



*Gas Measurement Instruments Ltd*



**User Handbook**

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This handbook is an important part of the GDUnet product.

Please note the following points:

- It should be kept with the GDUnet for the life of the product.
- Amendments should be attached to this handbook.
- This handbook should be passed on to any subsequent owner/user of the product.
- Although every care is taken in the preparation of this handbook, it does not constitute a specification for the product.

## **DISPOSAL ADVICE**

When no longer in use, dispose of the GDUnet carefully and with respect for the environment. Refer to WEEE directive statement, such as:

In compliance with the WEEE directive, GMI will dispose of the GDUnet without charge if the GDUnet is returned to GMI.

## SAFETY PROCEDURES

The instruments which are used on the *GDU<sub>net</sub>* can be used to protect life and property and certain elements may be used in potentially explosive, toxic, and oxygen deficient atmospheres.

- Never attempt to calibrate, adjust or repair the product unless you are fully trained, aware of all potential hazards and have been assessed by an authorised body as to your competence. Unauthorised adjustment of the product may endanger yourself and others.
- Gases are dangerous. Care should always be taken when monitoring or handling gases. All personnel should be trained and competent in their use.
- Some gases need special handling or delivery techniques since inappropriate use of material or techniques may influence the calibration result. Please contact GMI Customer Support if you have any queries.

Any right of claim relating to product liability or consequential damage to any third party against GMI is removed if the above warnings are not observed.

## MAINTENANCE, SERVICING & CALIBRATION

Maintenance of the *GDU<sub>net</sub>* should only be undertaken by trained competent personnel who have been authorised by the certificate holder or other licensed body who has passed on the relevant certification data. Failure to ensure this and the use of unauthorised parts or repairers may invalidate the approvals.

- Only GMI replacement parts should be used.
- All instruments and associated equipment should be regularly serviced and calibrated.
- Only certified traceable gases should be used in the maintenance / calibration of the *GDU<sub>net</sub>*.
- Only calibrate the product in the gases it will be used for to ensure compliance with the specification. GMI does not recommend the use of correction factors for calibration or hazard monitoring.

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# INTRODUCTION

## 1.1 BASIC CONCEPTS

The Gas Delivery Unit (GDU<sub>net</sub>) can be used in three different applications:

- As a gas delivery unit in an Instrument Management System (IMS) - see paragraph (a).
- As a gas delivery unit in a workshop system - see paragraph (b).
- As a gas delivery unit in standalone mode - see paragraph (c).



Fig. 1-1 Gas Delivery Unit (GDU<sub>net</sub>)

The *GDU<sub>net</sub>*, as illustrated in Fig. 1-1, is used to automatically deliver gas to Gascoseeker / Gasurveyor / First Responder / Leak Surveyor / Oxygas / Shipsurveyor instruments, via one of the applications detailed below:

- (a) The *GDU<sub>net</sub>* as a gas delivery unit in an Instrument Management System (IMS).

The *GDU<sub>net</sub>* is used by instrument operators to automatically test or calibrate instruments on a regular basis, e.g. every two weeks.

Test and calibration files are sent to the *GDU<sub>net</sub>* by a networked PC or laptop running **flexiCal *net*** software.

Test and calibration results stored on the *GDU<sub>net</sub>* are retrieved from the *GDU<sub>net</sub>*, and sent to an IMS database, by a networked PC or laptop running **IMS Results Manager** software.

Network communication is made via Ethernet. Multiple *GDU<sub>net</sub>*'s can be connected to the network at any time.

The *GDU<sub>net</sub>* can be defined as 'operating-system independent' - once the test files are received the *GDU<sub>net</sub>* operates as a standalone system.

The setup consists of a *GDU<sub>net</sub>*, a networked PC, gases, **flexiCal *net*** software and **IMS Results Manager** software.

The objective of using a *GDU<sub>net</sub>*, is to ensure that the instrument is tested on a regular basis, to check and correct calibration, ensuring instrument compliance and to maintain records of the instrument performance.

- (b) The *GDU<sub>net</sub>* as a gas delivery unit in a workshop system.

A workshop system is used by an instrument technician to service, repair and calibrate / test instruments annually, or more frequently if required.

The workshop system consists of a *GDU<sub>net</sub>*, a PC, gases and **flexiCal *Plus*** software. Communication is made via USB.

- (c) The *GDUnet* as a gas delivery unit in standalone mode.

Test and calibration files are transferred from a PC / Laptop running **flexiCal net** software, to the *GDUnet* via a USB memory stick.

Test and calibration results stored on the *GDUnet* are retrieved from the *GDUnet* using a USB memory stick.

The setup consists of a *GDUnet*, gases and **flexiCal net** software.

---

**Note: For standalone operation refer to Chapter 7. A large amount of the information contained in this handbook is irrelevant when using standalone mode.**

---

## 1.2 CALIBRATION GASES

The *GDUnet* is connected to cylinders of calibration gas to ensure that a consistent standard can be maintained against which the instrument can be checked.

The *GDUnet* can connect up to 8 gas cylinders (a 4 gas cylinder version is also available).

### 1.2.1 Recommended Types

The instrument should be calibrated in the gas it will be used in, rather than using calibration factors, i.e. Propane instruments should be calibrated with Propane gas etc.

Gases should be full scale or mid range of scale rather than lower end; i.e. calibrate 100% LEL range at 50% LEL rather than 10% LEL.

Heavier hydrocarbon gases may take longer to clear the system than lighter ones like Methane, and should be carefully organised in terms of location on the manifold position and test sequence.

### 1.2.2 Traceability

Gases should be analysed and traceable to National Standard. The Test Certificate should have the total gas analysis including air components.

### 1.2.3 Limits of Preparation

The limits of preparation of the gas should be clear, e.g.  $\pm 2\%$ . These limits should be better than the accuracy required from the instrument.

The accuracy of preparation of the gas mixtures together with the analysis accuracy should be clearly marked on the cylinder.

### 1.2.4 Analysis

The cylinder analysis should be known and within the operating requirements as specified by the operating organisation.

- Individual cylinders should be analysed.
- Limits on analysis should be clear.
- Method of analysis should be known.

### 1.2.5 Preferred Values

The typical values that would be used for instruments are given below. The list is not exhaustive but can be used as a general guide.

FOR ALL INSTRUMENTS ZERO RANGE	-	Control Air
Methane Instruments with 10% LEL Range	-	0.5% CH <sub>4</sub>
Methane Instruments with 100% LEL Range	-	2.5% CH <sub>4</sub>
Methane Instruments with %GAS Range	-	100% CH <sub>4</sub>
Methane Instruments with ppm Range	-	800ppm CH <sub>4</sub>
Methane Instruments with CO Range	-	500ppm CO
Methane Instruments with H <sub>2</sub> S Range	-	50ppm H <sub>2</sub> S

Note: This list is for guidance only and does not cover all the ranges or gases that GMI instruments will cover.

## 1.2.6 Specification

For detailed specifications on test limits and gases users should consult instrument manuals, service bulletins, operating procedures and specifications to ensure that the specifications and limits suit their need and are in line with their Company procedures.

The manufacturer or his agent should be consulted for up to date instrument information.

## 1.3 CALIBRATION LIMITS

### 1.3.1 Gas Limits

Gas limits for calibration or test are at the discretion of the customer and are set up via **flexiCal net**. Limits should be based on the application but must always make allowance for the instrument specification and for the accuracy of the calibration gas.

Limits for various types of gases may change calibration test parameters.

e.g.

Butane requires wider limits than Methane because of increased gain requirements, thus the same limit cannot be applied to different calibrations.

### 1.3.2 Standards

Reference should be made to the manufacturer's standards for the instrument and equipment as well as end users' own standards. These should all be compatible.

## 1.4 flexiCal net

**flexiCal net** is GMI's Windows™ based software package that will allow customers to easily setup test and calibration files to be sent to the *GDU net* for testing and calibrating instruments.

The *GDU net* comes pre-loaded with the following **flexiCal net** test and calibration file setup:

- Gas 1 - Air
- Gas 2 - 800 PPM Methane
- Gas 3 - 50% LEL Methane
- Gas 4 - 100% Volume Methane

The **flexiCal net** software configures the *GDU net* to test or calibrate instruments automatically. This allows the user to specify how instruments will be tested or calibrated and includes gases, concentrations and pass or fail criteria.

**flexiCal net** is also used to register additional *GDU net*'s to the network.

The installation of the software is detailed in Chapter 2.

The operation of the software is detailed in Chapter 3.

## 1.5 IMS RESULTS MANAGER

All test and calibration results are stored on the *GDU net*.

**IMS Results Manager** is a software package that retrieves the test and calibration results, from the *GDU net*, and downloads them to an IMS database.

After setup this application runs in the background on the networked PC or laptop.

The installation and setup of the software is detailed in Chapter 4.



## **flexiCal *net* INSTALLATION**

### **2.1 SYSTEM REQUIREMENTS**

To install the **flexiCal *net*** software package, you require the following minimum system requirements:

- PC / Laptop running Windows XP™ or newer
- Processor speed 1GHz
- 512Mb RAM
- A minimum of 850Mb of free hard disk space
- CD-ROM drive
- Ethernet port
- .NET Framework 4 or newer

### **2.2 INSTALLATION**

The **flexiCal *net*** software package is supplied on CD-ROM (Part No. 14767).

To install the software on a PC / Laptop using Microsoft Windows XP™ or newer, proceed as follows:

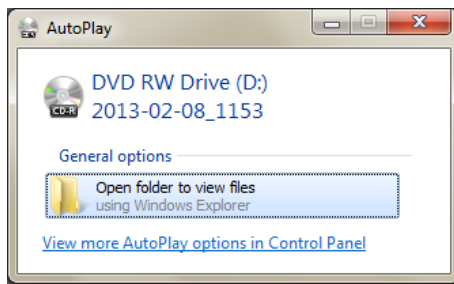
1. Switch on the PC and start Windows™ operating system.

2. Insert GDU<sup>net</sup> CD-ROM into the appropriate CD drive in your PC / Laptop.

The 'Autoplay' window should appear, displaying the 'Open folder to view files' option, as illustrated in Fig 2-1.

Should the CD-ROM not run automatically, select 'Start' then 'Computer' to find the CD-ROM drive, then, double-click to open.

The following window is displayed:



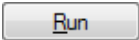
*Fig. 2-1 CD-ROM AutoPlay*

Open the folder to view CD-ROM options.

3. GMI recommend that before using this software program, the user reads the User Handbook.

Adobe Reader must be installed on your PC / Laptop to view the User Handbook.

4. Before installing the **flexiCal net** software program, it is recommended that the user exits all other Windows programs.

- To start installation, select the **GMI flexiCal net Setup** installer, a security warning as illustrated in Fig. 2-2 may be displayed. Click  to continue.

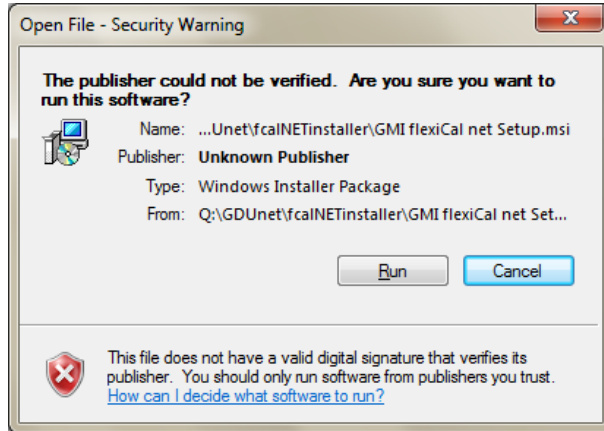
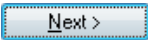


Fig. 2-2 Security Warning

- The setup wizard will be displayed, as illustrated in Fig. 2-3. Click  to continue.

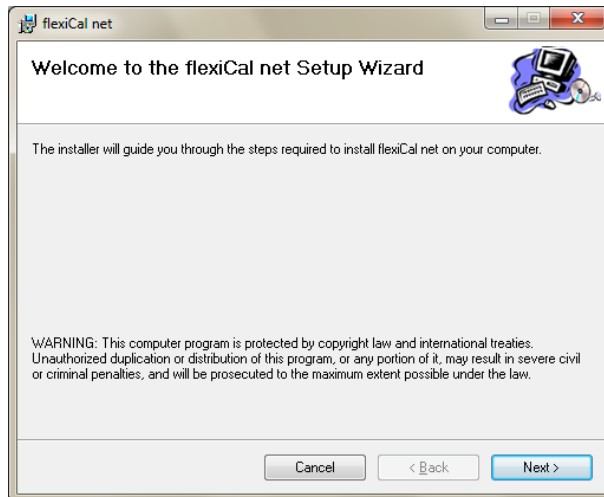
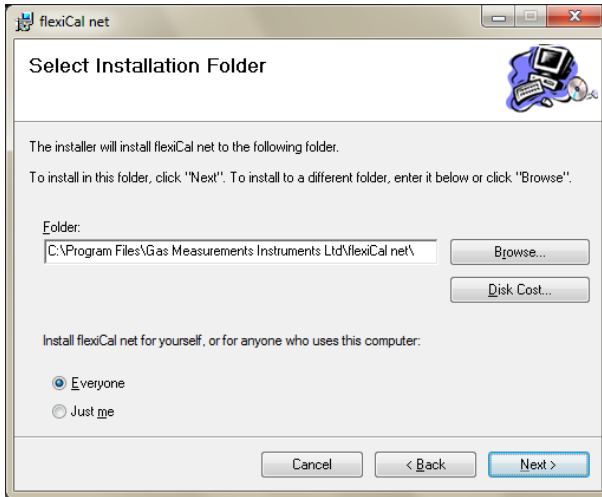


Fig. 2-3 Setup Wizard

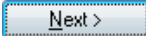
- To proceed with software installation, select an installation folder. The installer creates the folder destination, C:/Program Files/Gas Measurements Instruments Ltd/flexiCal net/, where the software will be installed, as illustrated in Fig. 2-4. Click

 to continue.

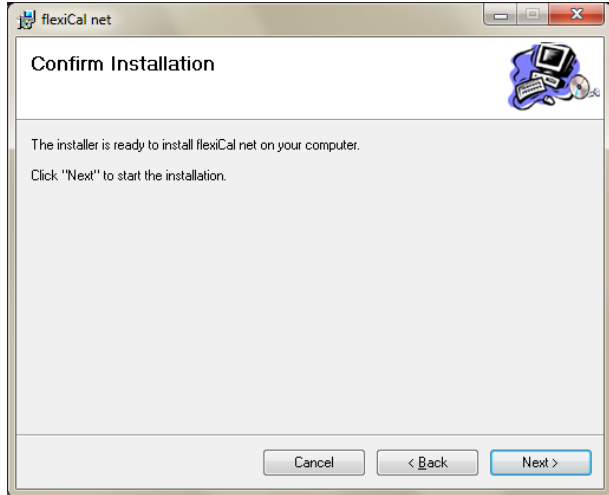
An alternative folder destination can be chosen, if preferred.




*Fig. 2-4 Installation Folder*

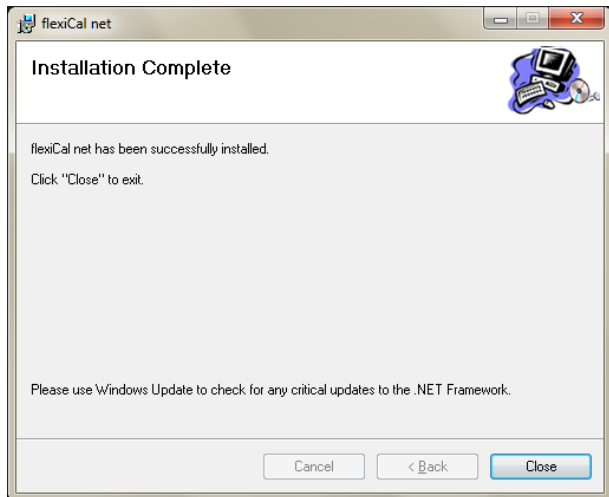
- To confirm and start installation, click  as illustrated in Fig. 2-5.

## flexiCal net INSTALLATION



*Fig. 2-5 Confirm Installation*

9. On completion of installation, the window illustrated in Fig. 2-6 is displayed. Click  to exit the installation.




*Fig. 2-6 Installation Complete*

10. The **flexiCal net** software installation is now complete.

The CD-ROM can now be removed from the CD drive.



A **flexiCal net** icon  is automatically placed on the PC desktop for easy access to the software.

## flexiCal *net* OPERATION

To start the **flexiCal *net*** software package:  
Select Start / All Programs / Gas Measurement Instruments Ltd  
/ flexiCal net or, double click



flexiCal net

The main **flexiCal *net*** window, as illustrated in Fig. 3-1 can now be seen.

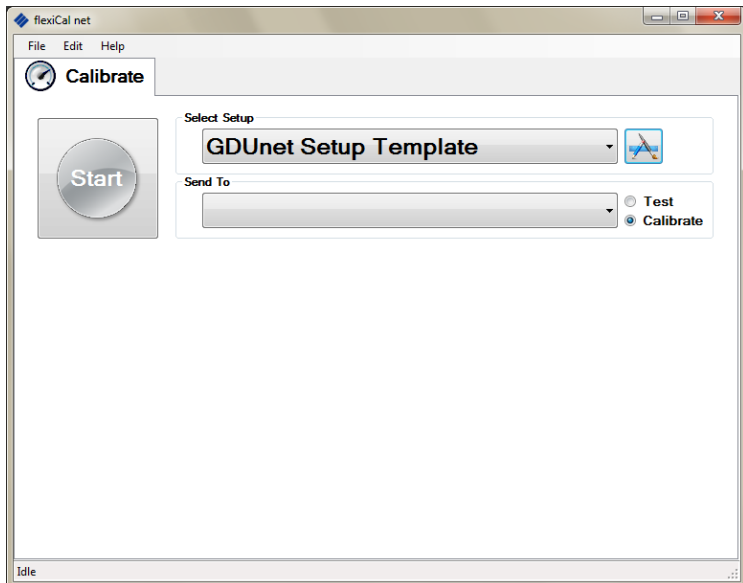


Fig. 3-1 Main Window

### 3.1 NAVIGATION

From this window, it is possible to navigate through the main functions required to setup any GDU<sub>net</sub> to test / calibrate an instrument.

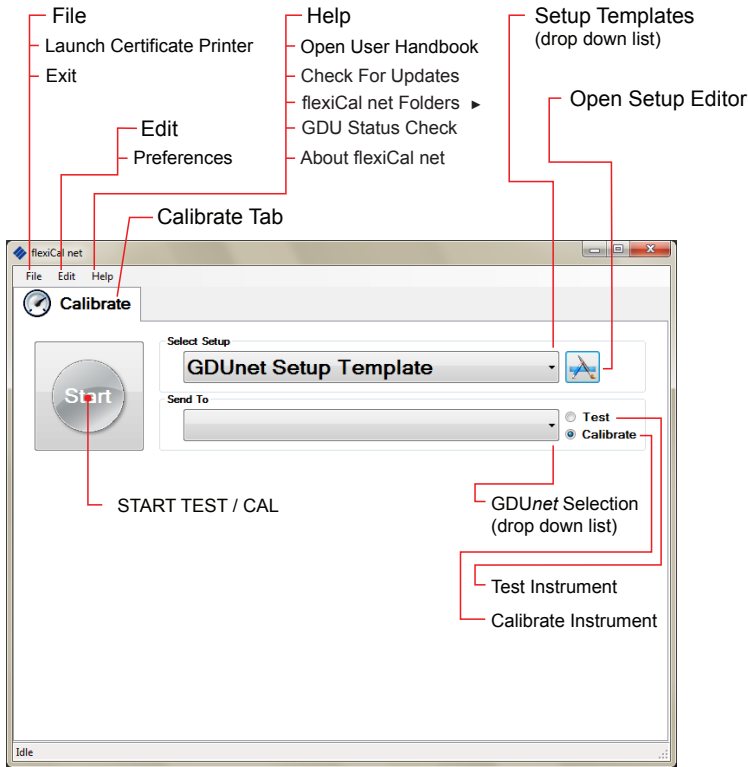


Fig. 3-2 Navigation

Note: Details of 'File', 'Edit' and 'Help' drop down items are included in section 3.5 of this handbook. All other items are detailed in this chapter.



