Instruction Manual
IM/VCM2 Issue 6

Field and Software Tools

CalMaster2 and CheckMaster

ABB

The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The UKAS Calibration Laboratory No. 0255 is just one of the ten flow calibration plants operated by the Company and is indicative of our dedication to quality and accuracy.

EN ISO 9001:2000

Cert. No. Q 05907

EN 29001 (ISO 9001)

Lenno, Italy –
Cert. No. 9/90A

Stonehouse, U.K.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Technical Publications Department.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

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1 Introduction

CalMaster IRIS and CheckMaster are stand-alone verification and validation tools within the CalMaster2 Verification Suite.

CalMaster2 tests the integrity of a flow metering system by altering a number of flow measurement parameters and measuring the values returned from the flow measuring system. A report is displayed that verifies the performance of the system.

A CalMaster2 verification comprises a large number of separate test routines, including:

- Insulation and integrity tests of the entire flow meter system including the cables.
- Transmitter gain, linearity and zero point tests.
- Test of sensor magnetic properties.
- Digital output test.
- Analog output test.

The CalMaster IRIS/CheckMaster (see Section 1.1, page 4) test box displays the results of each test during the testing sequence. At the end of each test, a record is stored locally within the test box. Up to 100 test results can be stored.

Once the CheckMaster/CalMaster2 test box is connected to a PC that is running the CalMaster IRIS software, the stored test results can be uploaded and processed.

The Windows™-based CalMaster2 IRIS software that is provided as part of the CalMaster2 package enables electronic management and printing of the test results.

The CheckMaster/CalMaster2 test box can be used with:

MagMaster

- HiFlo
- LoFlo
- Water/Waste Water
- Process hazardous Area

AquaMaster

- AquaMaster fitted with MIL SPEC connectors
  (hard-wired units can be upgraded – part no. WABC2024M)
- AquaMaster Explorer

1.1 CalMaster2 Options

There are two options of CalMaster2 available:

- **CalMaster IRIS**

  Enables the printing of service reports and certification to within 1% of factory calibration (fingerprinted flow meters) or 2% (non-fingerprinted flow meters). Predictive diagnostics are also provided to provide early warning of a possible system failure, enabling maintenance engineers to anticipate problems and take planned remedial action in advance.

  CalMaster2 comprises:

  – CalMaster IRIS Verification Tool
  – Enhanced IRIS Software

- **CheckMaster**

  Enables the validation of flow meters and the printing of a service report.

  CheckMaster comprises:

  – CheckMaster Validation Tool
  – IRIS Software

The functions available for each option are:

	CheckMaster	CalMaster IRIS	Page
Install Factory Files	✗	✓	34
Transmitter Wizard	✓	✓	32
CalMaster2 Wizard	✓	✓	27
Flowmeter Calibration Verification Report	✗	✓	35
Flowmeter Conformance Report	✓	✓	35
Trend Analysis	✗	✓	36

Table 1.1 CalMaster2 Options

2 Preparation

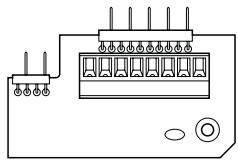
2.1 Unpacking

Unpack and visually inspect the CalMaster2.

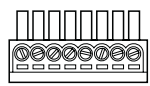
Also packed with the CalMaster2 are:

- CalMaster2 IRIS Software CD-ROM.
- This Instruction Manual.
- Universal mains adaptor and in-car adaptor.
- 5 MagMaster adaptor kits (Part no. WADX0089) — see Fig. 2.1.
- Connection Leads — see Section 2.1.1, page 6.

Note. Recharge the CalMaster2 before first use – see Section 6, page 40.



MagMaster VKE Adaptor Board

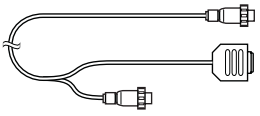


Sensor Cable Plug

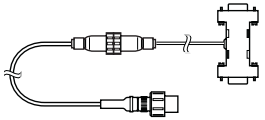
Fig. 2.1 MagMaster Adaptor Kit

2.1.1 CheckMaster Leads:

AquaMaster Communications Leads
(Red and Yellow numeric sleeves)



Communications Lead 1
WEBC0221



RS232 Serial Communications Lead
WEBC2000

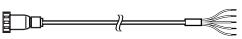
Communications Lead 3*
WEBC0221/T

*for units with pulsed output socket with serial communications – not supplied with CalMaster 2 as standard.

