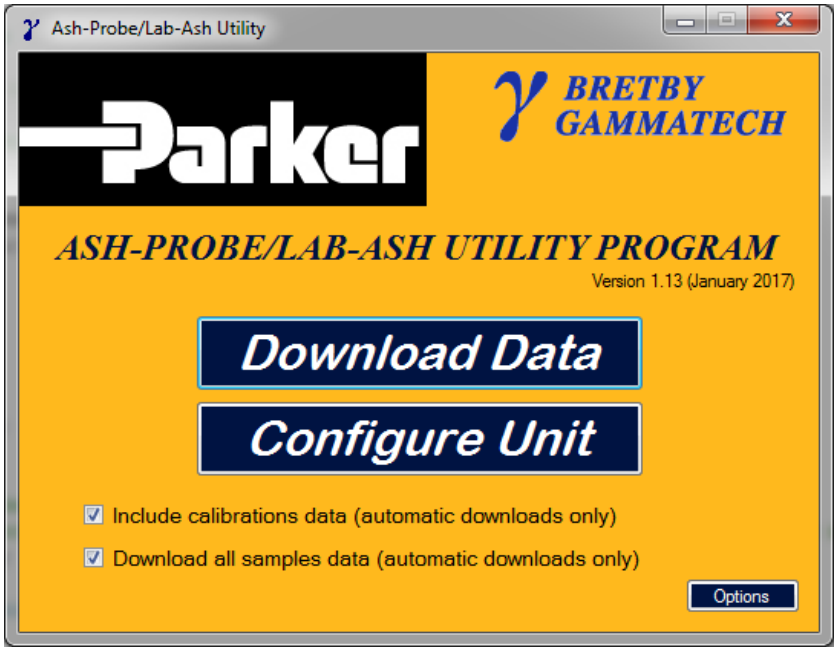
Click **Next** to start the installation which will display the progress screen below. If selected previously, another screen will also be shown, displaying the progress of the installation of the USB cable driver.



When installation is complete, the screen below will be show. Click **Close** to complete the installation.



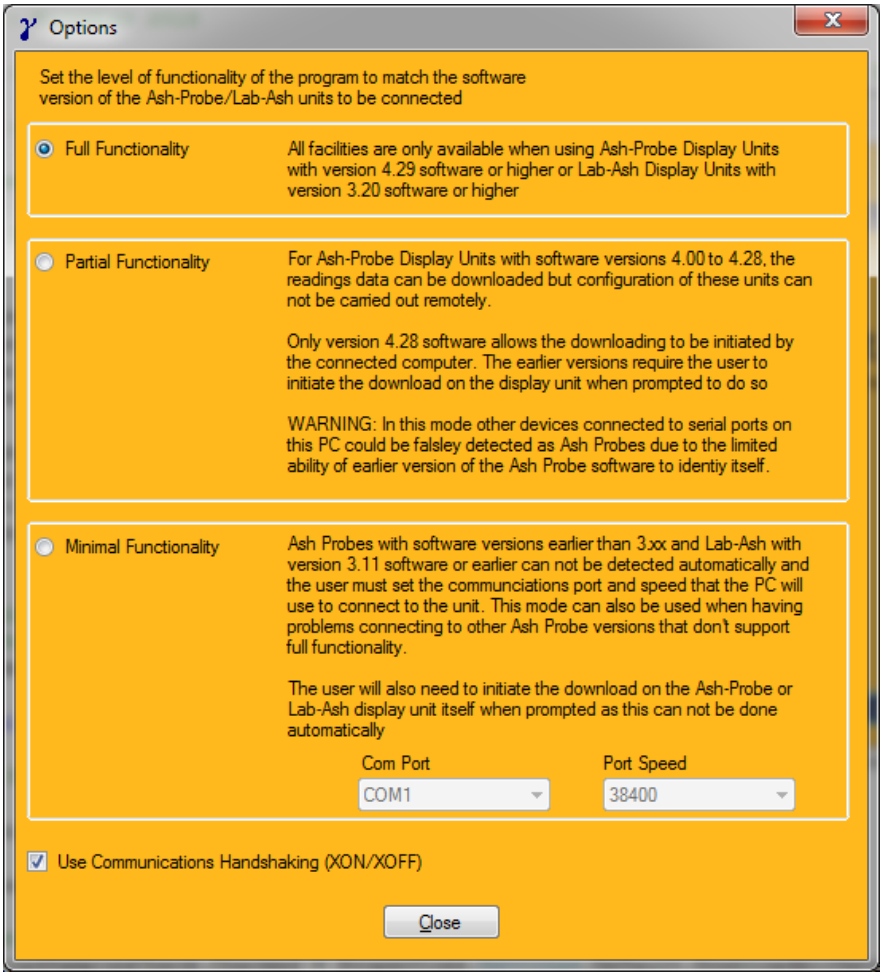
An icon will have been placed on the computer desktop and a shortcut to ***Ash Probe Utility*** will have been placed in the Program menu. Select either of these to launch the application.