## 3.2 INITIAL SETUP

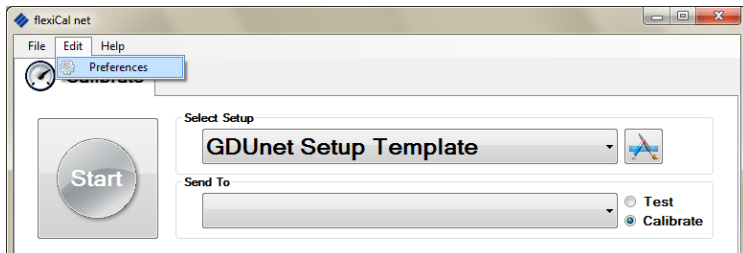
If using the GDU*net* as a gas delivery unit in an IMS, on first use of **flexiCal *net***, the IMS server **MUST** be setup.

The initial setup of the IMS server is required for a GDU*net* to successfully connect to the network, therefore, the following **MUST** be setup correctly:

- **Server name** - this is the database management system which contains the IMS database.
- **Database connection** - this is the IMS database which stores all registered GDU*net*'s to the network.

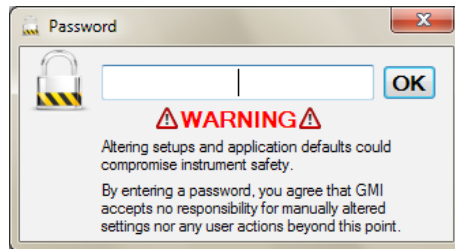
### 3.2.1 Select IMS

To connect to the IMS server, from the Edit menu select preferences as illustrated in Fig. 3-3.



*Fig. 3-3 Select Preferences*

The following 'Password' dialogue box is displayed:



*Fig. 3-4 Password Protected*

Enter the password then click 'OK'.

Note: The factory set password is 'default'.

The password can be edited as detailed in section 3.6 PREFERENCE SETTINGS.

The preferences dialogue window is now displayed, click 'Select IMS', as illustrated in Fig. 3-5.

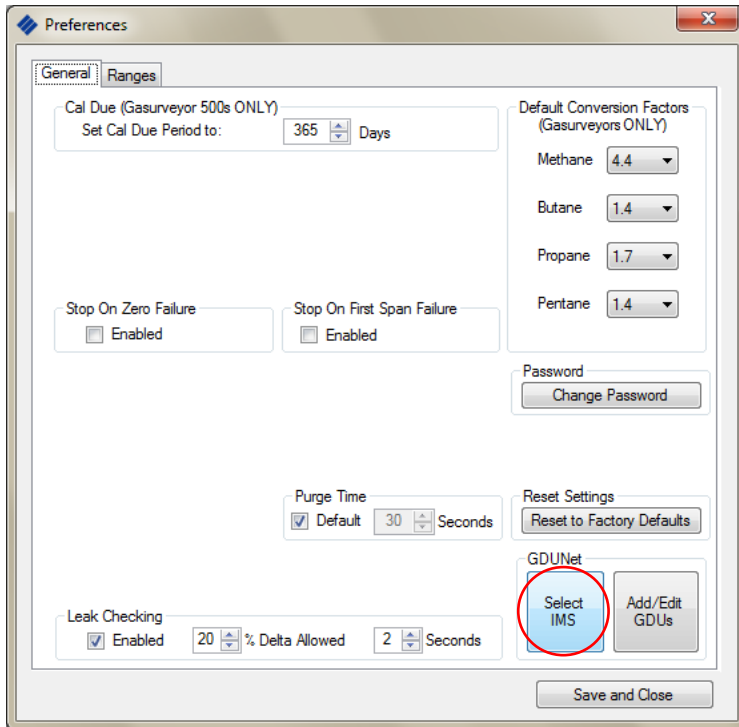
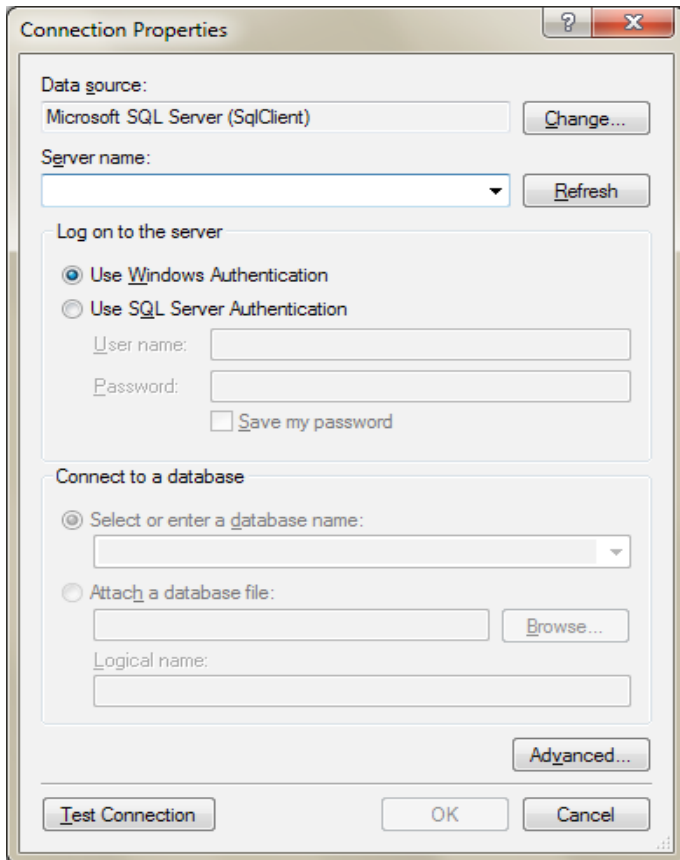


Fig. 3-5 Select IMS

The connections properties window, as illustrated in Fig. 3-6 will now be present:



*Fig. 3-6 Connection Properties*

### 3.2.2 Server Name

To setup the server name:

Click the drop down arrow from the **Server name** section and select the appropriate server name to be used, as illustrated in Fig. 3-7.

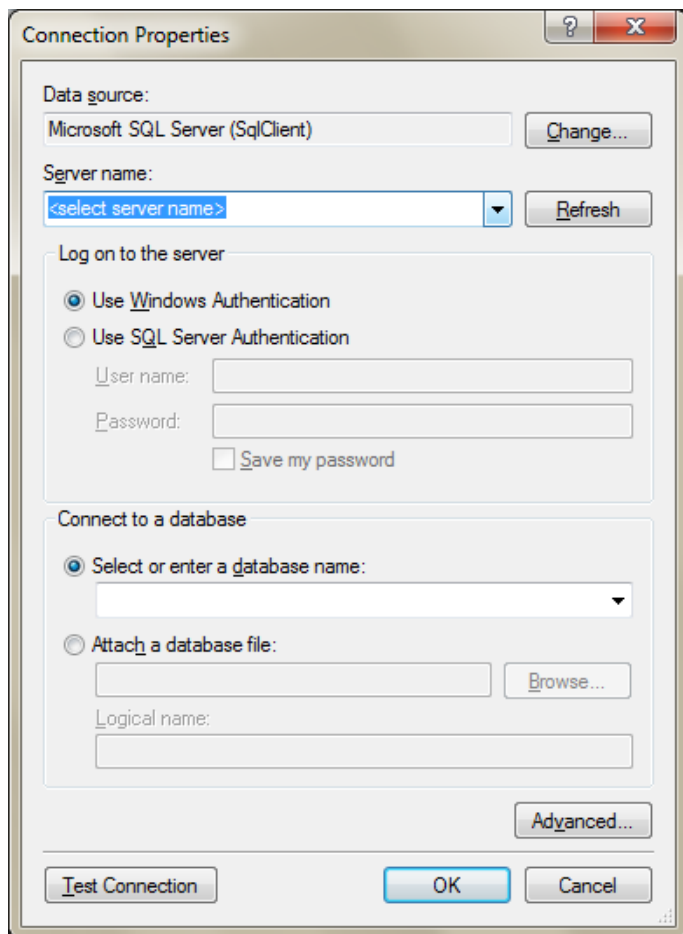


Fig. 3-7 Server Name

### 3.2.3 Database Connection

To setup a database connection:

Click the drop down arrow from the **Select or enter a database name** section and select or enter the appropriate database connection to be used, as illustrated in Fig. 3-8.

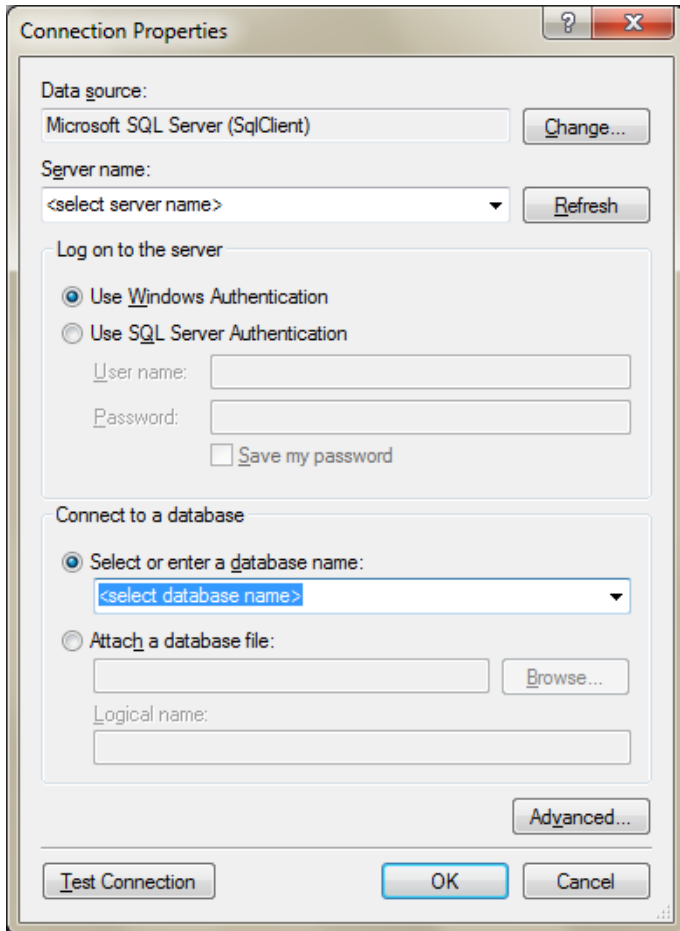



Fig. 3-8 Database Connection

Click  to confirm server name and database connection.

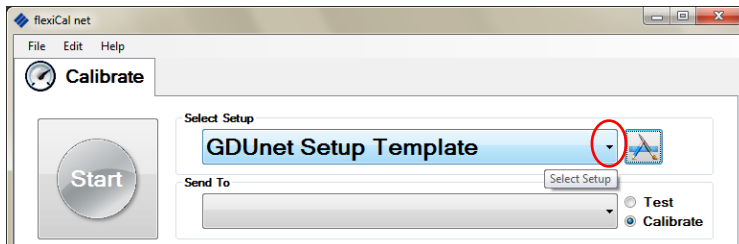
### 3.3 CALIBRATE

This function is used to define the gases to be applied to the instrument and then sends the test or calibration setup files to a GDU $net$ . There is also the option to select which GDU $net$  the setup files are sent too.

#### 3.3.1 Calibration Setup Options

A drop down menu allows the user to select templates of test / calibration applications. This method greatly reduces setup time for future tests / calibrations of same instrument type.

To view / select alternative templates, select the drop down menu 'arrow', highlighted in Fig. 3-9, to view stored list.



*Fig. 3-9 Setup Template(s)*

Note that the **flexiCal net** software package is pre-loaded with the 'GDUnet Setup Template' and is used as an example in the following process. The GDU $net$  is also packaged with the 'GDUnet Setup Template' test and calibration setup.

Calibration templates for GMI instruments can be accessed / selected as detailed in section 3.3.2.

Up to four (4) or eight (8) gases (flammable, toxic and oxygen) can be fully defined.


Typically, instruments can be calibrated with Methane, Propane, Butane or Pentane gases.

Generally, either a label on the instrument, or detailed on instrument display during warm-up, identifies the calibration gas type.

For calibration gas concentrations and gases required, refer to GMI Instruction Sheet, Part No. 13939.

### 3.3.2 Calibration Setup Editor

Calibration Setup Editor allows the user to select calibration options for a range of GMI instruments.

To access this feature, select the Setup Editor  button. The window, illustrated in Fig. 3-10, is displayed.

#### Navigation

From the Setup Editor window, illustrated in Fig. 3-10, it is possible to navigate through the main functions required to create a new setup, or edit an existing setup for test / calibration.

The Setup Editor has *GDUnet* selected by default as the equipment of choice for performing the test / calibration of the instrument.

In this example, gas types and values, for the *GDUnet* can be viewed / edited.

There is also a facility to edit the gas test / calibration limits, conversion factors, purge time, via the 'Advanced Editor' button in the Setup Editor window. A password is required to perform this function.

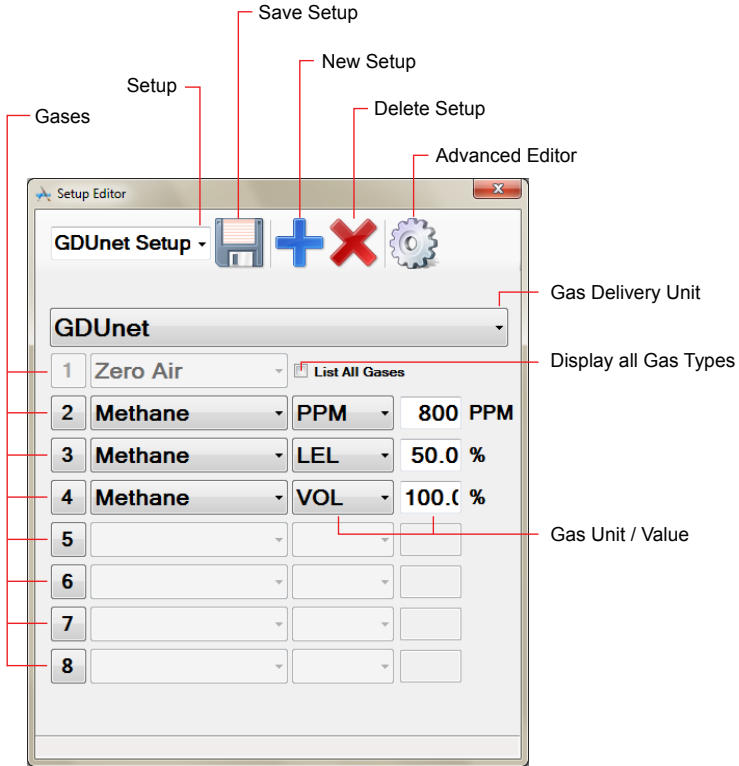


Fig. 3-10 Setup Editor

As illustrated in Fig. 3-10, the 'GDUnet Setup Template' references 'GDUnet' as the hardware required to test / calibrate instruments.



### 3.3.3 Edit Calibration Option

To view / setup, gas types and values, for the *GDUnet*, proceed as follows:

The 'GDUnet Setup Template', using the 'GDUnet', includes the following:

Gas 1: This is always 'Zero Air', used for zeroing the instrument's ranges. This cannot be edited.

Gas 2: Methane will be applied to the instrument, as listed in this template. The template gases / values must be consistent with the gases / values indicated on the label of gas cylinder used.

Gases 3 & 4 - see Gas 2.

If the gas type to be used is CombiGas, the following example is a guide for CombiGas setup:

1. Select CombiGas, as illustrated in Fig. 3-11.

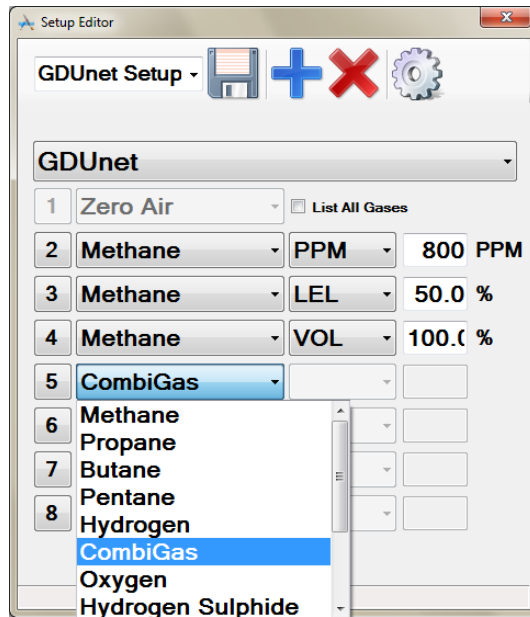


Fig. 3-11 CombiGas Selection

- To edit default template, select the 'CombiGas Settings' button, as illustrated in Fig. 3-12.

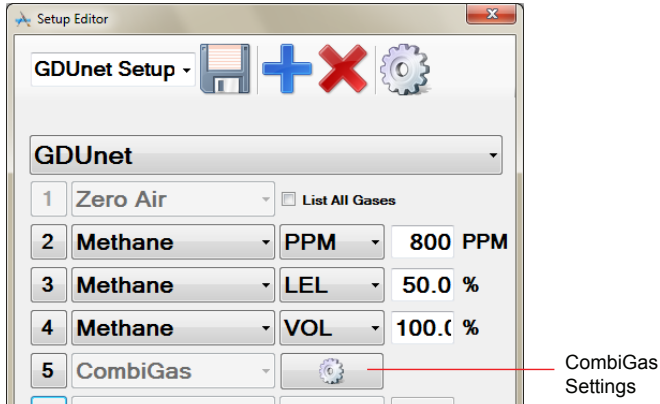


Fig. 3-12 Select 'CombiGas Settings'

Fig. 3-13 displays the contents of an example CombiGas template.

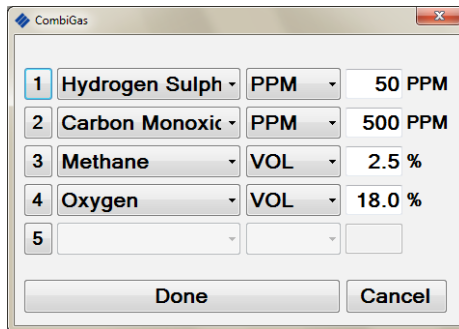


Fig. 3-13 CombiGas Contents

- The template gases / values, illustrated in Fig. 3-13, can be compared and must be compatible with the corresponding gases / values on the gas cylinder label.
- If compatible, proceed to section 3.3.7.

### 3.3.4 Edit Setup / New Template

To edit template gas type or value proceed as follows:

1. The 'gas type' drop down arrow allows selection of an alternative gas to the one displayed in adjacent window, as illustrated in Fig. 3-14.