MagMaster Leads
(Yellow numeric sleeves)

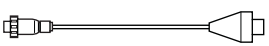
MagMaster Transmitter Lead 2
WEBC0212

MagMaster Sensor Lead 3
WEBC0213

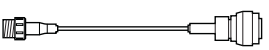


MagMaster Transmitter Lead 2
WEBC0211

AquaMaster MIL Connector Leads
(Green numeric sleeves)



AquaMaster MIL Sensor Cable
WEBC0233

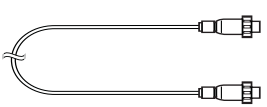


AquaMaster 19-way Output Cable
WEBC0235

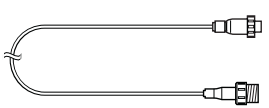
AquaMaster 7-way Output Cable
WEBC0234

AquaMaster 7-way Output Cable
WEBC0232

AquaMaster Explorer Leads
(Red numeric sleeves)



AquaMaster Transmitter Lead 2
WEBC0222



AquaMaster Transmitter Lead 3
WEBC0223

3 Installation

3.1 Software Installation

Note. To install CalMaster2 successfully, 'Administrator' rights for the computer are required.

Insert the CD into the computer, the install program should start automatically. If it does not, from the Windows 'Start' menu, select 'Run…' and type 'D:\Setup.exe' (where D is the drive letter of the CD ROM) and press 'Enter'.

Follow the on-screen instructions to install.

3.1.1 Register CalMaster2 IRIS Software

The first time the CalMaster2 IRIS software is used, a registration screen appears:

To register the CalMaster2 IRIS software:

1. Type the 'User name', 'Company name' and 'Customer identification number'.

   Note. The 'Customer identification number' is printed on the label of the CD.

2. Select to either create a PDF of the registration or send the details by email:
   - To create a PDF, select the 'Create a pdf file for printing or faxing' check box.
   - To send an email, leave the 'Create a pdf file for printing or faxing' check box unselected.

3. Click 'Next'. Either an e-mail is sent to calmaster@gb.abb.com automatically or a PDF is created:
   - If an e-mail was sent, a response will be received within 24 hours. A confirmation message that the e-mail has been sent appears.
   - If a PDF was created, print the PDF and either send it to:

     ABB Limited
     CalMaster Helpline
     Oldends Lane, Stonehouse
     Gloucestershire
     GL10 3TA
     UK

     or Fax it to: +44 (0)1453 829671

4. Click 'Close' to exit CalMaster2.

> **Note.** At any time, CalMaster can be re-registered by clicking 'Re-Register'. A new e-mail to ABB will be created.

3.1.2 Unlocking CalMaster2

When the registration e-mail or letter is received from ABB:

1. Copy the registration number provided and start the CalMaster2 IRIS software. The Registration dialog box appears:

2. Paste the registration number into the text box and click 'Next'. The CalMaster2 IRIS software is unlocked with an appropriate licence.

3.2 MagMaster Connection

To enable a MagMaster system to be tested by the CalMaster2 it may be necessary to fit a small adaptor board (see Section 3.2.1, page 10) to the MagMaster.

Note. The newer series VKH MagMaster does not need to have this adaptor board fitted as one is already incorporated into its design.

Once the adaptor is fitted to the MagMaster transmitter, the CalMaster2 can be connected easily to the transmitter for testing at any time.

Extra adaptor kits are available (part no. WADX0089).

To enable a hard-wired MagMaster system to be tested by the CalMaster2 it may be necessary to fit a small adaptor board (see Section 3.2.1, page 10) to the MagMaster.

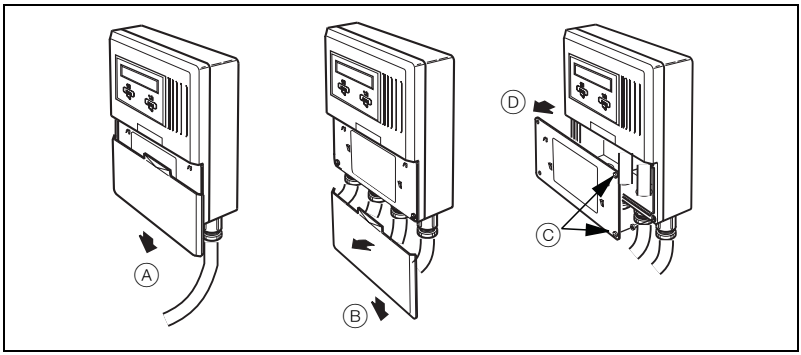


Fig. 3.1 Removing the MagMaster Covers

To remove the MagMaster covers:

1. Slide the cover down (A).
2. Pull out slightly and slide off (B).
3. Slacken the captive screws (C).
4. Remove the protective cover (D).