If the software is to be used with an older version of the Ash Probe or Lab Ash (Ash Probe firmware version 4.28 or earlier or Lab Ash version 3.11 or earlier), then it may be necessary to configure the program to work with the appropriate type.

2.1 OPTIONS FOR OLDER VERSIONS OF ASH-PROBE/LAB-ASH

For Ash Probe Display Units running Version 4.28 or earlier firmware or Lab Ash Display Units running Version 3.11 or earlier firmware, select the **Options** button on the screen to display the window below



If running Ash Probe firmware **before** V4.00 or Lab Ash firmware V3.11 or earlier, then select the **Minimal Functionality** button. These Display Unit versions cannot be automatically detected by the APU program and therefore the **Com Port** and **Port Speed** need to be defined in order to connect to the unit. If using a USB cable, then you will need to determine the communications port that the cable is attached to (see below). The speed is usually set to 38400, but some units may be set to 9600.

To determine which port to use when using a USB cable (either a Bretby supplied cable or convertor or a third party supplied one), use **Device Manager** from the **System** section of the Windows Control Panel (for Windows XP, this will be in the *Hardware* tab of the System window) and look at the ***Ports(COM & LPT)*** item to see a list of installed communications ports. The USB cable will normally appear in the list of ports as an entry with a title similar to:

USB-to-Serial port (COM x)

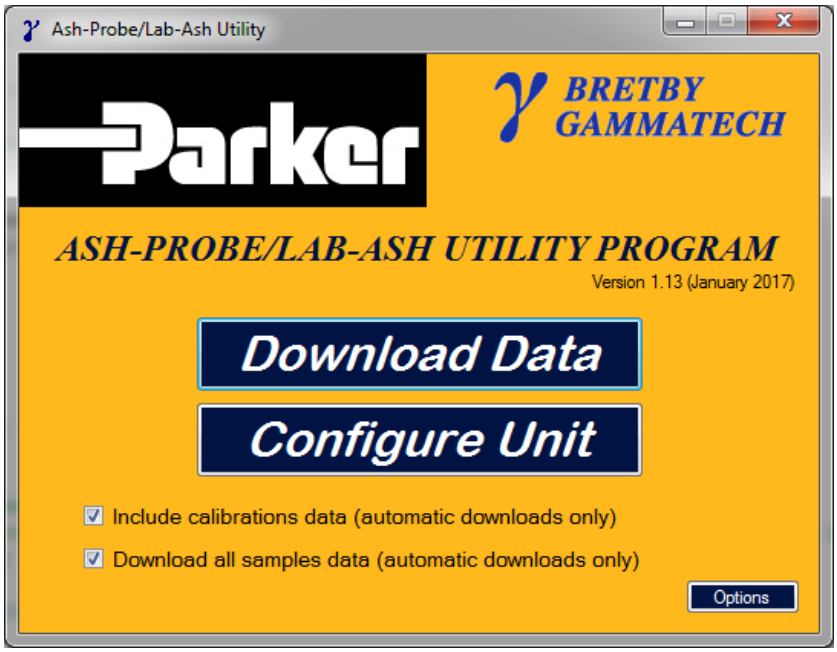
where *COM x* is the port to select in the APU software.