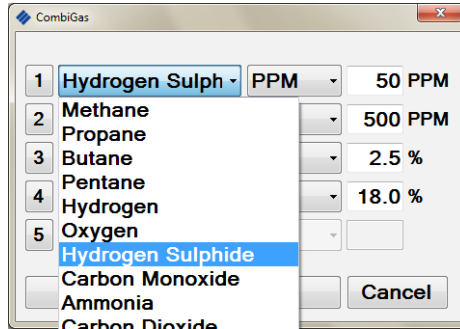


Fig. 3-14 Edit Gas Type

2. Similarly, the unit of measure can also be edited by selecting the adjacent drop down arrow, as illustrated in Fig. 3-15.

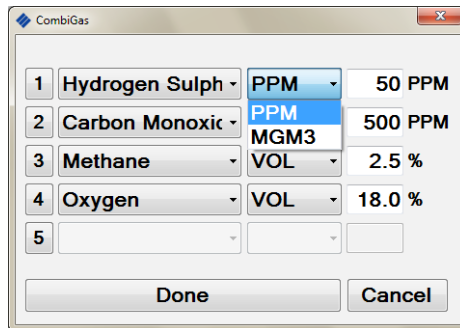


Fig. 3-15 Edit Gas Measurement

- If the gas value requires editing, highlight current value then type replacement value, as illustrated in Fig. 3-16.

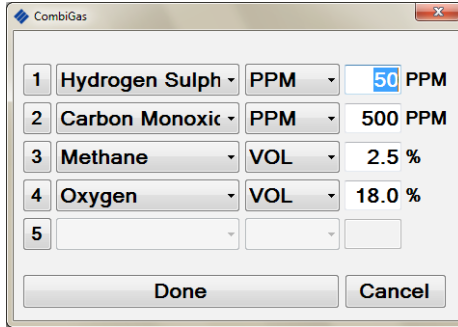



Fig. 3-16 Edit Gas Value

- On completion, select  to return to the setup editor window, as illustrated in Fig. 3-10.
- To save edited setup as a new template, highlight then edit template name (e.g. New Template), as illustrated in Fig. 3-17.

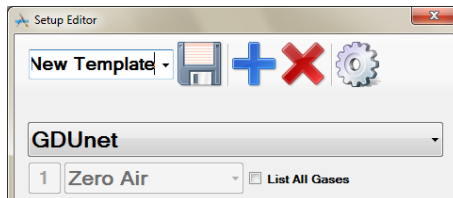


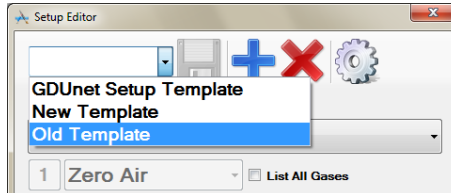
Fig. 3-17 Re-name Template

- To save New Template, click .


**Remember that template gases / values must be compatible with the corresponding gases / values on the gas cylinder label.**

### 3.3.5 Delete Setup / Template

1. To delete an unwanted setup / template, use the drop down arrow illustrated in Fig. 3-18, then select the unwanted template ('Old Template' in example) from the displayed list.



*Fig. 3-18 Delete Template*


2. With the unwanted template name displayed in the window adjacent to drop down arrow, click  to delete 'Old Template' setup.

### 3.3.6 Advanced Editor

---

**Warning:** **Advanced Editor settings should not normally be accessed as gases, gas ranges and corresponding limits are factory set and should not require adjustment. GMI cannot be held responsible if these values are edited.**

---

This option is password protected and is accessed by selecting 'Advanced Editor' button  from the 'Setup Editor' window, illustrated in Fig. 3-10.

For further details on using this option, refer to section 3.4 of this handbook.

### 3.3.7 GDU<sub>net</sub> Selection

To test or calibrate an instrument, a GDU<sub>net</sub> must have the required test or calibration files received via the network.

To select a GDU<sub>net</sub> registered on the network, in the ‘Send To’ section, click the drop down arrow and select the required GDU<sub>net</sub>, as illustrated in Fig. 3-19.

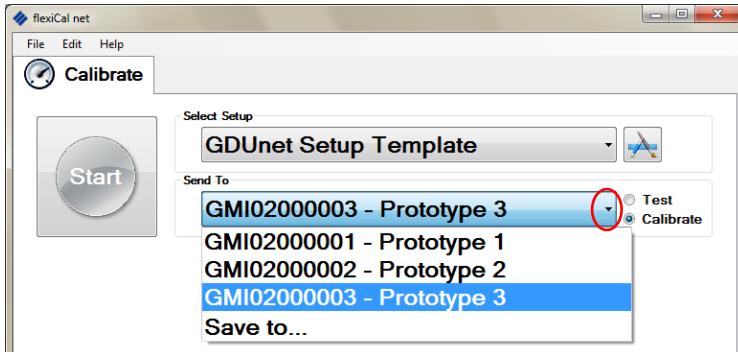


Fig. 3-19 GDU<sub>net</sub> Selection

### 3.3.8 Test or Calibrate Selection

‘Send To’ also contains the selection to ‘Test’ or ‘Calibrate’ instruments as the required process.

- The **‘Test’** process is selected to simply apply gas then record instrument status.  
This process does not update instrument calibration settings in any way.
- The **‘Calibrate’** process is selected to perform a full calibration of the instrument. Gases are applied and the instrument settings are automatically adjusted until the instrument reading is the same as each gas applied.  
This process updates stored data including new ‘cal-due’ date.

To select ‘Test’ or ‘Calibrate’ option, select the appropriate ‘radio’ button, highlighted in Fig.3-20.

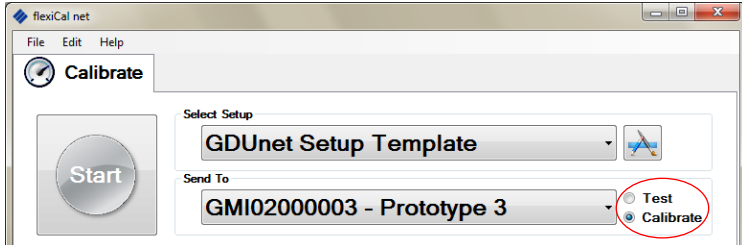


Fig. 3-20 Test or Calibrate

### 3.3.9 Test / Calibrate Instrument

In this example, an instrument is the subject of a calibration procedure using the pre-loaded **GDUnet Setup Template** and **GDUnet GMI02010009 - Prototype 009**.

When you are ready to send the setup across the network,



select **Start** to send the calibration file to **GMI02010009 - Prototype 009**, as illustrated in Fig. 3-21.

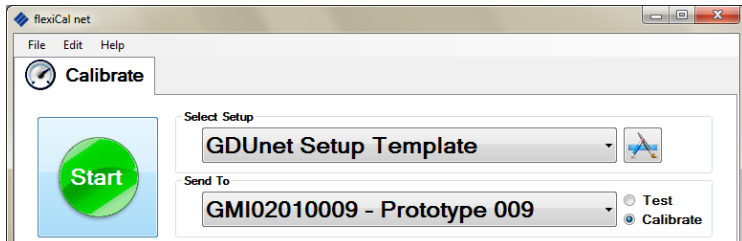
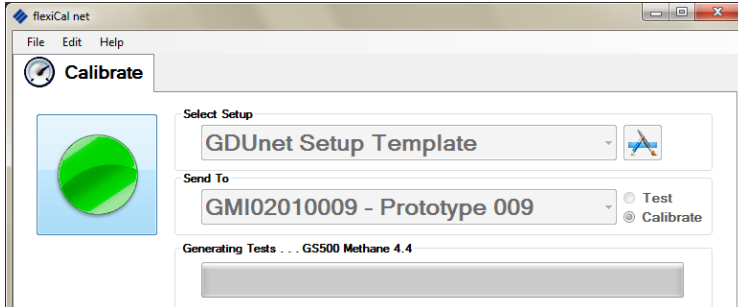


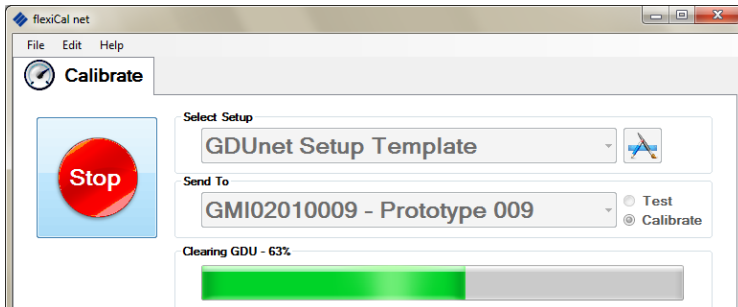
Fig. 3-21 Send Calibration File

**flexiCal net** now generates the calibration test files to be sent to the **GDUnet**, as illustrated in Fig. 3-22.



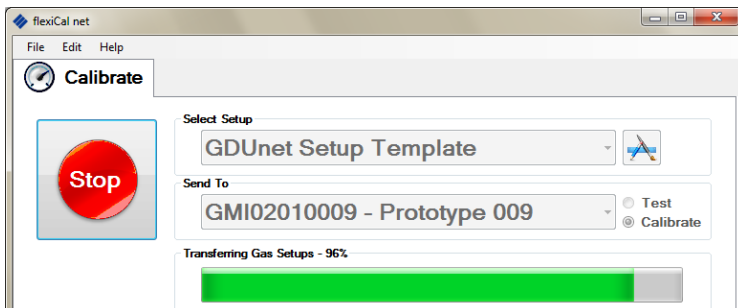
*Fig. 3-22 Generating Tests*

Following this the GDU<sub>net</sub> is cleared prior to the test file being sent, as illustrated in Fig. 3-23.



*Fig. 3-23 Preparing GDU<sub>net</sub>*

After being cleared the test files are then transferred to the GDU<sub>net</sub>, as illustrated in Fig. 3-24.



*Fig. 3-24 File Transfer in Progress*




## 3.4 ADVANCED EDITOR

---

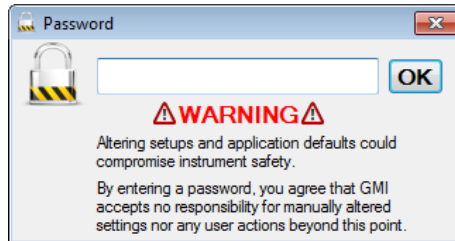
**Warning:** The Advanced Editor should not normally be accessed as gases, gas ranges and corresponding limits are factory set and should not require adjustment. GMI cannot be held responsible if these values are edited.

---

This option is password protected, and can be accessed by selecting 'Advanced Editor' button  from the 'Setup Editor' window, illustrated in Fig. 3-10.

Note: Advanced Editor options are only applicable to each currently displayed gas setup.

Next, a password is required to proceed. Refer to Fig. 3-25.



*Fig. 3-25 Advanced Editor Password Request*

Note: The factory set password is 'default'. This password can be edited in 'Preference Settings' as detailed in section 3.6.

1. To proceed, enter the required password then click 'OK'. The following 'Advanced Editor' window is displayed:

In this example, illustrated in Fig. 3-26, a CombiGas cylinder is used.

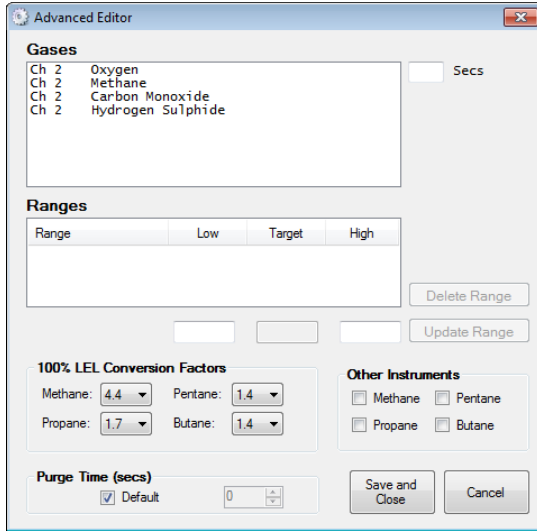


Fig. 3-26 Advanced Editor

- To view the individual gas ranges, select a gas, e.g. Oxygen, to display the Oxygen gas range, as illustrated in Fig. 3-27.

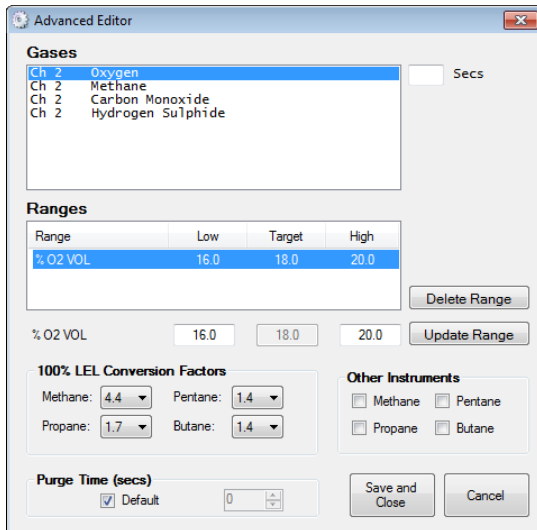
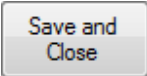


Fig. 3-27 View Gas Ranges

### 3.4.1 Edit Gases

Apply Gas Application Time Value: (not normally applicable to CombiGas)

If, for example, a number of individual gases were listed in the 'Gases' window, a specific time value for application of each gas type can be specified. Simply, position cursor in panel adjacent to highlighted gas, then type a value (in seconds).

Select  button to save time value, if applicable.

Other Instruments:

If, for example, the instrument is configured to be calibrated using methane as the flammable calibration gas and methane is unavailable, the instrument can be calibrated using an alternative calibration gas, e.g. Butane ; Propane ; Pentane.

**flexiCal *net*** software compensates for the alternative gas selected.

To select an alternative calibration gas, firstly make sure that the gas type is highlighted in the 'Gases' window, then select a gas from the 'Other Instruments' section. In the example illustrated in Fig. 3-28, Butane is selected as the alternative calibration gas.

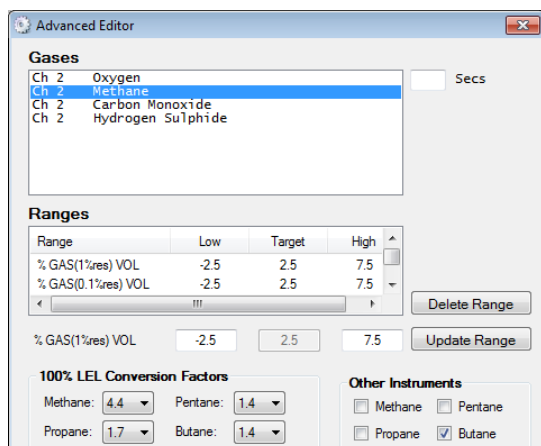
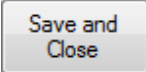



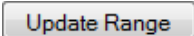
Fig. 3-28 Alternative Flammable Calibration Gas

Select  button to save alternative flammable gas.

Delete Range:

To delete a gas range from list in the ‘Ranges’ window, highlight the gas range to be removed, e.g. Carbon Monoxide, then select  to remove from list.

Update Range:

Use  to save any ‘Range’ amendments, for example, if ‘Low’, ‘Target’ or ‘High’ values are edited, as detailed in example, section 3.4.2.

### 3.4.2 Edit Gas Limit(s)

1. To edit the gas limits, select a gas range, e.g. Carbon Monoxide, to display gas and corresponding ‘Low’, ‘Target’ or ‘High’ values in the editing panels, as illustrated in Fig. 3-29.

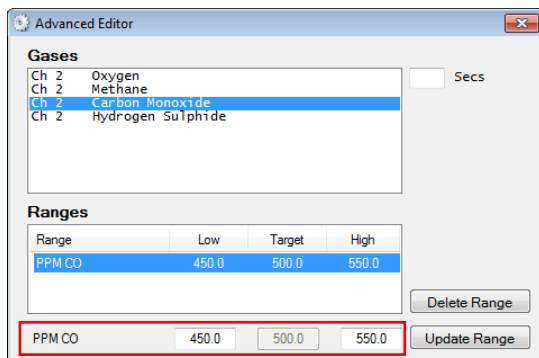


Fig. 3-29 Edit Gas Range

2. To edit the ‘Low’ or ‘High’ value for a particular range, use the cursor to highlight gas value in editing panel, e.g. ‘High’ limit 550.0, as illustrated in Fig. 3-30.

Ranges			
Range	Low	Target	High
PPM CO	450.0	500.0	550.0

PPM CO      450.0      500.0      550.0

Delete Range      Update Range

*Fig. 3-30 Edit High Gas Limit*

---

**Warning:**      Care should be taken if editing gas limits.

---

3. Type new value in editing panel.
4. Select  button to store updated value.

### 3.4.3 Edit 100% LEL Conversion Factors

The advanced editor window displays the default 100% LEL conversion factors for Methane, Pentane, Propane and Butane calibration gases, as illustrated in Fig. 3-31.

100% LEL Conversion Factors			
Methane:	4.4	Pentane:	1.4
Propane:	1.7	Butane:	1.4

*Fig. 3-31 Default Conversion Factors*

1. To edit the conversion factor (Methane in example), use cursor to select a new value from the drop down list, as illustrated in Fig. 3-32.

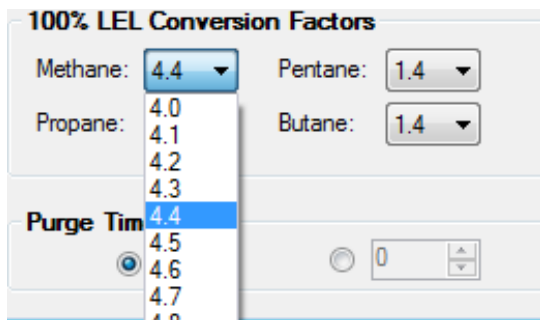
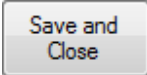


Fig. 3-32 Edit Methane Conversion Factor

2. Select  button to store updated value, if no further 'advanced editing' is required.

### 3.4.4 Edit Purge Time

This feature normally applies to automatic calibration only.

1. To edit the purge time (in seconds), select radio button adjacent to panel displaying time value, as illustrated in Fig. 3-33. Use up / down arrows to increase / decrease purge time value respectively.

Value can be set from 0 to 120 seconds.

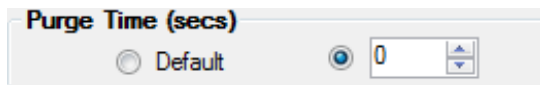
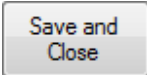


Fig. 3-33 Edit Purge Time

2. Select  button to store updated value, if no further 'advanced editing' is required.

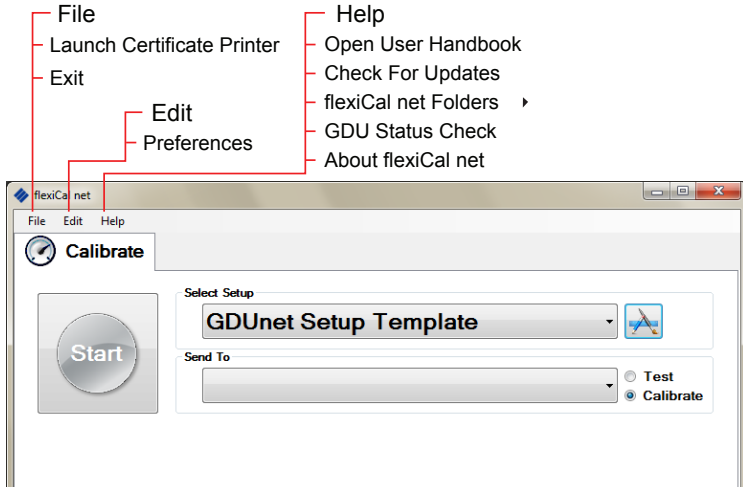
---

**Note:** A longer purge time ensures all the gas is cleared from the instrument.

---

## 3.5 ADDITIONAL FILE MENU ITEMS

From the 'File', 'Edit' and 'Help' menus, the user can access additional items, details of which are explained in the following paragraphs:



*Fig. 3-34 File Menu Items*


### 3.5.1 File Menu

From the 'File' menu, the following item can be accessed:

Launch Certificate Printer:

Refer to section 7.4.1 for 'Certificate Generation'.