3.2.1 Fitting an Adaptor Board to a MagMaster

Note. The newer series (VKH) MagMaster does not need to have this adaptor board fitted as one is already incorporated into its design.

To fit an adaptor:

1. Turn off the power to the MagMaster and remove the covers – see Fig. 3.1.
2. Remove the wiring from the terminals. Slacken the terminal screws by at least 6 turns.
3. Carefully ease the sensor wiring to one side and fit the adaptor board so that the extended pins fit into the terminals – see Fig. 3.2. Tighten the terminal screws.
4. Fit and tighten the securing screw to the corner of the adaptor board.
5. Connect the sensor cable leads to the adaptor plug – see Fig. 3.3. Do not fit the plug to the socket on the adaptor board.

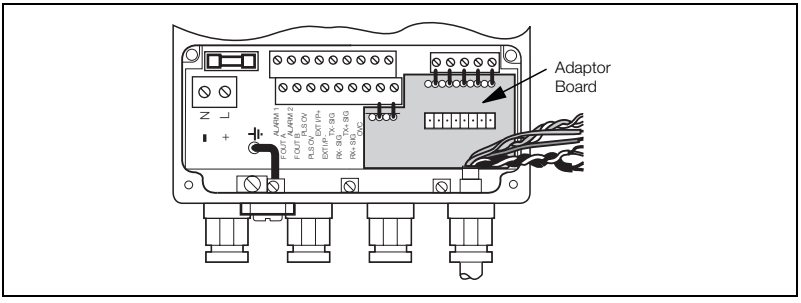


Fig. 3.2 Fitting the Adaptor Board

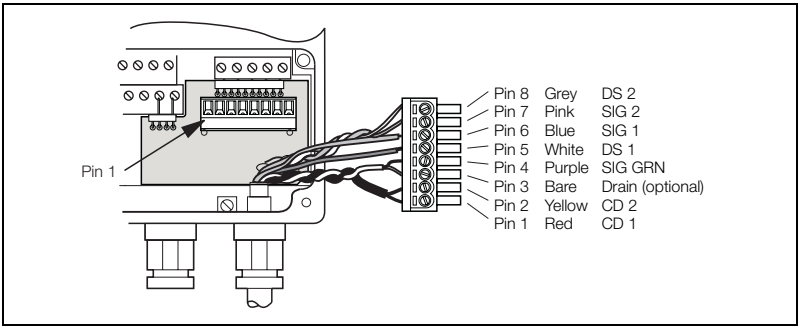


Fig. 3.3 Fitting the Sensor Cable Plug

3.2.2 Connecting a MagMaster to a CalMaster2

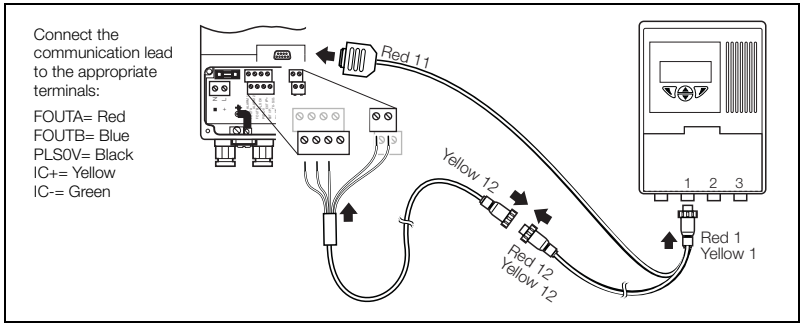


Fig. 3.4 Fitting Communications Leads

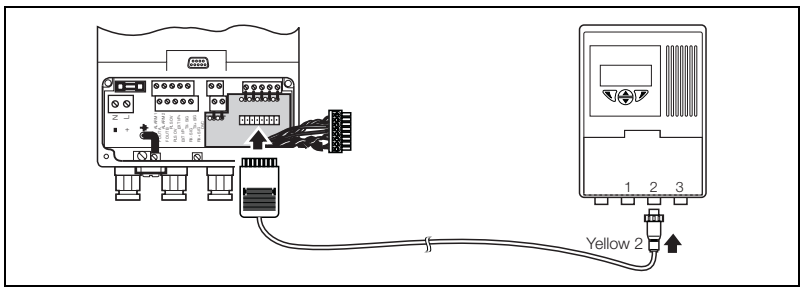


Fig. 3.5 Fitting Transmitter Leads

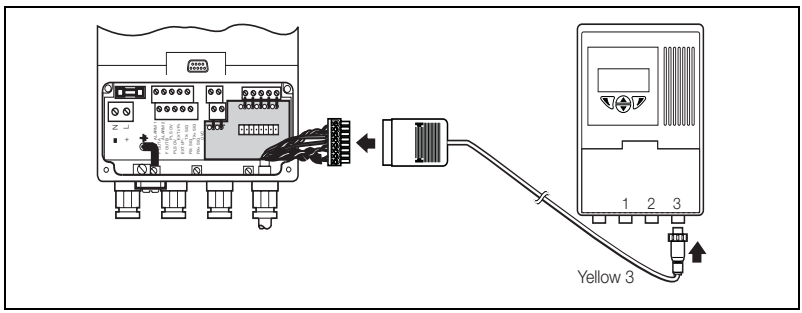


Fig. 3.6 Fitting Sensor Leads

To test a MagMaster refer to see Section 4, page 20.

3.3 AquaMaster Connection