For Ash Probe Display Unit firmware versions 4.00 to 4.28 inclusive, select the **Partial Functionality** option, where the APU software can detect the connected unit automatically by scanning all communication ports, but won't display *Configuration* facilities, which are not available on these firmware versions.

For all newer Ash Probe firmware versions (V4.29 and later) or Lab Ash versions (3.20 and later), select the **Full Functionality** option, which allows for all facilities to be made available.

3 OPERATION

On running the APU program, the screen below will be shown.



There are two main function buttons, **Download Data** and **Configure Unit** (which may not be displayed if the connected unit is not capable of providing this feature due to being an earlier version).

There are two other check-boxes, which are used in conjunction with the downloading of data (which will be explained in the next section of this document) and an **Options** button, which is used when connecting to older Ash-Probe/Lab-Ash Display Units (for details see section *2.1 Options for Older Versions of Ash-Probe/Lab-Ash*).

3.1 DOWNLOAD DATA

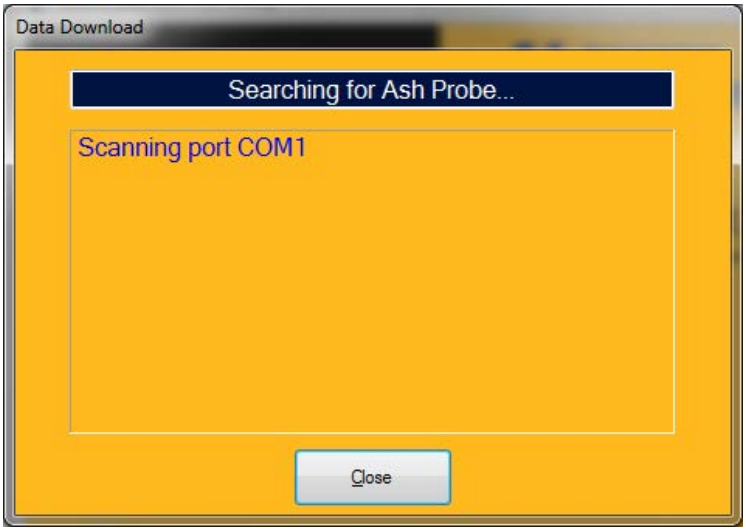
The main purpose of the program is to enable to downloading of data from a Display Unit into a spreadsheet format file for offline analysis.

The main screen includes two check-boxes which provide options for the formatting the data being downloaded.

- **Include Calibrations Data** – If ticked, then the downloaded data (where the data is available) will include a section listing the coefficients for each possible calibration set.
- **Download All Samples Data** – *This parameter is only relevant to Ash Probes. It does not affect the data output of a Lab Ash.* If ticked, the details of all the individual samples taken for each *Pile* will be included in the data (when available – some older versions may not be able to provide this information). If not ticked, then only the overall readings for each pile will be downloaded.