Exit:

The 'Exit' button  closes the **flexiCal net** software package. Note that any unsaved changes will be lost.

### 3.5.2 Edit Menu

From the 'Edit' menu, the following items can be accessed:

Preferences:

Refer to section 3.6 for 'PREFERENCE SETTINGS'.

### 3.5.3 Help Menu

From the 'Help' menu, the following items can be accessed:

Open User Handbook:

This link provides the user with access to the **GDU**net User Handbook. The user handbook can also be accessed in a separate folder in the root directory on software CD-ROM.

Check For Updates:

If selected, the link provides the user with the ability to verify that the latest version of '**flexiCal net**' software is installed.

This link requires PC / Laptop internet connection enabled.

flexiCal Net Folders:

There are two folders accessed via this link. All are located on the PC / Laptop hard disk and include the following:

- |                      |  |
|----------------------|--|
| Data Folder:         | This folder contains all stored data files (open .accdb files using Ms Access™ 2007 or later).     |
| Certificates Folder: | This folder contains all stored certificates (access .html files using Internet Browser software). |
| Application Folder:  | This folder contains all stored instrument application files - access not recommended for users.   |



GDU Status Check:

Selecting will check the status of ALL *GDUnet* devices connected to the network. Status refers to whether a *GDUnet* is:

Online - connected to the network, or

Offline - not connected to the network.

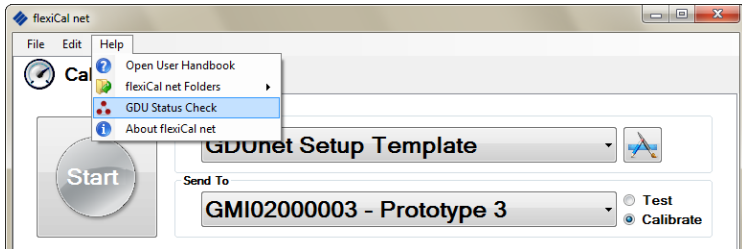
For further detail regarding GDU Status Check, refer to section 3.5.4.

About flexiCal Net:

This link displays **flexiCal *net*** software version number.

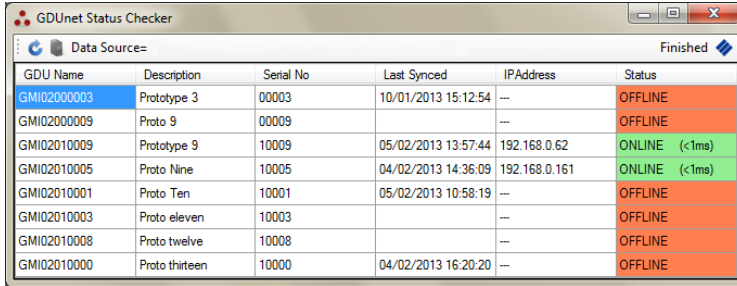
### 3.5.4 GDU Status Check

This application allows the user to check the current status of all *GDUnet* devices connected to the network. To access this application, from the Help menu, select GDU Status Check, as illustrated in Fig. 3-35.



*Fig. 3-35 Select GDU Status Check*

The application will open and communicate with each *GDUnet* connected to the network and provide the following details, as illustrated in Fig 3-36:



GDU Name	Description	Serial No	Last Synced	IPAddress	Status
GMI02000003	Prototype 3	00003	10/01/2013 15:12:54	---	OFFLINE
GMI02000009	Proto 9	00009		---	OFFLINE
GMI02010009	Prototype 9	10009	05/02/2013 13:57:44	192.168.0.62	ONLINE (<1ms)
GMI02010005	Proto Nine	10005	04/02/2013 14:36:09	192.168.0.161	ONLINE (<1ms)
GMI02010001	Proto Ten	10001	05/02/2013 10:58:19	---	OFFLINE
GMI02010003	Proto eleven	10003		---	OFFLINE
GMI02010008	Proto twelve	10008		---	OFFLINE
GMI02010000	Proto thirteen	10000	04/02/2013 16:20:20	---	OFFLINE

Fig. 3-36 GDU Status Checker

- **GDUnet** - name, description and serial no.
- **Status** - GDUnet will be either ONLINE or OFFLINE.
- **IP Address** - Any ONLINE GDUnet will show an assigned IP Address.
- **Last Synced** - this is the last time the GDUnet synchronised with the IMS database.

The menu bar, illustrated in Fig. 3-37, provides the user with the following options:

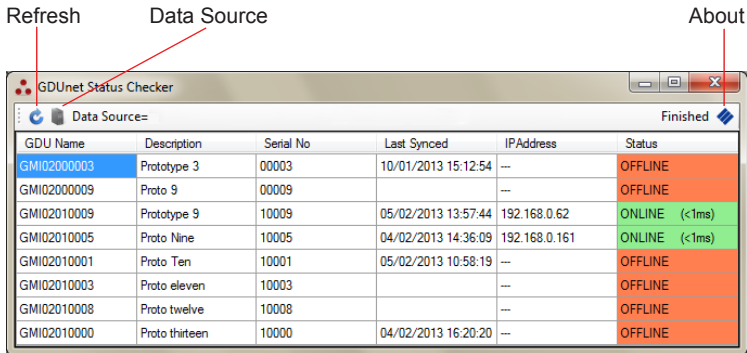


Fig. 3-37 Menu Bar

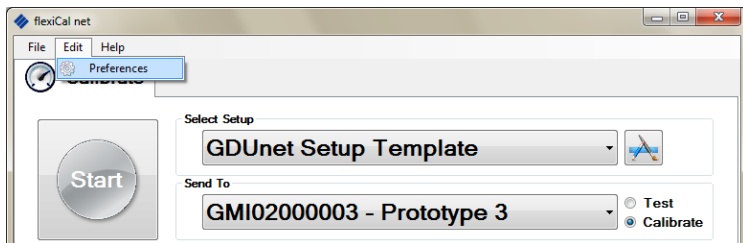
- **Refresh** - the application will check the current status of each GDUnet device connected to the network.

- **Data source** - opens the connection properties window for selecting a new server name and database connection. Refer to section 3.2.2 and 3.2.3 to setup the server name and database connection.
- **About** - provides information about GDU Status Checker, e.g. current version.

### 3.6 PREFERENCE SETTINGS

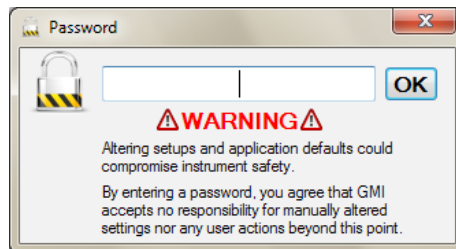
The preferences dialogue sets the global conditions for **flexiCal *net*** software to setup the IMS server / database, add a *GDU<sub>net</sub>* to the network, enable visible gas ranges, default limits on instrument tests and also gas application times.

Select 'Preferences' from the 'Edit' menu, as illustrated in Fig. 3.38.



*Fig. 3-38 Select Preferences*

The following 'Password' dialogue box is displayed:



*Fig. 3-39 Password Protected*

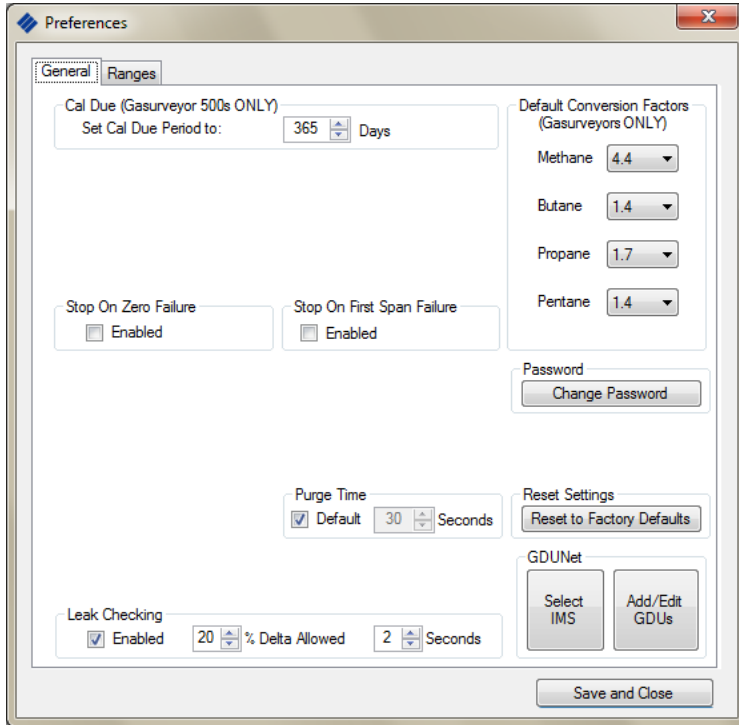
Enter password then click 'OK' button.

Note: The factory set password is 'default'.

The password can be edited as detailed later in this chapter.

The preferences dialogue box is now displayed. The dialogue box contains two selectable tabs: 'General' and 'Ranges'.

General tab is illustrated in Fig. 3-40.



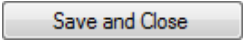
*Fig. 3-40 Preferences - General*

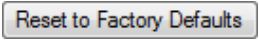
For 'General' tab details / contents, refer to Section 3.6.1

For 'Ranges' tab details / contents, refer to Section 3.6.2

### 3.6.1 'General' Tab

To save any preference change then close window, select

 Save and Close

To reject any preference change and return to factory default settings, select .

---


**Note:** Previously made changes will also be discarded.

---

#### 3.6.1.1 Cal Due (Gasurveyor 500 series only)


Following calibration, the calibration due (Cal Due) date is normally set as one year from present date (i.e. '365' value in window).

This preference can be replaced with a time period, in days, ranging from 0 days to 365 days.

Use  to select number of days required.


#### 3.6.1.2 Stop On Zero Failure

By default, stopping the test / calibration process due to an instrument zero failure is disabled.

To override this setting, i.e. enable feature, place a  in the 'Stop On Zero Failure' box.

#### 3.6.1.3 Stop On First Span Failure

By default, stopping the test / calibration process due to an instrument span failure is disabled.

To override this setting, i.e. enable feature, place a  in the 'Stop On First Span Failure' box.

### 3.6.1.4 Purge Time

By default, gas purge time is set to 30 seconds.


To override this setting, i.e. disable feature, un-tick the 'Default' box .

To adjust the Time Value, use  arrows. Value can be adjusted from 15 to 120 seconds.

### 3.6.1.5 Leak Checking

During the Test / Calibration process, both instrument pump and gas supply are stopped simultaneously. A leak test is performed while gas is trapped in the instrument.

If the Volume Gas reading drops by a level greater than '% Delta Allowed', the instrument records a 'Fail' condition.

To adjust the % Delta Value, use . Value can be adjusted from 0 to 20%.


Time value, in seconds, relates to the duration that the pump and gas supply is temporarily halted.

To adjust the Time Value, use . Value can be adjusted from 0 to 20 seconds.

### 3.6.1.6 Default Conversion Factors

The value (factor) displayed in each calibration gas type window represents 100% LEL of that particular gas type.

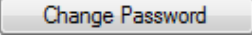
This value can be edited if your company policy dictates adjustment to a specific value that your company has determined equates to 100% LEL.

To adjust the default conversion factors, use  to display option values for each gas type.

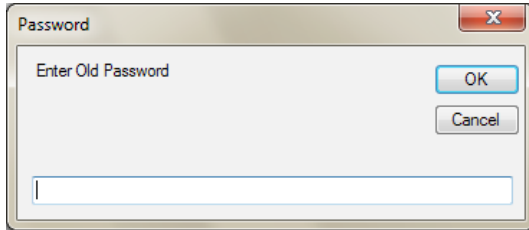
### 3.6.1.7 Password

The preferences dialogue box, illustrated in Fig. 3-40, is password protected to prevent users modifying test / calibration parameters.

Note: If password is forgotten, contact GMI for recovery details.

To change the password, select  from the 'General' tab in the 'Preferences' window.

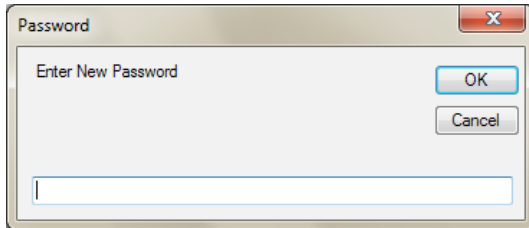
The window illustrated in Fig. 3-41 is displayed:



*Fig. 3-41 Enter Current Password*

Enter current password then select 'OK' button.

The window illustrated in Fig. 3-42 is displayed:

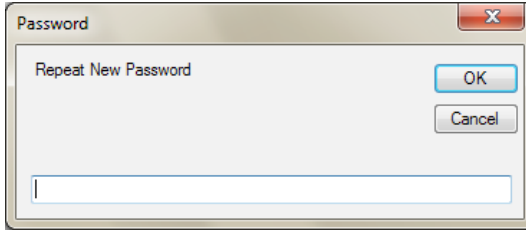


*Fig. 3-42 Enter New Password*

Enter new password then select 'OK' button.

Note: If no password is entered and only 'OK' selected, then the password entry dialogue is disabled and free access to 'Preferences' is enabled.

The window illustrated in Fig. 3-43 is displayed:

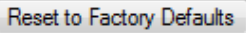


*Fig. 3-43 Repeat New Password*

Re-type new password then select 'OK' button.


Note: If no password was entered in previous step, then this dialogue would also remain blank, thus enabling free access to 'Preferences'.

### 3.6.1.8 Reset Settings

This feature allows the user to reject any preference change and return to factory default settings by selecting  , illustrated in Fig. 3-40.

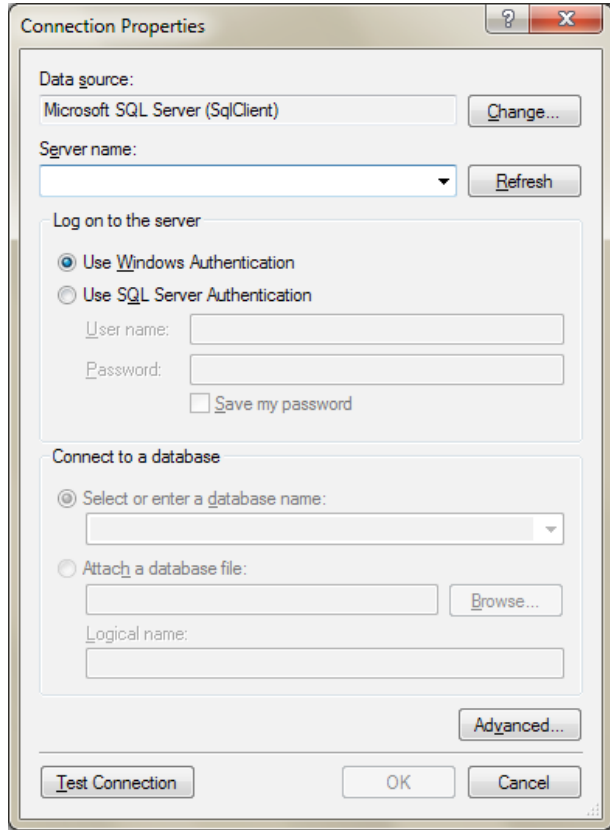
### 3.6.1.9 Select IMS

For a GDU<sub>net</sub> to connect and be recognised on the network, each GDU<sub>net</sub> has to be registered to the IMS database.

To setup the IMS database, select  .

The window illustrated in Fig. 3-44 is displayed:





*Fig. 3-44 Connection Properties*

For the *GDUnet* to successfully connect to the network, the following **MUST** be setup correctly:

- **Server name** - this is the database management system which contains the IMS database.
- **Database connection** - this is the IMS database which stores all registered *GDUnet*'s to the network.

## Server Name

To setup the server name:

Click the drop down arrow from the **Server Name** section and select the appropriate server name to be used, as illustrated in Fig. 3-45.

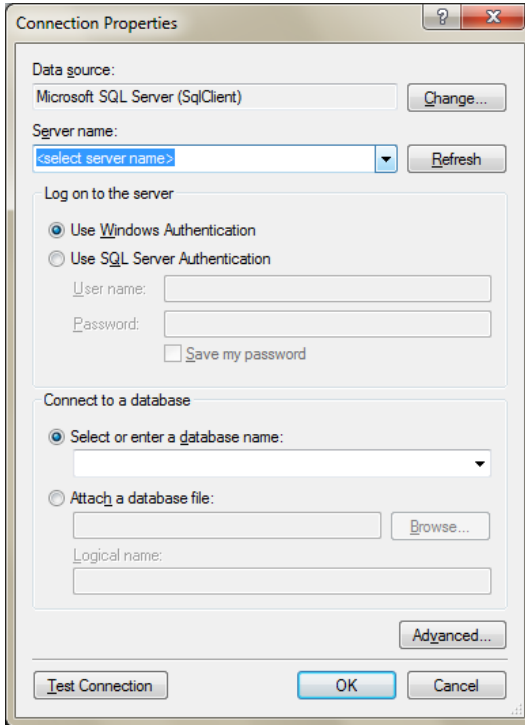


Fig. 3-45 Server Name

## Database Connection

To setup a database connection:

Click the drop down arrow from the **Select or enter a database name** section and select or enter the appropriate database connection to be used, as illustrated in Fig. 3-46.

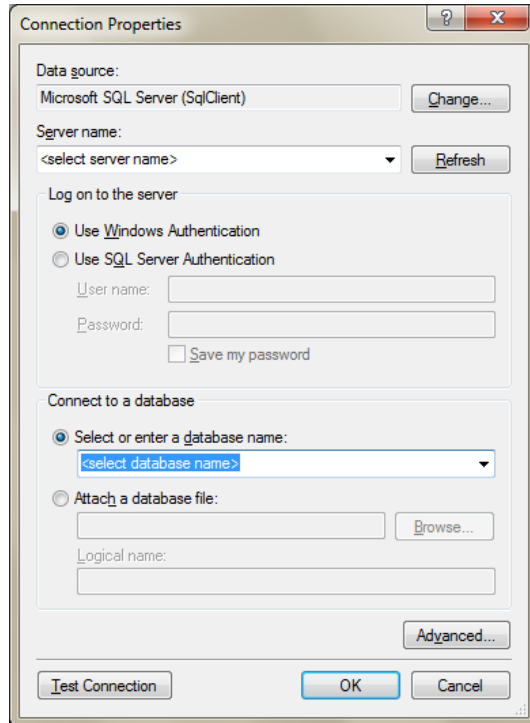
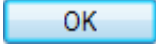


Fig. 3-46 Database Connection

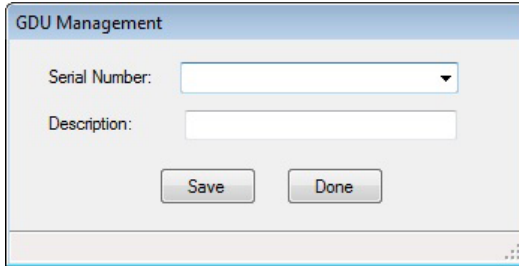
Click  to confirm server name and database connection.