3.3.1 AquaMaster with Hard-wired Sensor Leads

To enable a hard-wired AquaMaster system to be tested by the CalMaster2 it may be necessary to fit a socket to the AquaMaster (see Section 3.3.3, page 13) and a small adaptor box to the end of the sensor cable (see Section 3.3.6, page 16).

Note. Hard-wired AquaMasters that have been potted need to have the potting dug out carefully. Re-pot the Aquamaster after the new sockets have been fitted.

3.3.2 Removing the AquaMaster Cover

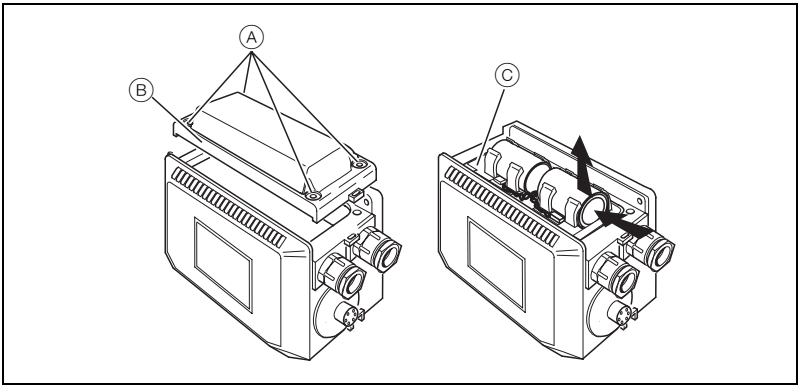


Fig. 3.7 Removing the AquaMaster Cover

To remove the AquaMaster cover:

1. Slacken the captive screws (A).
2. Lift the cover off (B).
3. Press the battery tray retaining tabs and remove the battery tray (C).

3.3.3 Fitting an AquaMaster Sensor Socket

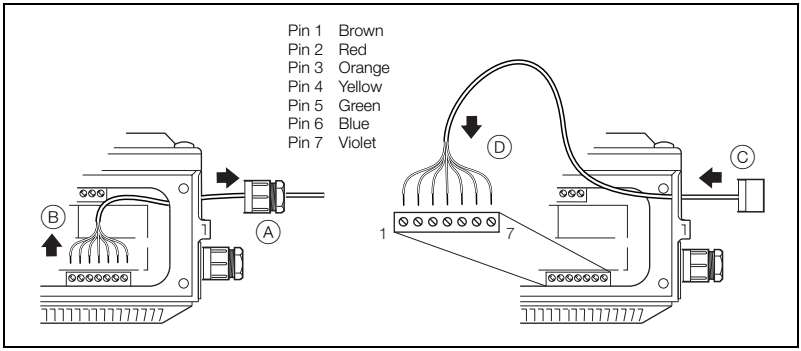


Fig. 3.8 Fitting an AquaMaster Sensor Socket

To fit an AquaMaster sensor socket:

1. Turn off the power to the AquaMaster and remove the covers – see Section 3.3.2, page 12.
2. Disconnect and withdraw the sensor cable (A).
3. Remove and discard the gland (B).
4. Feed the socket lead into the AquaMaster and fit the socket (MGFA0609-S) (C).
5. Connect the sensor cable (D).
6. Replace the covers – see Fig. 3.7, page 12.