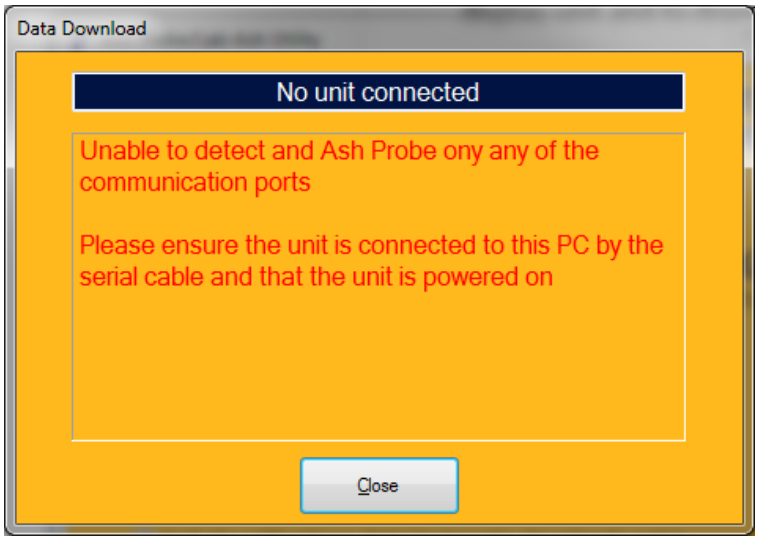
Pressing the Download button will cause the program to start searching for a connected Ash Probe or Lab Ash display unit and to download data for that unit.

The following screen will be displayed showing the progress of the scan.



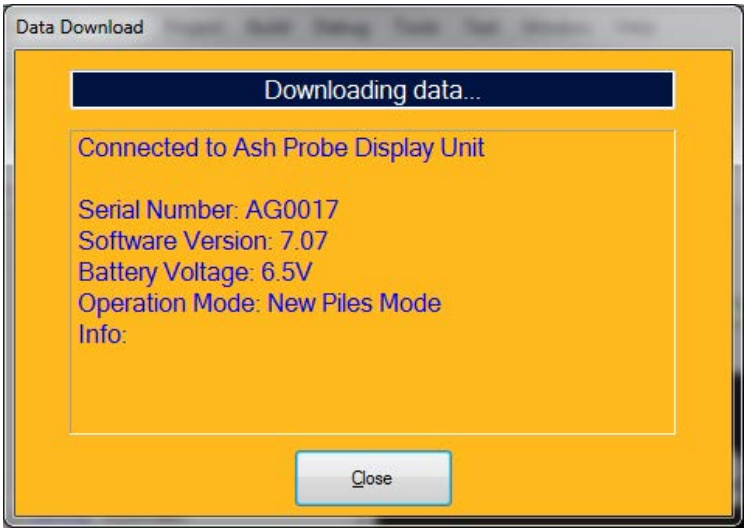
If the program has been used previously, it should find a connected display unit far quicker as it will start searching on the previous port used to connect to it, but if this is the first time it has been connected, or a different port is being used, then the program will scan through all available ports, which may take a few seconds.

If the unit is not detected, the following error display will be shown. Ensure that the unit is powered on and the cable connected (to the correct port if using a much older display unit where the port has had to be specified in the Options function).



When a successful detection is made, the data will start to be downloaded. In older display units, the APU program may prompt the user to initiate the download on the Display Unit itself as the program cannot remotely trigger the download on these versions. For newer Display Units, the download will start automatically.

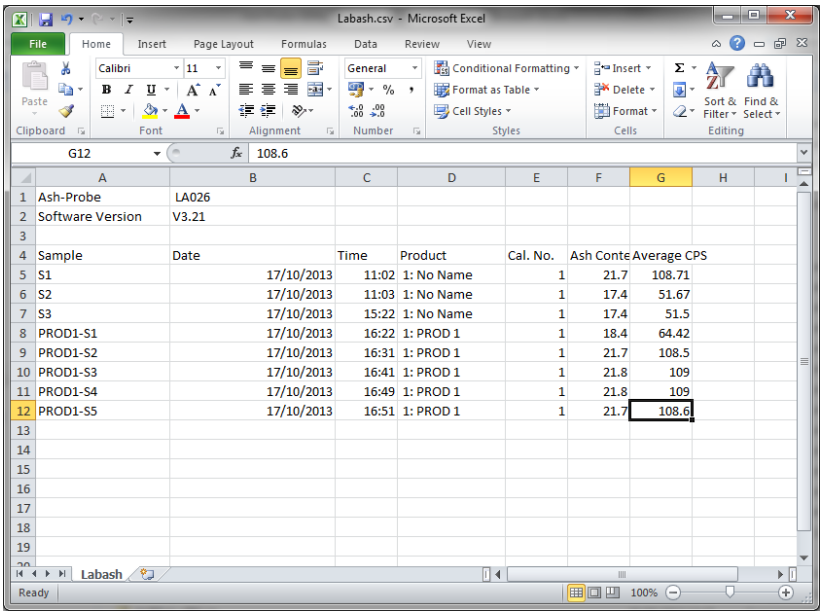
The downloading of data will be indicated by the status bar at the top of the progress window. The main portion of the window will show the details of the connected unit.