### 3.6.1.10 Add GDU

To register a GDU<sup>net</sup> to the IMS database, select

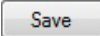


The window illustrated in Fig. 3-47 is displayed:



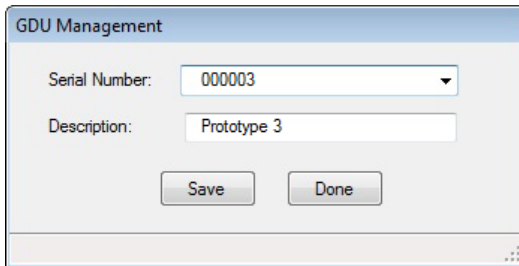
The dialog box titled "GDU Management" contains two input fields: "Serial Number:" with a dropdown arrow and "Description:" with a text box. Below the fields are two buttons: "Save" and "Done".

*Fig. 3-47 Enter GDU Details*

Enter the serial no. and a description of the GDU<sup>net</sup> to be registered to the network, then select  to confirm details.

Note: The serial no. is the 6 digit number found on the serial no. label of the GDU<sup>net</sup>.

As an example, GDU<sup>net</sup> with serial no. '000003' and the description 'Prototype 3' are to be used, as illustrated in Fig. 3-48.



The dialog box titled "GDU Management" shows the "Serial Number:" dropdown menu set to "000003" and the "Description:" text box containing "Prototype 3". The "Save" and "Done" buttons are visible below.

*Fig. 3-48 Example GDU Details*

---

**Warning:** If the serial no. is entered incorrectly the GDU<sup>net</sup> will not be found. Ensure the serial no. matches the serial no. label, as, once registered the serial no. cannot be deleted.

---

The example *GDUnet* added to the network can now be seen when the drop down menu is selected in the 'Send To' section of the main window, as illustrated in Fig. 3-49.

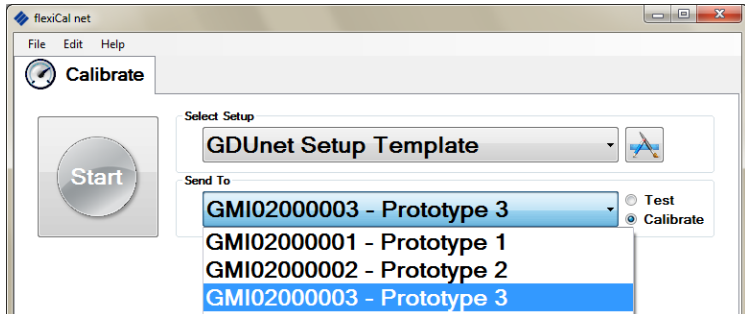


Fig. 3-49 Example *GDUnet* Selection

Note: The GMI02 prefix is the *GDUnet* identifier.

### 3.6.1.11 Edit *GDU*

To amend the description details of a registered *GDUnet*, select



The window illustrated in Fig. 3-50 is displayed:

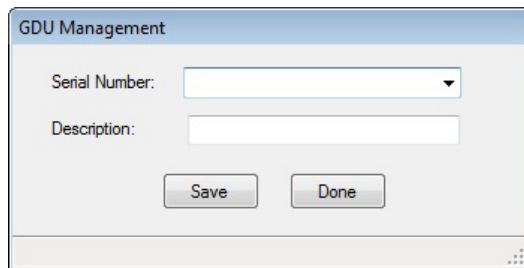
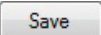
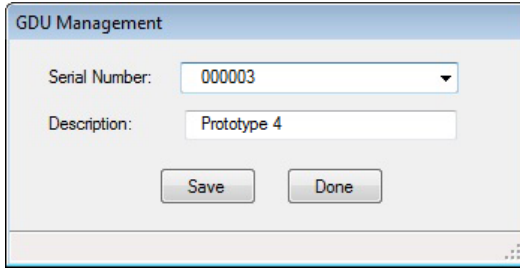


Fig. 3-50 Edit *GDUnet* Description

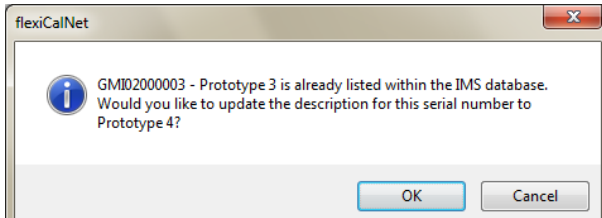
Select the serial no. of the *GDUnet* to amend from the drop down list, amend the description of the *GDUnet*, then select  to confirm.

As an example, GDU $net$  with serial no. '000003' is to have the description amended to 'Prototype 4', as illustrated in Fig. 3-51.



*Fig. 3-51 Example GDU $net$  Description Change*

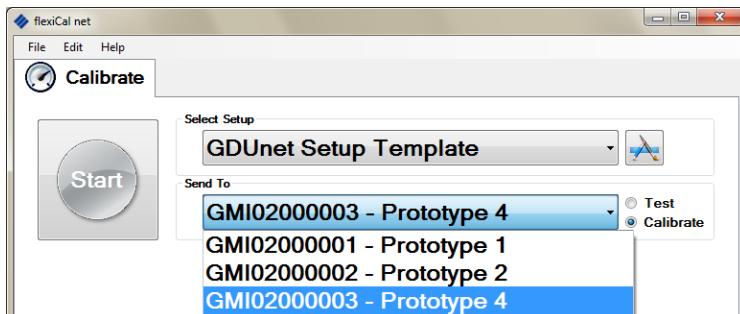
Confirm the amendments are correct, as illustrated in Fig 3-52.



*Fig. 3-52 Confirm Description Change*

Confirmation the record has been updated will be displayed.

The example GDU $net$ , with the description changed, can now be seen when the drop down menu is selected in the 'Send To' section of the main window, as illustrated in Fig. 3-53.



*Fig. 3-53 Example GDU $net$  Selection*

### 3.6.2 'Ranges' Tab

If the 'Ranges' tab is selected from Preferences window, the dialogue box illustrated in Fig. 3-54 is displayed:

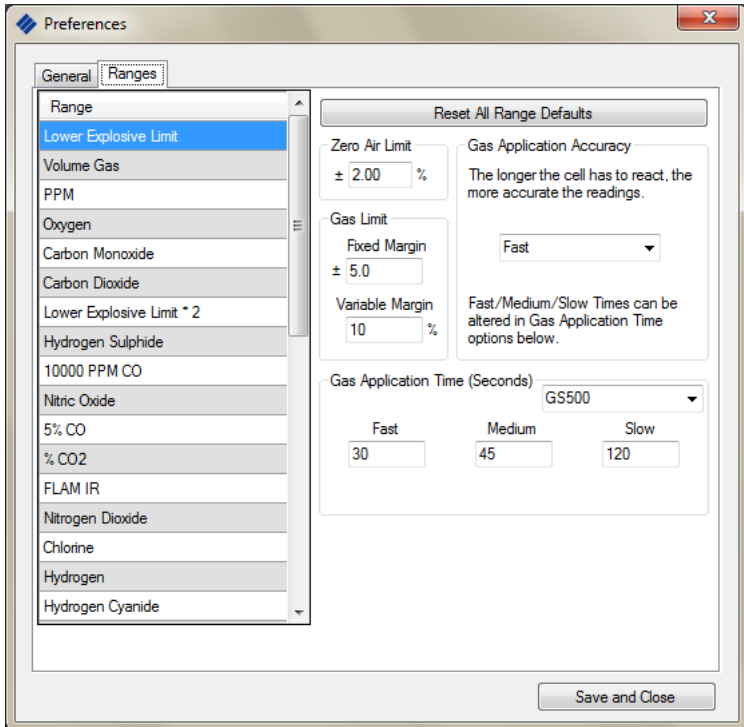


Fig. 3-54 Preferences - Ranges

To save any preference change then close window, select

Save and Close

#### 3.6.2.1 Reset All Range Defaults

To reset **all** gas ranges to factory set defaults, select

Reset All Range Defaults

### 3.6.2.2 Zero Air Limit

At the start of a Test / Calibration, zero air is applied to each range and will record a 'Pass' if the reading is within this amount of zero, or 20.9 for oxygen.

To edit 'Zero Air Limit' value, highlight existing value in window then type new value.

### 3.6.2.3 Gas Limit


The software opts for the higher value in either the Fixed Margin or Variable Margin window. When the range is tested with gas, it will record a 'Pass' if the reading is within this amount of the gas concentration .

To edit either the 'Fixed Margin' or 'Variable Margin' value, highlight existing value in relevant window then type new value.

### 3.6.2.4 Gas Application Accuracy

This feature allows the user to set the gas application time, for each selected gas range, as Fast, Medium or Slow. Note that the longer the instrument cell has to react, the more accurate the readings obtained.

The actual application time values can be edited in paragraph 3.6.2.5.

To edit the 'Gas Application Accuracy' for any gas listed in 'Range' window, highlight the required gas range, then select accuracy setting using  to display Fast, Medium or Slow options.

### 3.6.2.5 Gas Application Time

As detailed in paragraph 3.6.2.4, the gas application accuracy can be set as Fast, Medium or Slow. The 'Gas Application Time' feature allows a time value, in seconds, to be applied to each.

Note that the entered value is independent of gas range highlighted in 'Range' window.

To edit Fast, Medium or Slow time value, highlight existing value in window then type new value.



## IMS RESULTS MANAGER

### 4.1 INTRODUCTION

The test results of all instruments that have been tested / calibrated on the *GDUnet* are stored in the *GDUnet* internal memory. The internal memory can store approximately 1000 test results.

These results are retrieved from the *GDUnet* and downloaded to the IMS database using the **IMS Results Manager** software package.

This package requires installation, setup, then must be left running in the background.

---

**Important: PC running IMS Results Manager must be switched on at all times to ensure results are retrieved from any GDUnet connected to the network.**

---

### 4.2 SYSTEM REQUIREMENTS

To run the **IMS Results Manager** software package, you require the following minimum system requirements:

- PC / Laptop running WindowsXP™ software or newer
- Processor speed 1GHz
- 512MB RAM and 850MB disk space
- SQL Server version 2005 or newer
- IMS Database version 1.0.8 or newer
- .NET Framework 4 or newer
- DHCP Network Addressing

## 4.3 INSTALLATION

---

**Important:** This procedure should be carried out by an IT operative with server ‘Administration Rights’.

---

The **IMS Results Manager** software package is supplied on the following CD-ROM’s:

- GDUnet IMS (Full Install) Software - Part No. 99590
- GDUnet IMS (Upgrade) Software - Part No. 99591

To install the software on a PC / Laptop using Microsoft Windows XP™, Windows Vista™ or Windows 7™ platforms, proceed as follows:

1. Insert GDUnet CD-ROM into the appropriate CD drive in your PC / Laptop.

The ‘Autoplay’ window should appear, displaying the ‘Open folder to view files’ option, as illustrated in Fig 4-1.

Should the CD-ROM not run automatically, select ‘Start’ then ‘Computer’ to find the CD-ROM drive, then, double-click to open.

The following window is displayed:

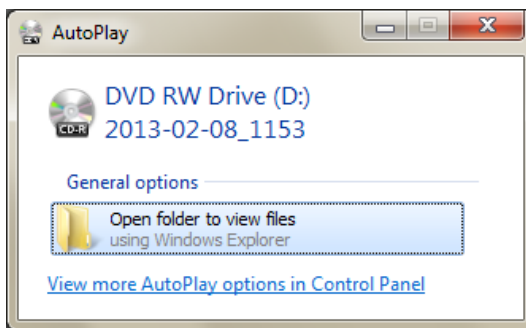


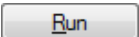
Fig. 4-1 CD-ROM AutoPlay

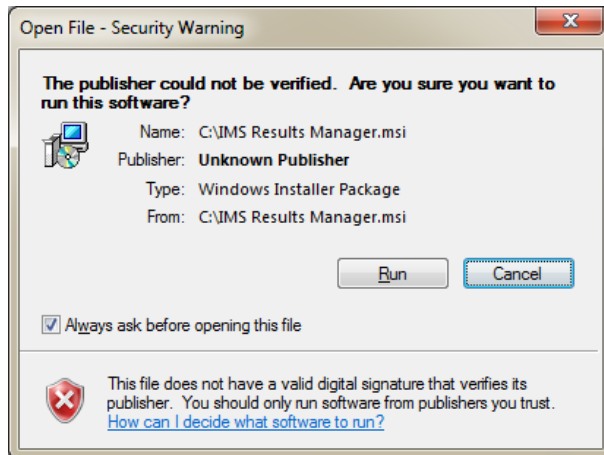
Open the folder to view CD-ROM options.

## RESULTS MANAGER

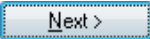
2. GMI recommend that before using this software package, the user reads the User Handbook.

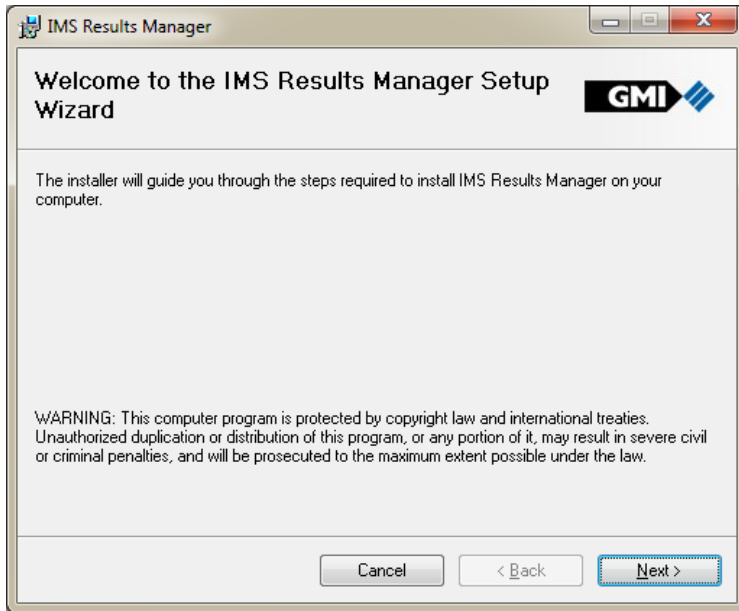
Adobe Reader must be installed on your PC / Laptop to view the User Handbook.

3. Before installing the **IMS Results Manager** software package, it is recommended that the user exits all other Windows programs.
4. To start installation, select the **IMS Results Manager** installer, a security warning as illustrated in Fig. 4-2 will be displayed. Click  to continue.

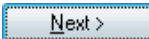


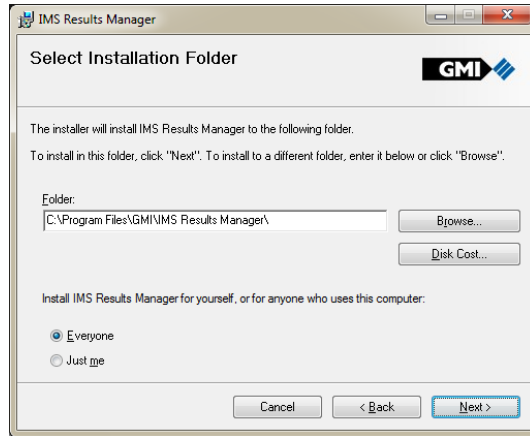
*Fig. 4-2 Security Warning*

- The Setup Wizard will be displayed, as illustrated in Fig. 4-3. Click  to continue.

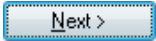


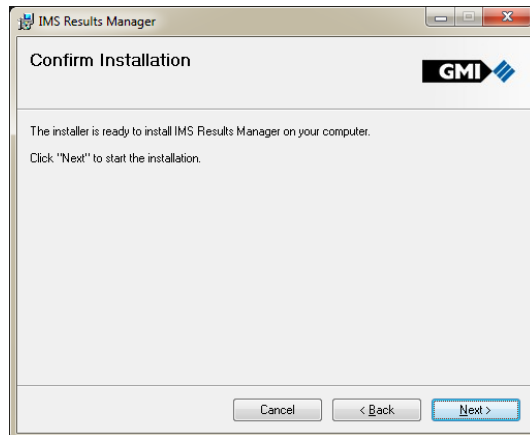
*Fig. 4-3 Setup Wizard*

- To proceed with software installation, select an installation folder. The installer creates the folder destination, C:\Program Files\GMI\IMS Results Manager\, where the software will be installed, as illustrated in Fig 4-4. Click  to continue.  
An alternative folder destination can be chosen, if preferred.




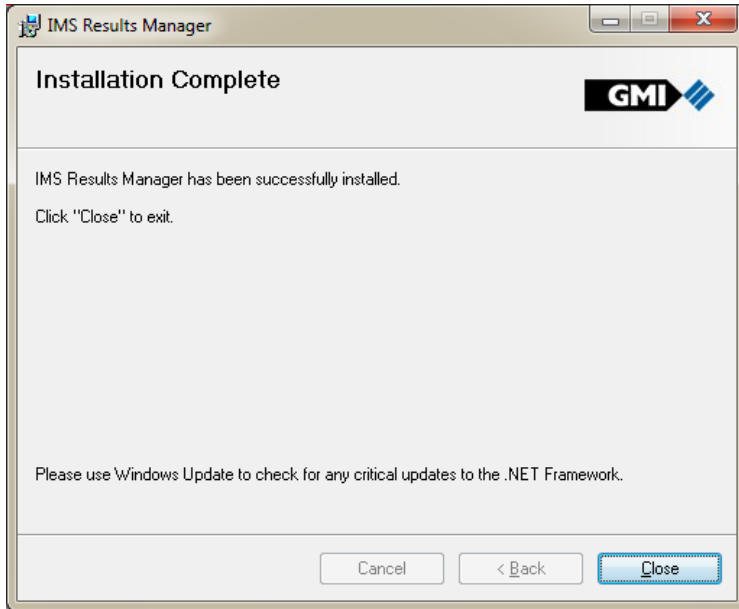
*Fig. 4-4 Installation Folder*

7. To confirm and start installation, click , as illustrated in Fig. 4-5.




*Fig. 4-5 Confirm Installation*

8. On completion of installation, the window illustrated in Fig. 4-6 is displayed. Click  to exit the installation.



*Fig. 4-6 Installation Complete*


9. The **IMS Results Manager** installation is now complete. The CD-ROM can now be removed from the CD drive.

An **IMS Results Manager** shortcut  is automatically placed on the PC desktop for easy access to the software.

IMS Results  
Manager

## 4.4 SETUP

To setup the **IMS Results Manager** software package, to transfer test results to the IMS database. Firstly, start the application by

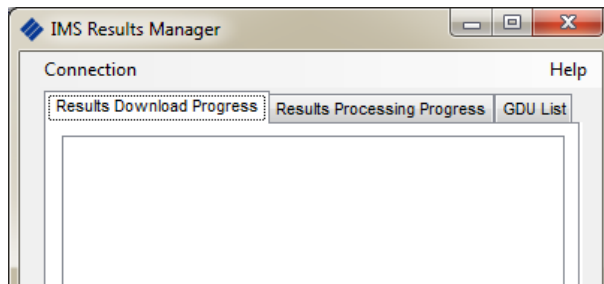
a double click of .

The application starts minimised in the notification area, as illustrated in Fig. 4-7.