3.3.4 Fitting an AquaMaster Pulsed Output Socket

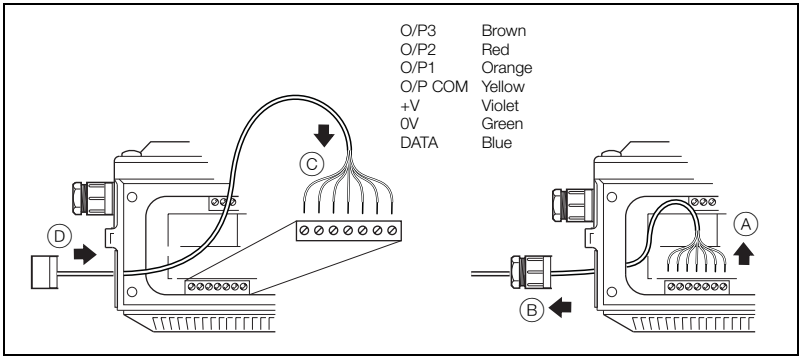


Fig. 3.9 Fitting an AquaMaster Pulsed Output Socket

To fit an AquaMaster pulsed output socket:

1. Turn off the power to the AquaMaster and remove the covers – see Section 3.3.2, page 12.
2. Disconnect and withdraw the pulsed output cable (A).
3. Remove and discard the gland (B).
4. Feed the socket lead into the AquaMaster and fit the socket (MGFA0609-S) (C).
5. Connect the sensor cable (D).
6. Replace the covers – see Fig. 3.7, page 12.

3.3.5 Fitting an AquaMaster Pulsed Output Socket with Serial Communications

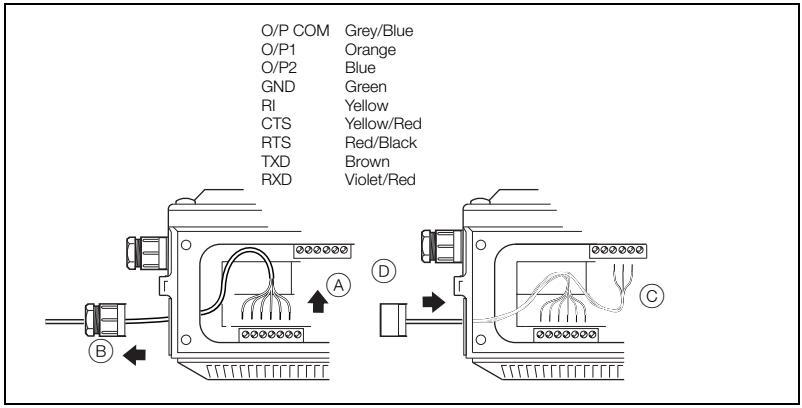


Fig. 3.10 Fitting an AquaMaster Pulsed Output Socket with Serial Communications

To fit an AquaMaster pulsed output socket with serial communications:

1. Turn off the power to the AquaMaster and remove the covers – see Section 3.3.2, page 12.
2. Disconnect and withdraw the pulsed output cable (A).
3. Remove and discard the gland (B).
4. Feed the socket lead into the AquaMaster and fit the socket (MGFA0609-O) (C).
5. Connect the sensor cable (D).
6. Replace the covers – see Fig. 3.7, page 12.

3.3.6 Fitting an Adaptor Box to the Sensor Cable

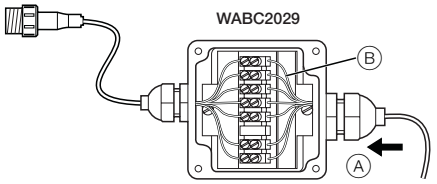


	ABB	Belden 8777
Pin 1	Brown	Black
Pin 2	Red	Green
Pin 3	Orange	Black
Pin 4	Yellow	Red
Pin 5	Green	Sleeved Grounds
Pin 6	Blue	Black
Pin 7	Violet	White

Fig. 3.11 Fitting an Adaptor Box to the Sensor Cable

To fit an adaptor box to the sensor cable:

1. Remove the cover of the adaptor box.
2. Feed the sensor lead into the adaptor box (A).
3. Connect the sensor cable (B).
4. If required, provide environmental protection – see Section 3.3.7, page 16.
5. Tighten the gland and replace the covers.