When the download is complete, the user will be prompted to select a file and location in which to store the downloaded data.

The data will be formatted as a Comma Separated Values (CSV) file, which can be read by any spreadsheet or database program.

Once a file location has been selected, the data will be saved and the file will then be opened for viewing using the default viewing/editing program associated with CSV format files on this PC, e.g. Microsoft Excel.



	A	B	C	D	E	F	G
1	Ash-Probe	LA026					
2	Software Version	V3.21					
3							
4	Sample	Date	Time	Product	Cal. No.	Ash Conte	Average CPS
5	S1	17/10/2013	11:02	1: No Name	1	21.7	108.71
6	S2	17/10/2013	11:03	1: No Name	1	17.4	51.67
7	S3	17/10/2013	15:22	1: No Name	1	17.4	51.5
8	PROD1-S1	17/10/2013	16:22	1: PROD 1	1	18.4	64.42
9	PROD1-S2	17/10/2013	16:31	1: PROD 1	1	21.7	108.5
10	PROD1-S3	17/10/2013	16:41	1: PROD 1	1	21.8	109
11	PROD1-S4	17/10/2013	16:49	1: PROD 1	1	21.8	109
12	PROD1-S5	17/10/2013	16:51	1: PROD 1	1	21.7	108.6

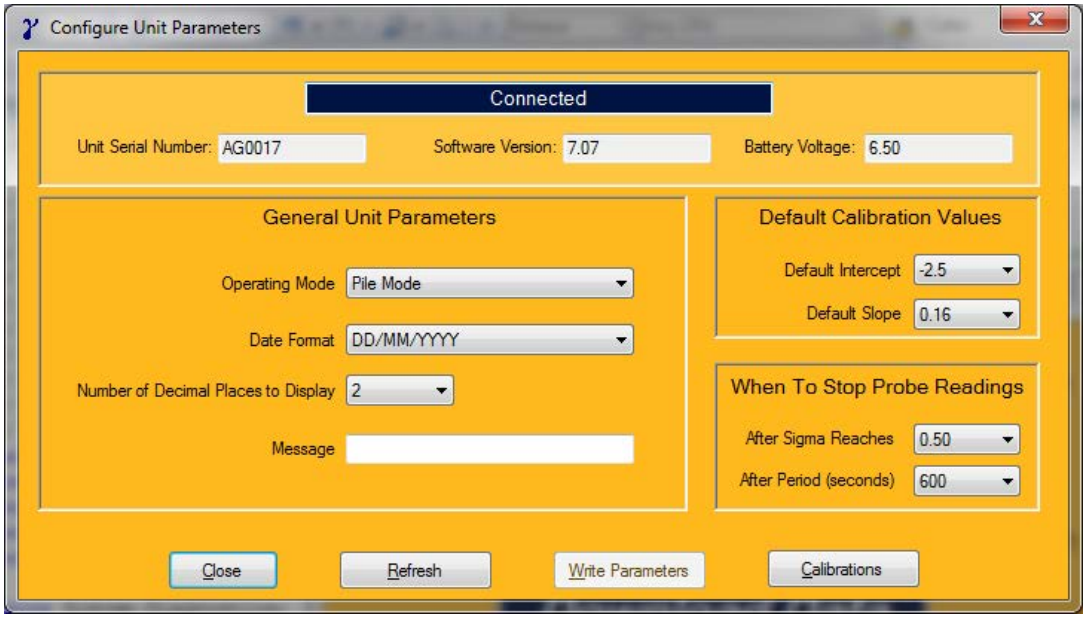
If no suitable viewer is installed, it is recommended that the free *Microsoft Excel Viewer* program is downloaded and installed. Conduct an internet search for "*Microsoft Excel Viewer*" to find a safe download site. **IMPORTANT: This program should ONLY be downloaded from a genuine Microsoft site.**