*Fig. 4-7 Main Window*

Double click from the notification area to maximise and bring up the main window, as illustrated in Fig 4-8:



*Fig. 4-8 Main Window*

For this application to successfully run the following **MUST** be setup correctly:

- **Server name** - this is the database management system which contains the IMS database.
- **Database connection** - this is the IMS database which stores all the *GDU<sub>net</sub>* test result information.

### 4.4.1 Server Name

To setup the server name:

1. Click **Connection** to open the connection properties window, as illustrated in Fig. 4-9.

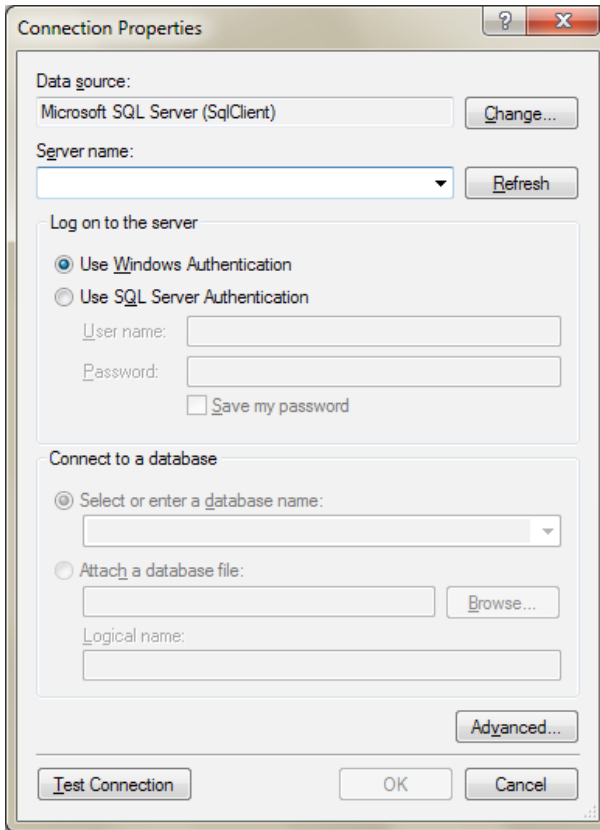


Fig. 4-9 Connection Properties



2. Click the drop down arrow from the **Server Name** section and select the appropriate server name to be used, as illustrated in Fig. 4-10.

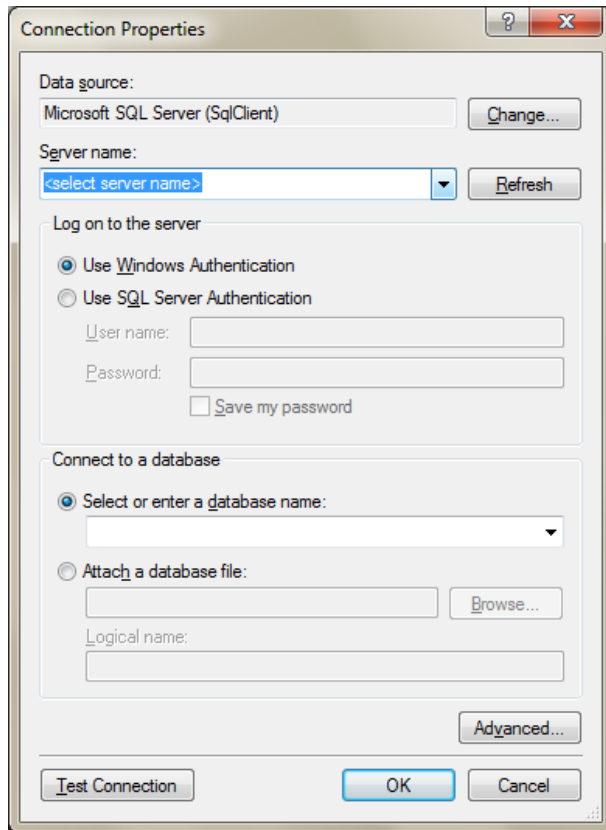


Fig. 4-10 Server Name

## 4.4.2 Database Connection

To setup a database connection:

1. Click **Connection** to open the connection properties window, as illustrated in Fig. 4-8.
2. Click the drop down arrow from the **Select or enter a database name** section and select or enter the appropriate database connection to be used, as illustrated in Fig. 4-11.

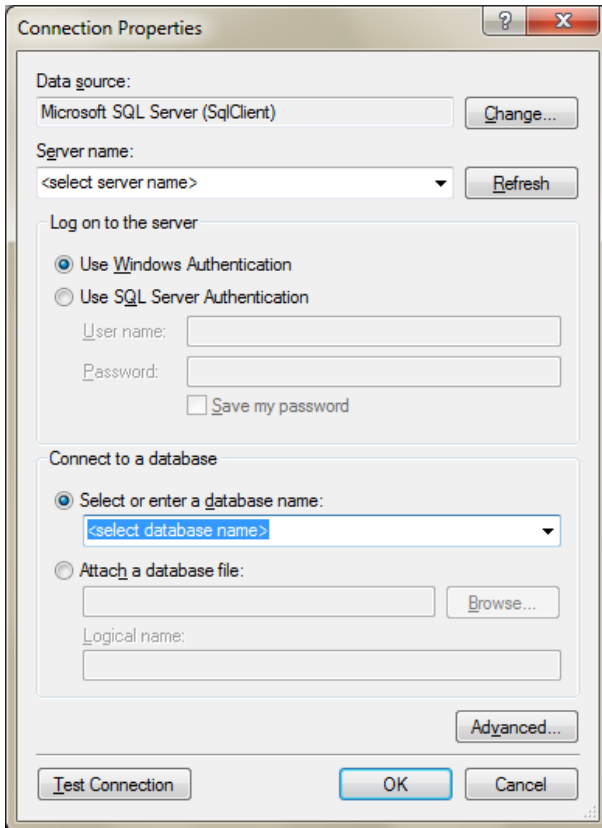


Fig. 4-11 Database Connection

3. Click **OK** to confirm database connection and server name.

## 4.5 TEST RESULT STORAGE

The **IMS Results Manager** software has three (3) functions:

1. To retrieve instrument test results from any *GDUnet* connected to the network.
2. To send the instrument test results to the IMS database (whilst archiving onto a PC).
3. The ability for users to select which *GDUnet*'s to retrieve results from.

### 4.5.1 Results Download

The **IMS Results Manager** software connects to *GDUnet*'s registered on the server; then looks for instrument test result files on each *GDUnet* (approximately every 30 seconds).

Any new test files are removed from the *GDUnet* and downloaded onto a PC (with *IMS Results Manager* installed).

Fig. 4-12 illustrates the 'Results Download Progress' tab and as an example *GDUnet*, GMI02000003, connected and various instrument test results files downloaded.

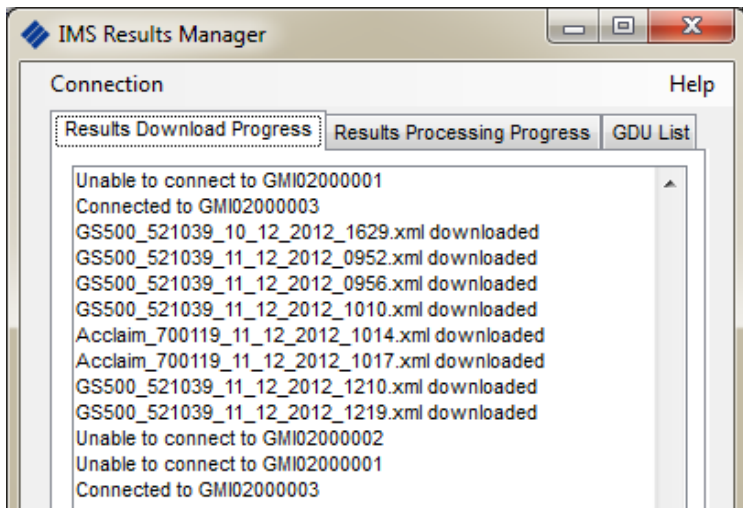


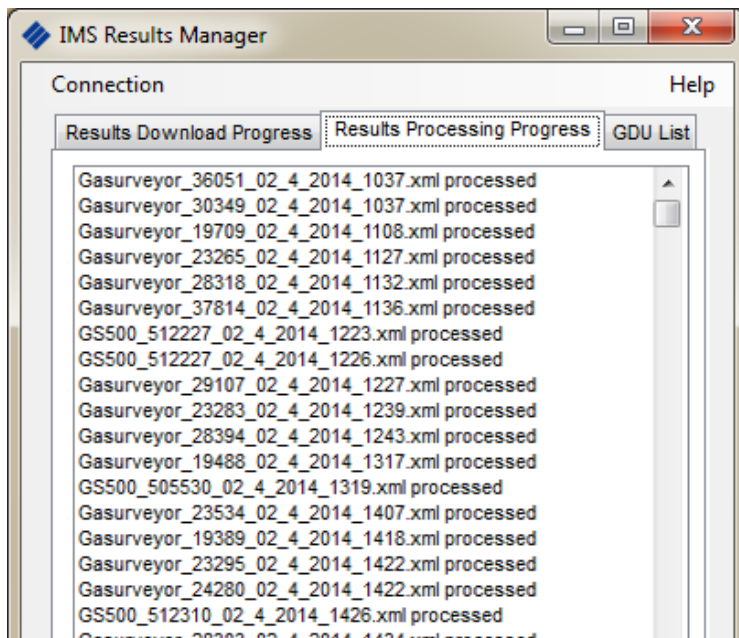
Fig. 4-12 Results Download

## 4.5.2 Results Processing

The **IMS Results Manager** looks for any new test files to process; then archives the files onto the PC, whilst, sending the test results to the IMS database.

Fig. 4-13 illustrates the 'Results Processing Progress' tab and shows the instrument result test files being detected and then archived.

In the background the test results are also being sent to the IMS database.



*Fig. 4-13 Results Processing*

Instrument test results are now stored on the IMS database and can be viewed using the IMS Commander application.

### 4.5.3 GDU List

The **IMS Results Manager** allows the user to select which GDU instrument results can be retrieved from.

Fig. 4-14 illustrates the 'GDU List' tab and shows that all GDU's are currently active. If a *GDU* is active the results are being retrieved and processed. Results are not retrieved from Ignored GDU's.

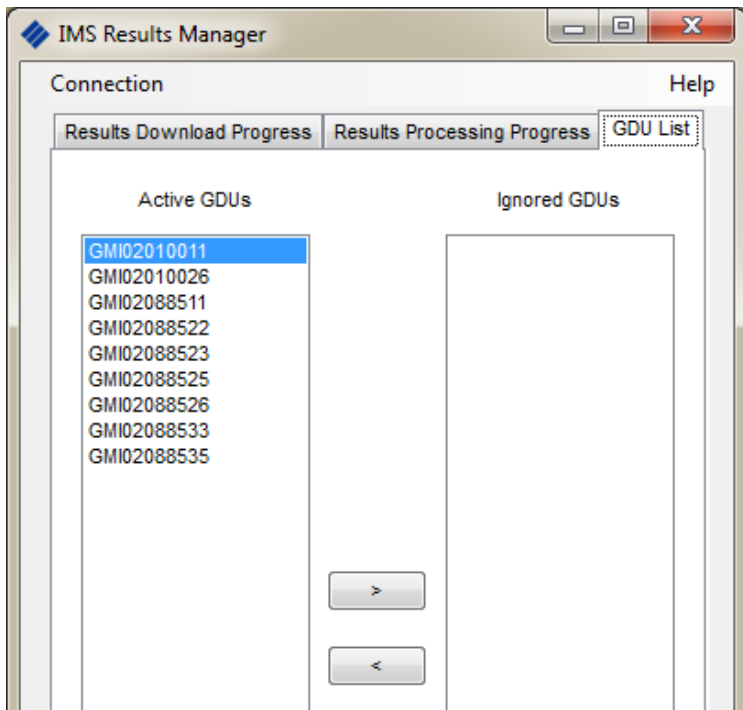
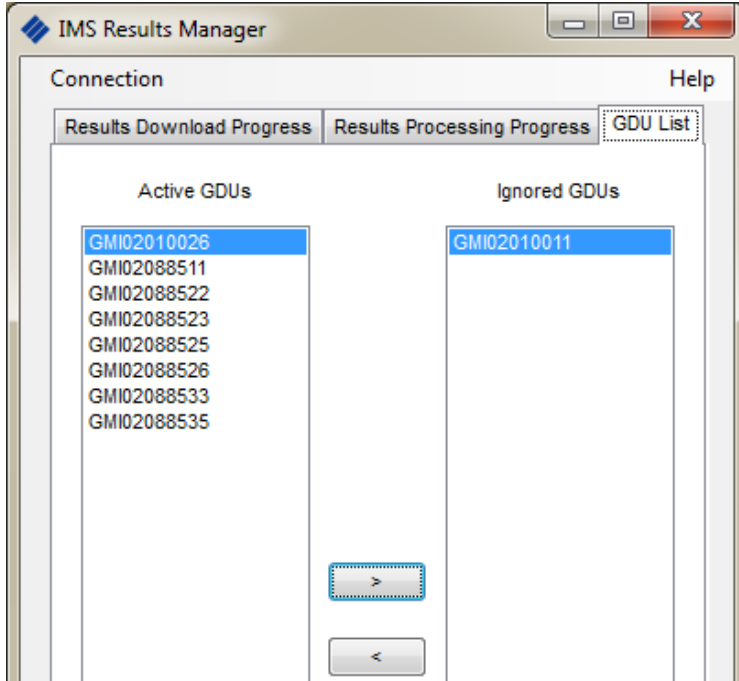


Fig. 4-14 GDU List

To move a GDU from the active to ignored list (or ignored to active list) highlight the GDU to be moved, select the right (or left) directional arrow and the GDU will move to the ignored list (or active list).

Fig. 4-15 shows the example of GDU<sub>net</sub> 'GMI02010011' having been moved to the ignored GDU list.



*Fig. 4-15 GDU<sub>net</sub> Ignored*

---

## GDUnet OPERATION

### 5.1 GDUnet Models

There are eight (8) models of GDUnet, as follows:

<u>Part No.</u>	<u>Gas Connections</u>	<u>Fittings</u>	<u>Keypad</u>
14750	8	6mm	No
14750Q	8	1/4 inch	No
14751	4	6mm	No
14751Q	4	1/4 inch	No
14780	8	6mm	Yes
14780Q	8	1/4 inch	Yes
14781	4	6mm	Yes
14781Q	4	1/4 inch	Yes

The differences between the models are:

- Ability to test / calibrate an instrument with up to 4 or 8 gases
- Use of imperial or metric gas fittings
- Keypad for ID entry

Other than keypad ID entry, the actual operation of each of the models are identical.

## 5.2 MAIN FEATURES

The main features of the GDU<sub>net</sub> are illustrated in Fig. 5-1 and described as follows:



Fig. 5-1 Main Features

- |                     |                        |
|---------------------|------------------------|
| 1. Gas Connections  | 6. Test LED's          |
| 2. Communications   | 7. Keypad (optional)   |
| 3. Microswitches    | 8. External Connectors |
| 4. Gas Nozzle       | 9. LCD                 |
| 5. Front Panel Lock |                        |



### 5.2.1 LCD

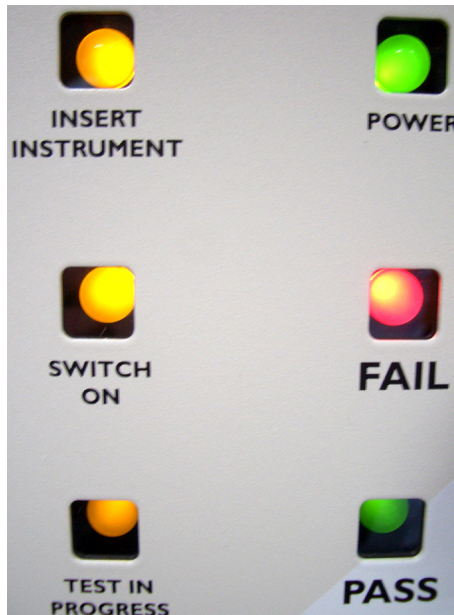
The LCD displays information relating to the status of a test being undertaken or has instructions for the user, as illustrated in the example in Fig. 5-2.



*Fig. 5-2 Example of LCD status*

### 5.2.2 Test LEDs

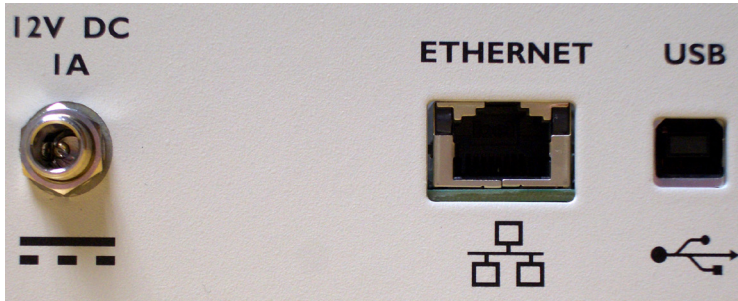
The front panel of the GDUnet contains six (6) LEDs relating to the current status of the GDUnet and instrument being tested.



*Fig. 5-3 Test LEDs*

### 5.2.3 External Connectors

There are three (3) external connectors on the GDUnet located at the side of the unit. There is the 12V power supply connection, an Ethernet connection for communication over the network and a USB connection for direct connection to an individual PC / laptop. The connector locations are illustrated in Fig. 5-4.



*Fig. 5-4 External Connectors*

### 5.2.4 Gas Connections

The GDUnet can be fitted with 4 or 8 gas connections. The gases for testing and calibrating instruments are connected to the gas inlet adaptors as shown, in Fig. 5-5, below.



*Fig. 5-5 Gas inlet adaptors*

---

**Note:** For correct installation of gases, refer to the GDUnet Installation Guide, part no. 14766.

---

### 5.2.5 Gas Nozzle

Gas is delivered to the instruments by the GDUnet via the outlet nozzle. When the instrument is located correctly in the tray the nozzle 'O' ring ensures there is a seal between the nozzle and the instrument, therefore no gas leakage.

There may be occasions where the nozzle 'O' ring may be damaged and can cause leaks resulting in instruments not passing the Leak Test. This would normally be regarded as user maintenance and a supply of 'O' rings should be provided near the GDUnet to enable users to change these on a regular basis, e.g. monthly.