3.3.7 Adaptor Box Environmental Protection

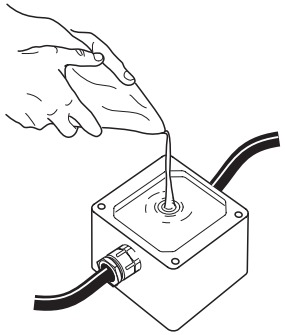


Fig. 3.12 Potting the Adaptor Box

Warning.

- Potting materials are toxic – use suitable safety precautions.
- Read the manufacturers' instructions carefully before preparing the potting material.
- Check all connections before potting – see Section 3.3.6, page 16.
- Do not overfill or allow the potting material to come into contact with 'O' rings or grooves.

3.3.8 Connecting an AquaMaster with MIL Connectors to a CalMaster2

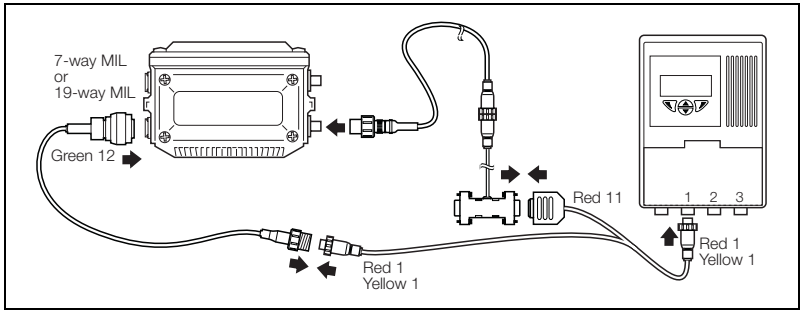


Fig. 3.13 Fitting Communications Leads

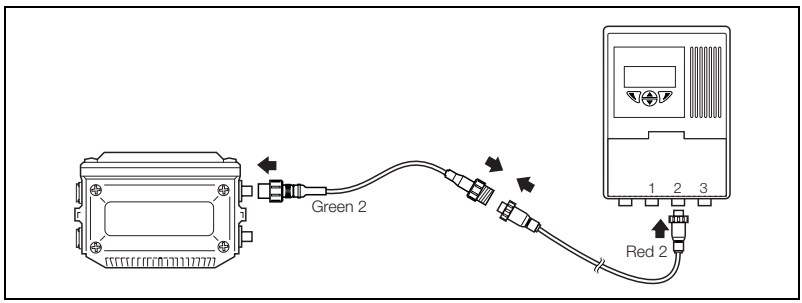


Fig. 3.14 Fitting Transmitter Leads

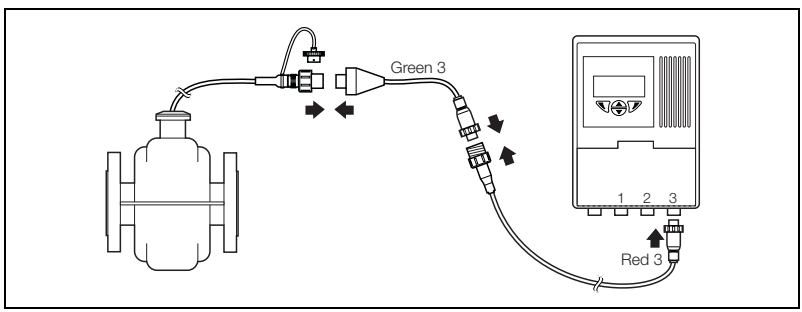


Fig. 3.15 Fitting Sensor Leads

To test an AquaMaster, see Section 4, page 20.