3.2 CONFIGURATION

The other main function of the APU program is to view and modify the Ash Probe/Lab Ash parameters. This facility is only available when using Ash Probe Display Units with firmware version 4.29 or later or Lab Ash Display Units with firmware version 3.20 or later.

If not sure which version you have, the firmware version of both types is displayed on the opening screen of the LCD display when the unit is first powered up.

On selecting the **Configuration** button on the main screen, the following window is displayed:



On entry, the program will attempt to download the parameters from the connected unit. The status of the download will be shown in the *status* bar at the top of the window.

The possible status messages that can be shown in this bar are:

Message	**Meaning**
Connecting to unit…	Attempting to detect unit and connect to it
Unable to connect to unit	Unit has not been detected (may not be powered on or connected or is running a version of software that cannot be remotely configured)
Connected to unit but unable to read parameters	Unit has been detected but parameters could not be downloaded. An information window should be displayed describing why the parameters failed to download. This may be that the display unit firmware is not compatible with this facility or it could be that the software was not successful on this particular attempt. The user should use the **Refresh** button to try again if prompted to do so.
Connected	The parameters have been successfully downloaded from the connected display unit.

The parameters that can be viewed are:

- **Unit Serial Number** – This shows the serial number of the connected unit. This parameter cannot be changed by the user.
- **Software Version** – This shows the software version of the firmware of the connected unit. This parameter cannot be changed by the user.

- **Battery Voltage** – For an Ash Probe only, this shows the current battery voltage of the unit's supply
- **Supply Voltage** – For a Lab Ash only, this shows the voltage of the power supply to the unit.
- **Operating Mode** – This shows the mode of operation of a unit. For a Lab Ash, this can only be set to *Lab Ash,* but for an Ash Probe, the mode can be set to *Pile Mode*, *Trucks Mode* or *Classic Pile Mode*. For an explanation of the available operating modes, please see the Ash Probe User Manual.
- **Date Format –** This defines how dates are displayed to the user on the LCD display of the connected unit (day/month/year or month/day/year).
- **Number of Decimal Places To Display –** For an Ash Probe only, this parameter defines how many decimal places are displayed to on the unit (1 or 2)
- **Number of Products –** For a Lab Ash only, this determines the maximum number of products that the unit can store. Possible values are selected from a list of available numbers.
- **Message –** This field defines the start-up message shown on the LCD display of the connected unit when it first powers up. This might be set to a unique name to distinguish between different units or the name of the site to which it belongs. It may be up to 40 characters long.
- **Default Calibration Values –** This field defines a set of calibration coefficients (*slope* and *intercept*) which will be used when calculating ash from detected gamma counts when no calibration has been programmed into the unit.
- **When To Stop Probe Readings –** This defines how long to wait when taking a sample before recording the result. This is based on the sigma (variation from the mean) reaching a minimum level that indicates a suitably stable reading or after a maximum period of time has passed. A sample will be recorded when either one of these criteria is reached.

When any parameters have been changed on the screen, the user must select **Write Parameters** to actually send them to the connected unit. A prompt will be displayed to say whether the parameters were written successfully or if they failed to be written.