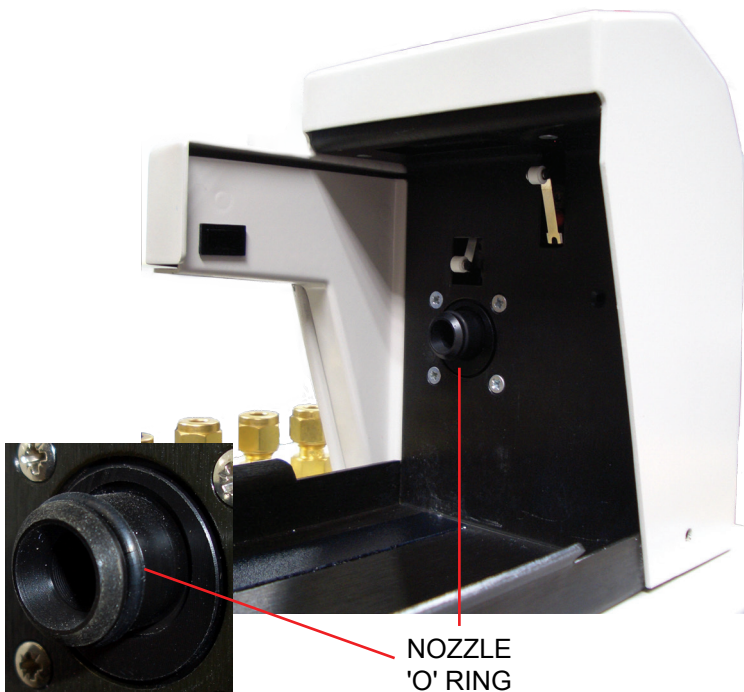


Fig. 5-6 Gas outlet nozzle

## 5.2.6 Microswitches

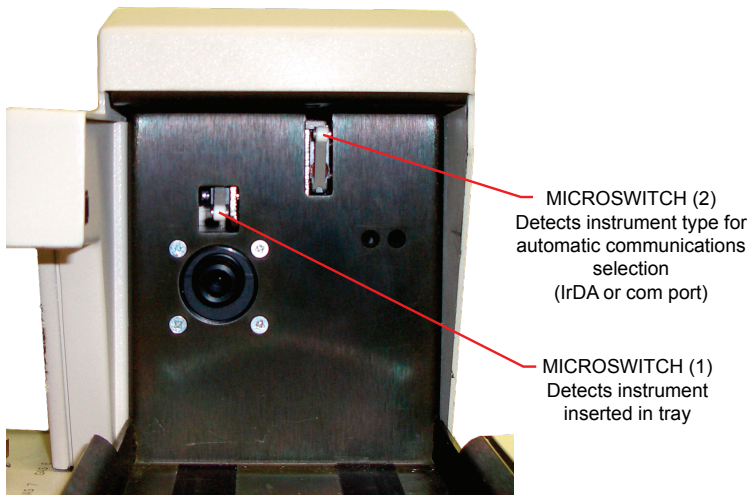
The GDU<sup>net</sup> contains two (2) contact microswitches located inside the instrument hood, as illustrated in Fig. 5-7.

The purpose of these microswitches is as follows:

**MICROSWITCH (1):** Detects when an instrument has been correctly located in the tray and activates the 'Switch ON' LED on the GDU<sup>net</sup> front panel.

**MICROSWITCH (2):** Detects instrument type. The instrument type determines whether communications are via the optical port or IrDA window.

- Optical comms when microswitch 2 is activated.
- IrDA comms when microswitch 2 hasn't been activated.



*Fig. 5-7 Microswitches*

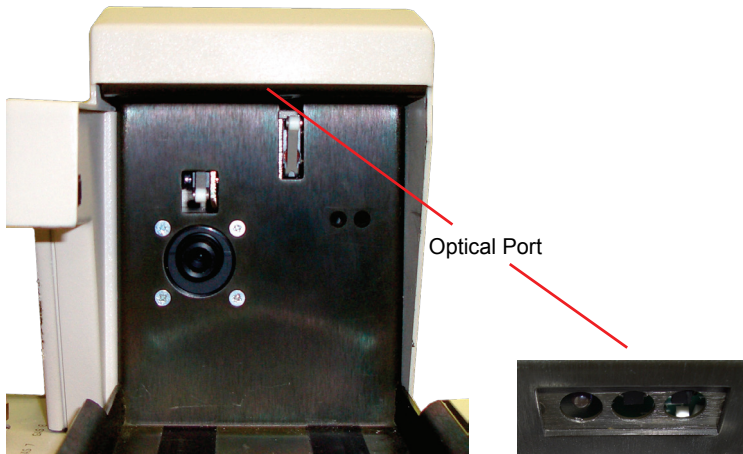
## **5.2.7 Optical Port**

Optical communication occurs when microswitch 2 has been activated.

The following examples are types of instruments that use optical communications:

- Gasurveyors (except Gasurveyor 700)
- First Responders
- Leak Surveyor

The optical port is illustrated in Fig. 5-8 below.



*Fig. 5-8 Optical Port*

## 5.2.8 IrDA Window

Infrared communication occurs when microswitch 2 has not been activated.

The following examples are types of instruments that use infrared communications:

- Gasurveyor 700
- Shipsurveyors
- Gascoseeker Acclaim

The IrDA window is illustrated in Fig. 5-9 below:



*Fig. 5-9 IrDA Window*

## 5.2.9 Front Panel Lock

The front panel of the GDU net can be secured with a key-lock, as illustrated in Fig. 5-10. Two (2) keys are supplied with the unit.



*Fig. 5-10 Front Panel Lock*

### 5.2.10 Keypad

The keypad version of the GDUnet will only allow users to test / calibrate an instrument after a user ID has been entered.

The user, when prompted, enters an ID code (can be up to 9 digits) followed by the # key.

Fig. 5-11 is an example of keypad entry.



*Fig. 5-11 Keypad Entry*

The GDUnet will automatically revert back to 'Enter ID then #', in the following circumstances:

- After 10 seconds, an instrument has not been inserted for testing. Additionally, the buzzer will sound and the test LED's will illuminate in sequence.
- An incorrect ID is entered. 'INVALID ID' will flash on the LCD.
- An instrument is removed from the GDUnet.

During each instrument test, the GDUnet logs the User ID.

## 5.3 STANDARD OPERATION

When the GDU $net$  is connected to a mains power supply, the green **POWER ON** LED will illuminate on the front panel, as shown in Fig. 5-12.



*Fig. 5-12 Power On*

The following start up sequence will begin:

1. The PASS and FAIL test LEDs will illuminate. The LCD back light will be on but no messages are present.
2. After approximately 30 seconds the buzzer will sound and the 6 test LEDs will illuminate in sequence.
3. For the keypad version of the GDU $net$ , the display will show 'Enter ID then #', enter the user ID to continue.
4. The 'INSERT INSTRUMENT' test LED will be illuminated and the LCD only now will display the message 'GDU $net$  #010001 INSERT GMI'.  
(#010001 - example serial number of a GDU $net$ .)
5. The GDU $net$  is now ready to test / calibrate instruments. Keypad users have 10 seconds to test / calibrate an instrument before the GDU $net$  reverts back to 'Enter ID then #'.

---

**Note:** The start-up sequence gives the opportunity to observe the test LEDs and buzzer are functioning correctly.

---



### 5.3.1 Test / Calibration Procedure

The following procedure will allow correct operation for testing / calibrating an instrument.

1. Ensure correct hardware installation has taken place, refer to the GDUnet Installation Guide, part no. 14766.
2. Ensure **flexiCal net** software installation has taken place, refer to chapter 2 - **flexiCal net** Installation.
3. Send the required test / calibration files to the GDUnet, refer to chapter 3 - **flexiCal net** Operation. If using the GDUnet in standalone mode refer to chapter 7 - Standalone Mode.
4. Ensure **IMS Results Manager** installation and setup has taken place, refer to chapter 4 - IMS Results Manager.
5. The procedure for the testing or calibrating of an instrument is illustrated in Fig. 5-12. The test procedure shows each step taken during the testing of an instrument from inserting onto the GDUnet until the removal of the instrument. The test procedure for the keypad version of the GDUnet is illustrated in Fig. 5-13.

---

**Note:** The test procedures also form the quick operation guide shipped with the GDUnet, part no. 14768.

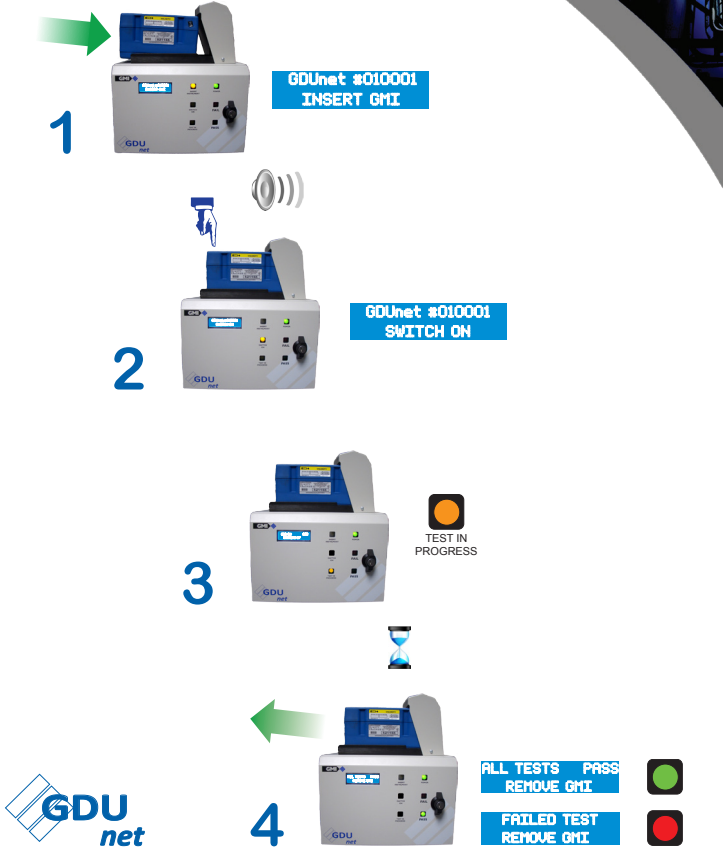
---

---

**Warning:** The GDUnet may reset if there is an interruption in the communications between the GDUnet and instrument under test. This interruption may be due to the instrument battery power being low, dirt in the optical communication windows, or electromagnetic interference.

---

### GDU<sub>net</sub> Quick Operation Guide



www.gmiuk.com  
Part No. 14768 Issue 2

Fig. 5-12 Quick Operation Guide

### GDUnet with Keypad - Quick Operation Guide

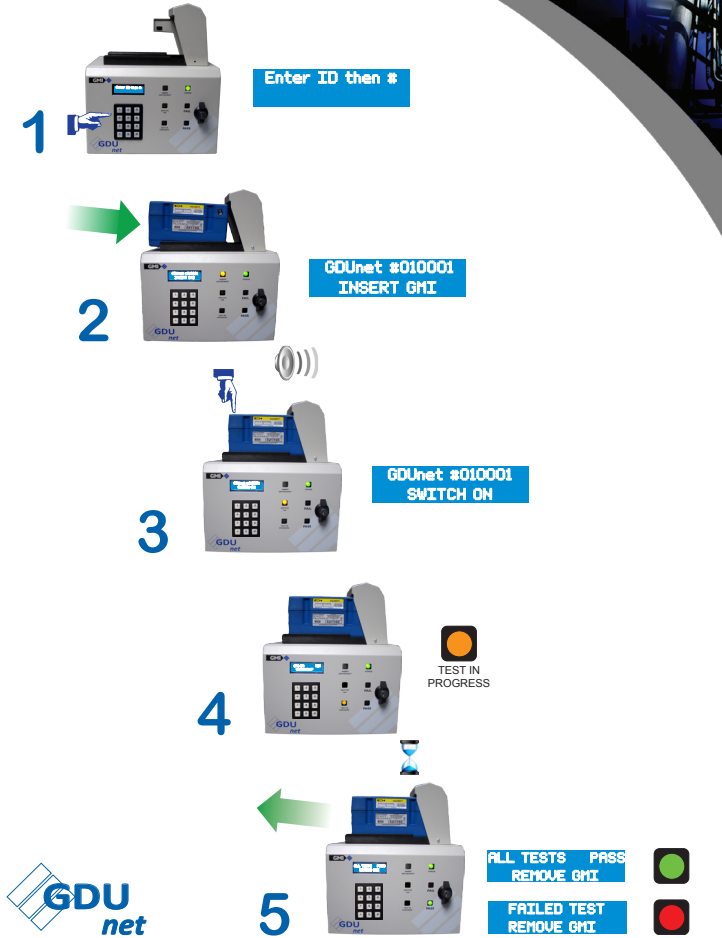


Fig. 5-13 GDUnet with Keypad - Quick Operation Guide



---

## TEST / CALIBRATION SETUP OF GMI PORTABLE INSTRUMENT

The following procedure details how to setup the test / calibration file for a GMI portable instrument using GMI **flexiCal net** software.

### 6.1 CALIBRATE GASURVEYOR 526 INSTRUMENT


In this example, calibration is to be performed on a GMI Gasurveyor 526 instrument.

To perform calibration, the calibration file for the instrument must be sent to a *GDUnet*.

To setup the Gasurveyor 526 calibration file, ensure **flexiCal net** has been installed and the *GDUnet* has been registered on the IMS server. Refer to chapters 2 and 3 for details.

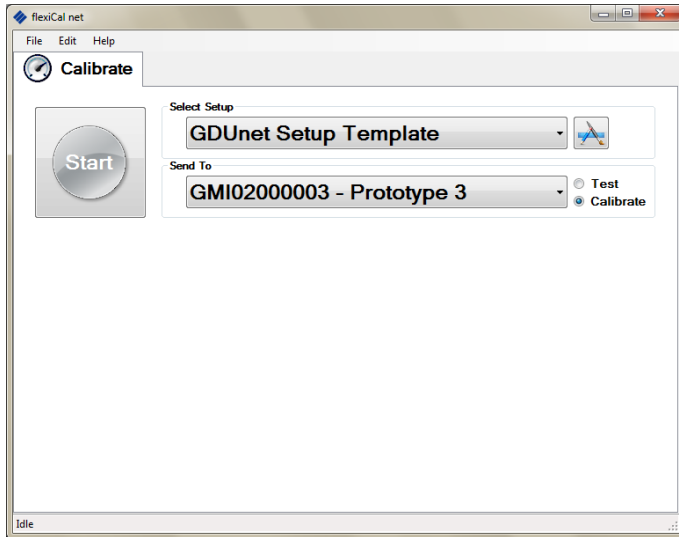
#### 6.1.1 Start Software

To start the **flexiCal net** software package:

Select Start / All Programs / Gas Measurement Instruments Ltd / flexiCal net or, double click on  the desktop.

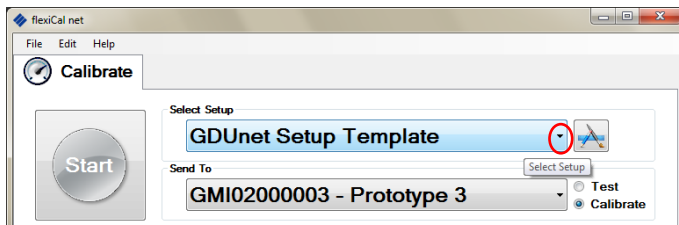
flexiCal net

The window is illustrated in Fig. 6-1 is now displayed:



*Fig. 6-1 Main Window*

Select the drop down menu arrow, illustrated in Fig. 6-2, to view stored setup templates.




*Fig. 6-2 View Setup Template(s)*

If there is an existing template in the drop down menu for the Gasurveyor 526 instrument, select template. The calibration gas setup can be viewed / verified in 'Setup Editor' if required.

If there is no template available in the drop down menu for Gasurveyor 526, a new setup template can be created. Proceed to 'Setup Editor'.

## 6.1.2 Create New Setup Template

1. Select the Setup Editor  button. The window illustrated in Fig . 6-3 is displayed.

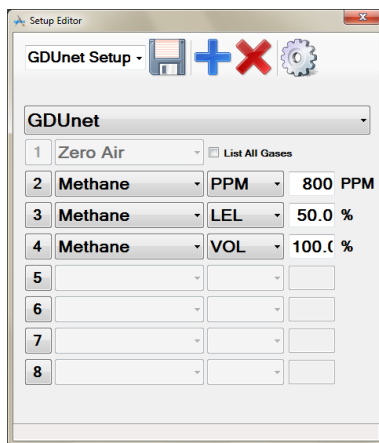


Fig. 6-3 Setup Editor

2. Select 'New Setup'  button from the 'Setup Editor' window. The window illustrated in Fig 6.4 is displayed:

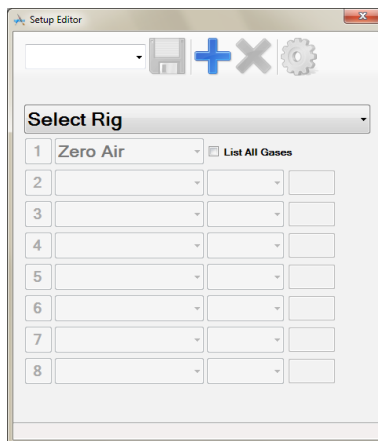


Fig. 6-4 New Setup

3. Select the drop down menu arrow, illustrated in Fig. 6-5, to display the GDU<sup>net</sup> as the calibration station and gas delivery unit suitable for all GMI instrument types:



*Fig. 6-5 Select Rig*

4. The gases can now be specified. A total of seven gases can be loaded (Nos. 2 to 8), together with 'Zero Air', always listed as No. 1. 'Zero Air' is used for zeroing the instrument's ranges and cannot be edited.

The Gasurveyor 526 features four gas ranges, calibrated for Methane as follows:

- 0 to 1000 PPM Flammable
- 0 to 100% LEL
- 0 to 100% Volume Gas
- 0 to 1000ppm Carbon Monoxide

**Remember that template gases / values entered must be compatible with the corresponding gases / values on each gas cylinder label.**

5. To specify gas No.2 (0 to 1000 PPM Flammable), select 2 to display gases drop down list, as illustrated in Fig. 6-6.



## TEST / CALIBRATION EXAMPLE

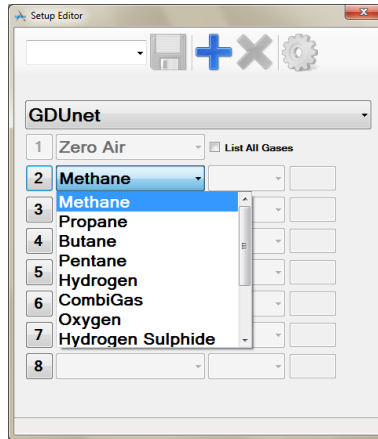


Fig. 6-6 Specify Gas Type

- From drop down list, select 'Methane'.  
PPM, LEL and VOL options are then displayed, as illustrated in Fig. 6-7.

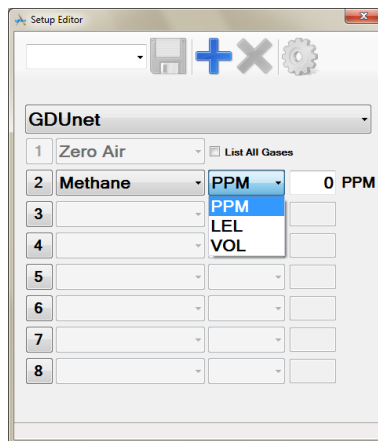


Fig. 6-7 Specify Gas Range

7. From list illustrated in Fig. 6-7, select 'PPM'.  
The displayed 'value' window automatically selects 'PPM' as the unit of measure.
8. The value on the gas cylinder label in this example is 800 PPM.  
To enter this (800) value, highlight existing (0) value then type new value in window, as illustrated in Fig. 6-8.

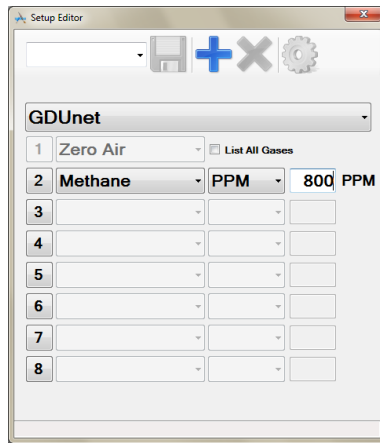


Fig. 6-8 Specify Gas Value

9. To specify gas No.3 (0 to 100% LEL), select 3 to display gases drop down list, as illustrated in Fig. 6-6.
10. From drop down list, select 'Methane'.  
PPM, LEL and VOL options are then displayed. Select 'LEL', as illustrated in Fig. 6-9.