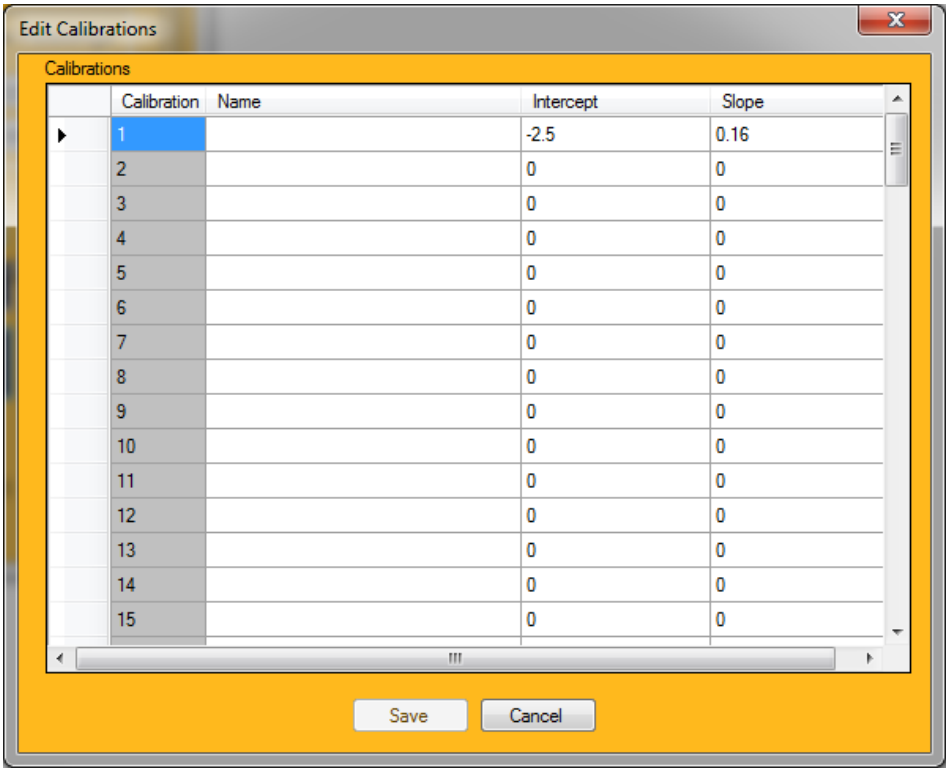
The **Refresh** button can be used at any point to reload the parameters from the connected unit.

3.2.1 CALIBRATIONS

The calculation of ash content from detected gamma counts is made using a set of calibration coefficients (normally calculated and supplied by Bretby Gammatech or a local agent). A calibration coefficients set consists of an *intercept* and *slope* term, which are used in the actual conversion formula, as well as an optional *ash error* figure (used for reference purposes only – it does not form part of the actual calculation).

The unit can hold many separate sets of calibration coefficients (usually 9, but can be up to 100 on the latest models), each based on previous analysis of different types of coal. When taking readings, the user will select the appropriate calibration set for the coal being analysed. In many cases, only one set will be used, but for some users, it may be necessary to have several different sets of calibrations as very different coal seams are being tested.

The values of the calibrations can be read and edited using the **Calibrations** button in the **Configuration** window, which displays the window below.