## TEST / CALIBRATION EXAMPLE

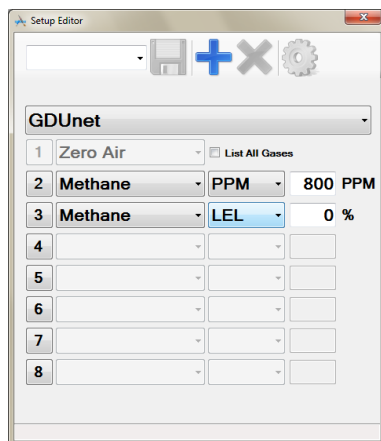


Fig. 6-9 Setup Continuation

11. Depending on supplied cylinder gas concentration, a corresponding value should be entered in ' % ' window.  
The value on the gas cylinder label in this example is 50%.  
To enter this (50) value, highlight existing (0) value then type new value in window.
12. To specify gas No.4 (0 to 100% VOL), select **4** to display gases drop down list, as illustrated in Fig. 6-6.  
Select Methane / VOL / from drop down list. The value on the gas cylinder label in this example is 100% VOL.  
To enter this (100) value, highlight existing (0) value then type new value in window.
13. To specify gas No.5 (0 to 1000ppm CO), select **5** to display gases drop down list, as illustrated in Fig. 6-6.  
Select Carbon Monoxide / PPM / from drop down list. The value on the gas cylinder label in this example is 500 PPM.  
To enter this (500) value, highlight existing (0) value then type new value in window.

On completion of gas entries, a setup template name can now be added.

14. To name 'gas setup', position cursor in window then type name of setup template, as illustrated in example Fig 6-10.

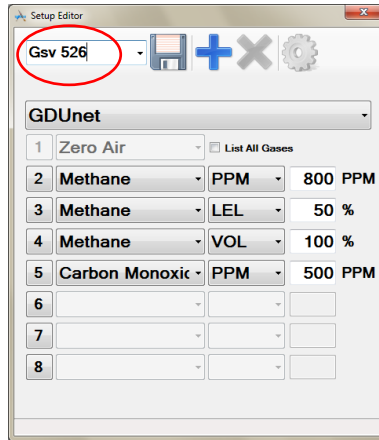


Fig. 6-10 Name Template

15. To save template, select 'Save Setup'  button to store new 'Gsv 526' setup.

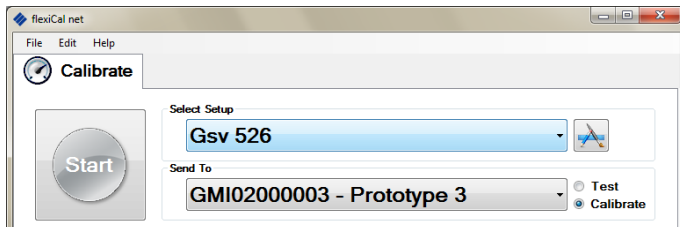
---

**Note:** There is an 'Advanced Editor' feature available, as detailed in Chapter 3, section 3.4. This feature should not normally be accessed as gases, gas ranges and corresponding limits are factory set and should not require adjustment. GMI cannot be held responsible if these values are edited.

---


### 6.1.3 Send Calibration File

1. From the main window, select 'Gsv 526' from drop down setup menu, as illustrated in Fig. 6-11



*Fig. 6-11 Select Setup*

2. In this example 'Calibrate' and GDU<sup>net</sup> 'GMI02000003 - Prototype 3' are selected from the 'Send To' section.
3. When you are ready to send the 'Gsv 526' calibration file to

GDU<sup>net</sup> 'GMI02000003 - Prototype 3', select  to proceed.

When the file transfer is complete, Gasurveyor 526 instruments can now be calibrated on GDU<sup>net</sup> 'GMI02000003 - Prototype 3'.



## STANDALONE MODE

The GDU $net$  can be setup to operate in standalone mode. This requires the **flexiCal net** test and calibration setup files to be uploaded to the GDU $net$  via a USB memory stick.

### 7.1 SEND TEST / CALIBRATION SETUP FILES TO USB

1. Create test / calibration setup file, refer to section 3.3.
2. Insert a USB memory stick into the PC / Laptop.
3. Send the test and calibration setup files to the USB memory stick, using **flexiCal net**. In the 'Send To' section click the drop down arrow and select 'Save to...', as illustrated in Fig. 7-1. In the example below, 'GDU $net$  Setup Template' is the setup file to be uploaded.

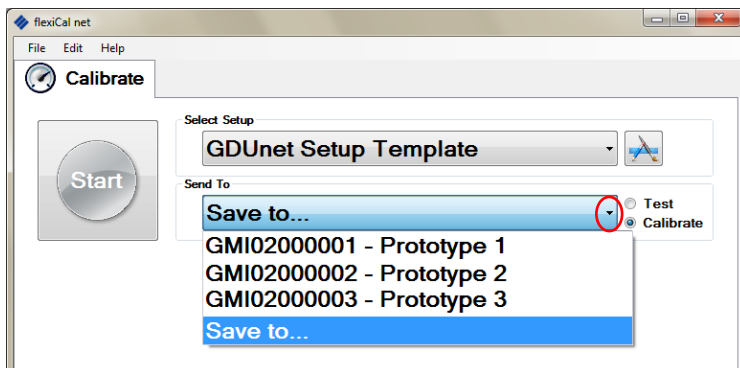
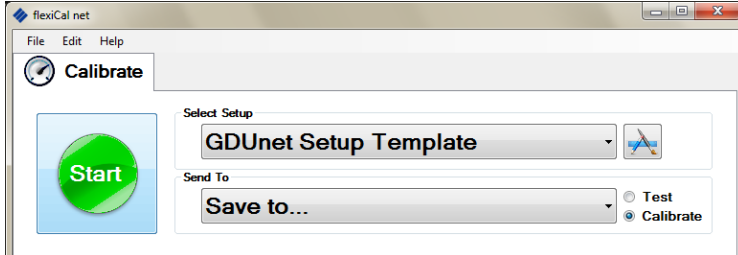


Fig. 7-1 Select 'Save to...'

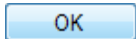


Next, select , as illustrated in Fig. 7-2.

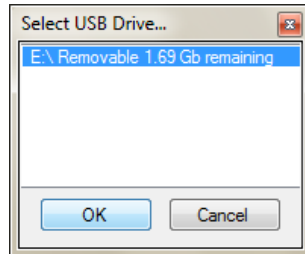


*Fig. 7-2 Send Setup Files*

The 'Select USB Drive...' window will open. Highlight the USB memory stick, the setup files are to be sent to, and select



, as illustrated in Fig. 7-3.

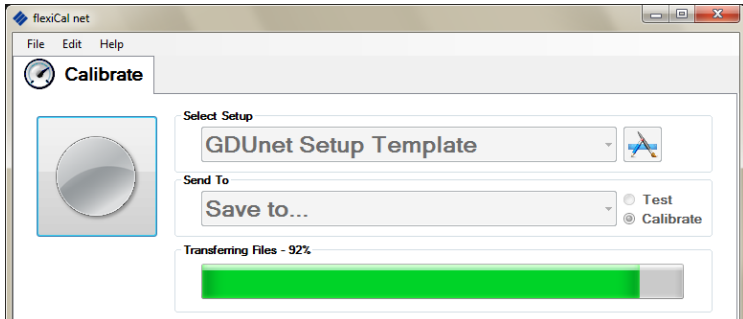


*Fig. 7-3 Select USB Drive*

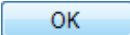


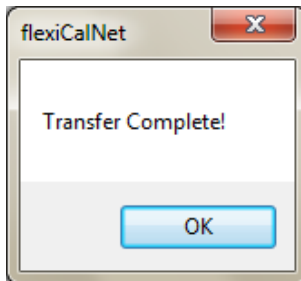
## STANDALONE MODE

Test and calibration setup files are now generated and transferred to the USB memory stick, as illustrated in Fig. 7-4.



*Fig. 7-4 File Transfer in Progress*

On completion the 'Transfer Complete!' window will open, select  to continue, as illustrated in Fig. 7-5.

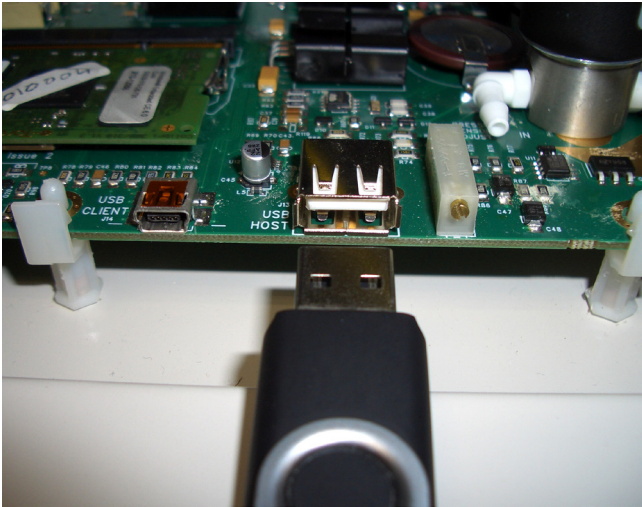


*Fig. 7-5 File Transfer to USB Complete*

The USB memory stick can now be removed from the PC / Laptop.

## 7.2 UPLOAD TEST / CALIBRATION SETUP FILES TO GDU<sup>net</sup>

Ensure the GDU<sup>net</sup> is powered on and the start up sequence is complete. Unlock the front panel door and insert the USB memory stick into the USB port as illustrated in Fig. 7-6.



*Fig. 7-6 GDU<sup>net</sup> USB Port*

The test and calibration setup files will automatically be uploaded to the GDU<sup>net</sup>. During the upload process, the front panel PASS and FAIL LED's will alternate until the upload is complete. The USB memory stick can now be removed and the front panel door locked.

---

**Warning:** If there is an error during the file upload process, the 'Test in Progress' LED will start flashing. The light will continue to flash when the USB memory stick has been removed and will not switch off until the USB memory stick is reinserted (file upload process starts again), or, an instrument is placed on the GDU<sup>net</sup> (test cycle begins).

---

## 7.3 DOWNLOAD TEST RESULTS

The test results of all instruments that have been tested / calibrated on the *GDUnet* are stored in the internal memory.

To download the test results from the *GDUnet*, ensure the *GDUnet* is powered on and the start up sequence is complete. Unlock the front panel door and insert a USB memory stick into the USB port as illustrated in Fig. 7-6.

The results will be automatically downloaded onto the USB memory stick. During the download process, the front panel PASS and FAIL LED's will alternate until the upload is complete.

---

**Warning:** Once the test results have been downloaded to the USB memory stick, the *GDUnet* internal memory will be cleared.

---

## 7.4 VIEW / PRINT TEST RESULTS

Insert the USB memory stick, containing the test results, into a USB port on PC / Laptop. Select 'Open folder to view files' to display the contents, then, send the test result files to a location of your choosing.

Fig. 7-7 shows an example of a test result folder.

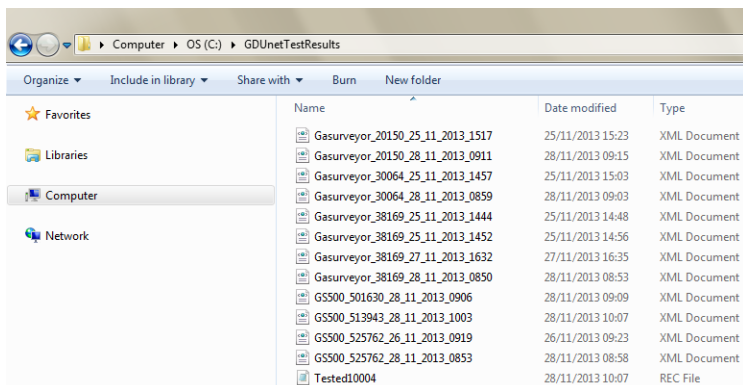


Fig. 7-7 Test Results Folder

### 7.4.1 Certificate Generation

Certificates of the Test Results can be generated by following the process below:

1. Select 'Launch Certificate Printer' from the file menu options, as illustrated in Fig. 7-8.

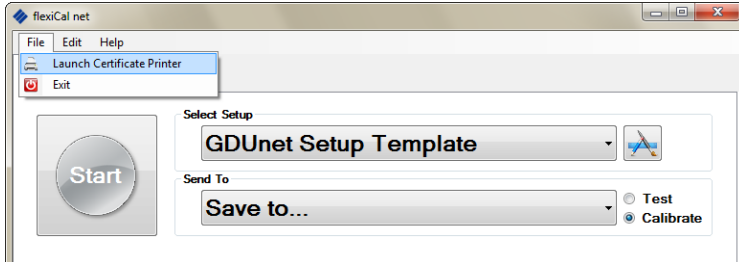


Fig. 7-8 Launch Certificate Printer

2. The certificate printer window will open, as illustrated in Fig. 7-9.

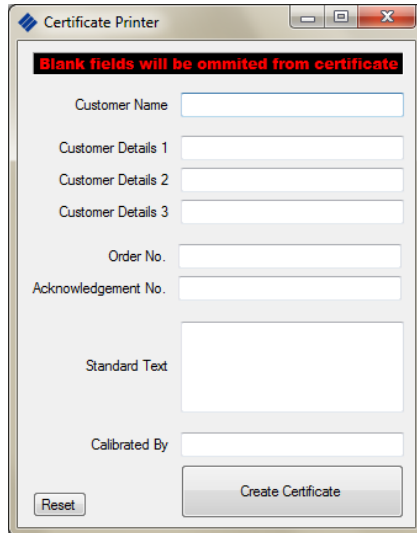
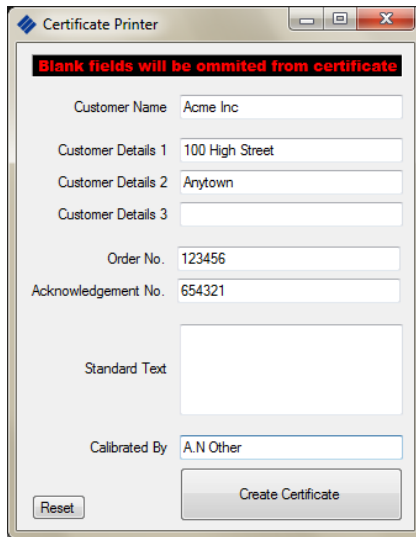


Fig. 7-9 Certificate Printer Window

## STANDALONE MODE

3. The window contents can now be completed to include company name, address, etc., as illustrated in Fig. 7-10.



The screenshot shows a window titled "Certificate Printer" with a standard Windows-style title bar. At the top, a red banner with white text reads "Blank fields will be omitted from certificate". Below this, the form contains the following fields:

- Customer Name: Acme Inc
- Customer Details 1: 100 High Street
- Customer Details 2: Anytown
- Customer Details 3: (empty)
- Order No.: 123456
- Acknowledgement No.: 654321
- Standard Text: (empty text area)
- Calibrated By: A.N Other

At the bottom left is a "Reset" button, and at the bottom right is a larger "Create Certificate" button.

*Fig. 7-10 Certificate Printer Window*

When the Certificate Printer window is complete, select the 'Create Certificate' button, as illustrated in Fig. 7-10.

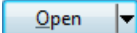
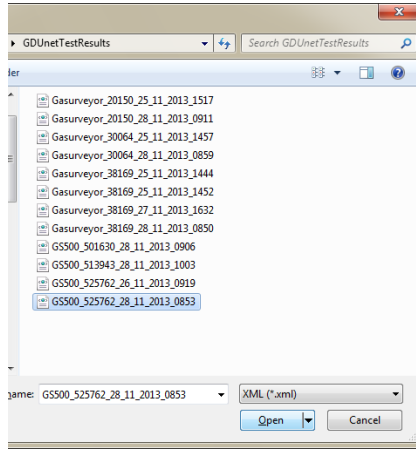
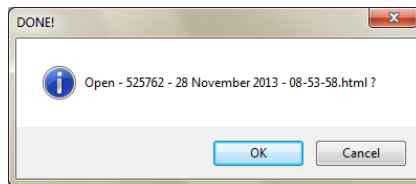
- After selecting the 'Create Certificate' button, a folder will be displayed, locate the test results folder, highlight a test result for certificate generation then select .

Fig. 7-11 shows an example of a highlighted test result.

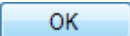


*Fig. 7-11 Select Test Result for Certificate Generation*

- A 'DONE!' window will be displayed, as illustrated in Fig. 7-12.



*Fig. 7-12 Open Certificate*

The certificate has now been generated for the selected test file. Select  to open the generated certificate, as illustrated in Fig. 7-13.

## Calibration Certificate

Customer Name Acme Inc  
 Customer Details 100 High Street  
 Anytown  
 Order No. 123456  
 Acknowledgement No. 654321  
 Model Gasurveyor 595  
 Serial No. 525762  
 Tested on 28 November 2013  
 Calibrated For METHANE  
 100% LEL equivalent 5% by VOL  
 Overall Result PASS



### Calibration Results

Gas Applied	Range	Reading	Calibrated To	Result
Zero Air	% LEL	-0.2	0.0	PASS
Zero Air	% GAS	0.0	0.0	PASS
Zero Air	% O2	20.9	20.8	PASS
Zero Air	PPM CO	-1	0	PASS
Zero Air	PPM FLAM	1	0	PASS

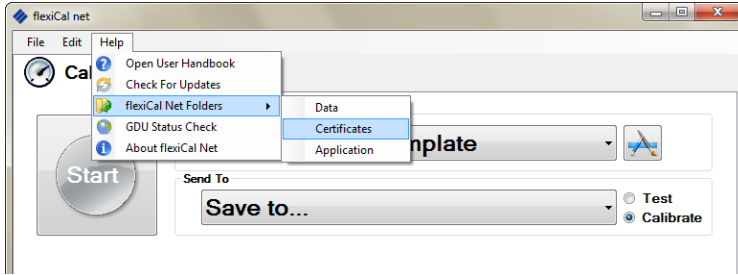
Gas Applied	Range	Reading	Calibrated To	Result
800 PPM Methane	PPM FLAM	808	799	PASS
50% LEL Methane	% LEL	50.3	50	PASS
100% VOL Methane	% GAS	100.5	100.1	PASS
100% VOL Methane	% O2	1.0	N/A	PASS
-	PPM CO	Not Tested	-	-

Calibrated by A.N Other : \_\_\_\_\_

Fig. 7-13 Calibration Certificate

## 7.4.2 Certificate Files

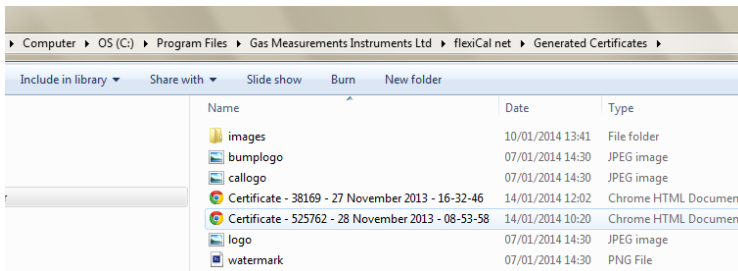
Generated certificate files can be accessed by selecting 'Certificates' from the 'Help / flexiCal net Folders' menu options, as illustrated in Fig. 7-14.



*Fig. 7-14 View Certificates*

A folder will be displayed, showing generated certificate files, identifying the date and time of each certificates generation. Each file can be opened individually to display / print.

Fig. 7-15 shows an example of the Generated Certificates folder.



*Fig. 7-15 Generated Certificate Folder*



---

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