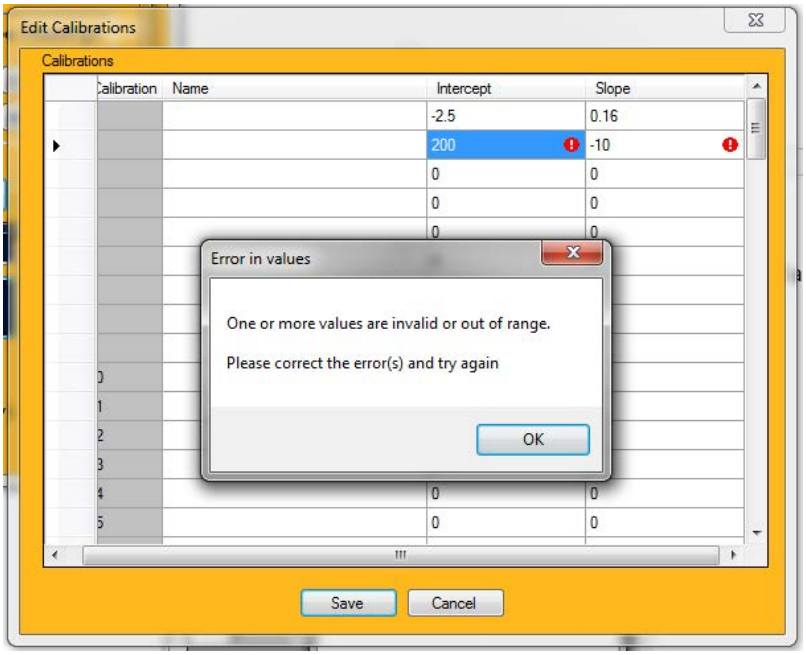


The individual calibrations are displayed in a grid format which the user can directly edit the values of. If there are more calibrations available than can be fitted within the window, then a scroll bar will be displayed allowing selection of all of the available range of calibrations.

If the connected unit permits it, the name of each set of calibration coefficients will also be displayed and can be edited in the grid.

After changing the values of any calibration set, press the **Save** button to send these to the connected display unit. A message prompt will inform the user of the success or failure of the operation.

If, on pressing **Save**, any of the entered values are invalid a red exclamation mark will be placed against the invalid fields and an error message displayed to the user.



Correct any invalid entries and press **Save** again to load into the unit.

Parker Worldwid

Europe, Middle East, Africa

AE – United Arab Emirates, Dubai
Tel: +971 4 8127100
parker.me@parker.com

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe, Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

BG – Bulgaria, Sofia
Tel: +359 2 980 1344
parker.bulgaria@parker.com

BY – Belarus, Minsk
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

CH – Switzerland, Etoy
Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

CZ – Czech Republic, Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 330 001
parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450
parker.greece@parker.com

HU – Hungary, Budaörs
Tel: +36 23 885 470
parker.hungary@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IL – Israel
Tel: +39 02 45 19 21
parker.israel@parker.com

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

KZ – Kazakhstan, Almaty
Tel: +7 7273 561 000
parker.easteurope@parker.com

NL – The Netherlands, Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Asker
Tel: +47 66 75 34 00
parker.norway@parker.com

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal
Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SK – Slovakia, Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

UA – Ukraine, Kiev
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

UK – United Kingdom, Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

ZA – South Africa, Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

North America

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

US – USA, Cleveland
Tel: +1 216 896 3000

Asia Pacific

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

CN – China, Shanghai
Tel: +86 21 2899 5000

HK – Hong Kong
Tel: +852 2428 8008

IN – India, Mumbai
Tel: +91 22 6513 7081-85

JP – Japan, Tokyo
Tel: +81 (0)3 6408 3901

KR – South Korea, Seoul
Tel: +82 2 559 0400

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

SG – Singapore
Tel: +65 6887 6300

TH – Thailand, Bangkok
Tel: +662 186 7000

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

South America

AR – Argentina, Buenos Aires
Tel: +54 3327 44 4129

BR – Brazil, Sao Jose dos Campos
Tel: +55 800 727 5374

CL – Chile, Santiago
Tel: +56 2 623 1216

MX – Mexico, Toluca
Tel: +52 72 2275 4200

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Parker Hannifin Manufacturing Ltd.
Instrumentation Products Division, Europe
President Park, President Way
Sheffield S4 7UR
Tel: +44 (0) 114 224 0200
www.parker.com/ipd