3.3.9 Connecting an AquaMaster with a Sensor Adaptor Box to a CalMaster2

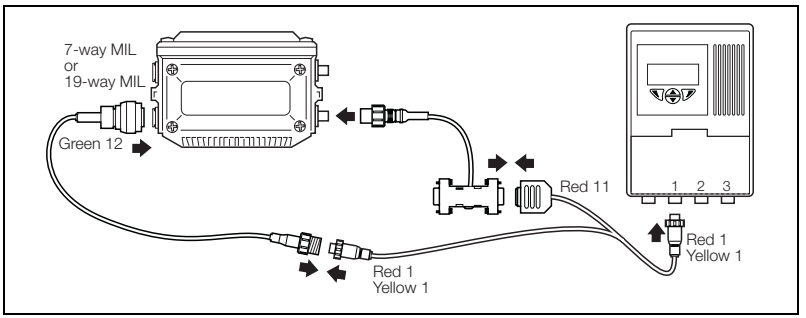


Fig. 3.16 Fitting Communications Leads

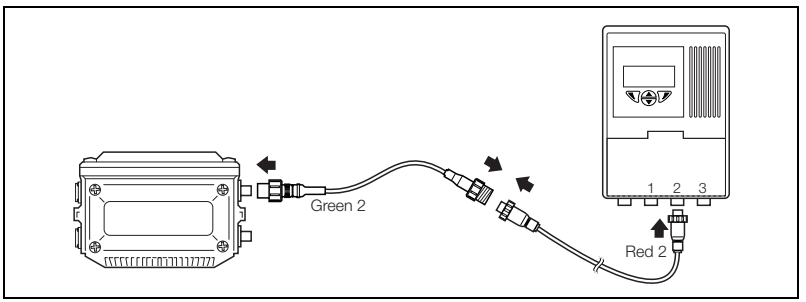


Fig. 3.17 Fitting Transmitter Leads

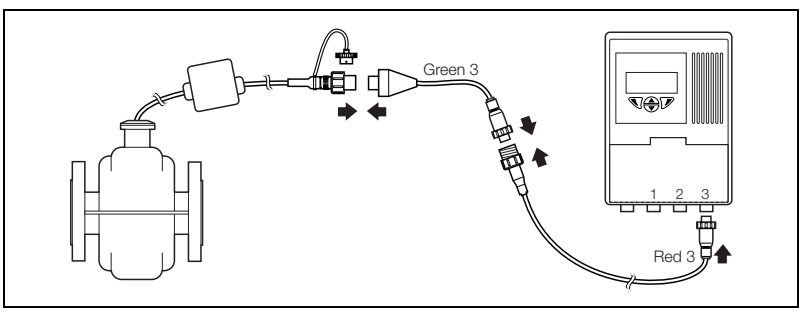


Fig. 3.18 Fitting Sensor Leads

To test an AquaMaster, see Section 4, page 20.

3.4 AquaMaster Explorer Connection

3.4.1 Connecting an AquaMaster Explorer to a CalMaster2

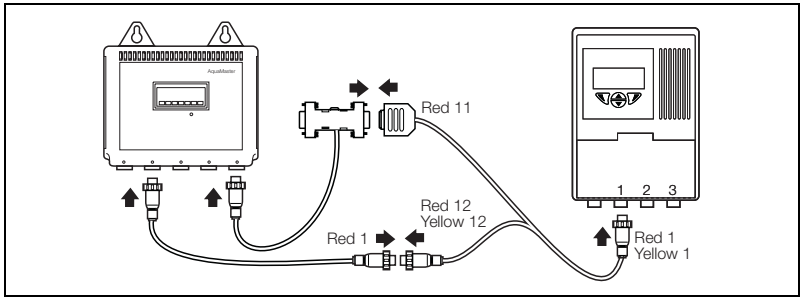


Fig. 3.19 Fitting Communications Leads

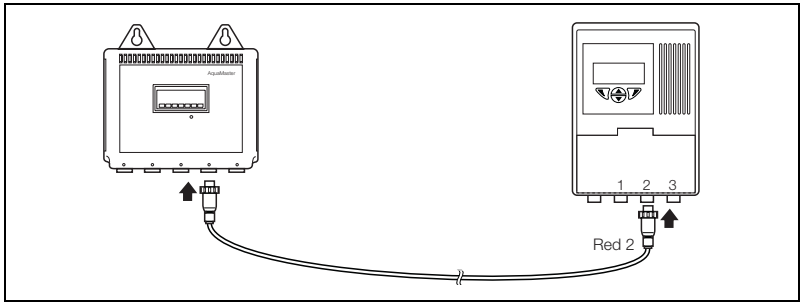


Fig. 3.20 Fitting Transmitter Leads

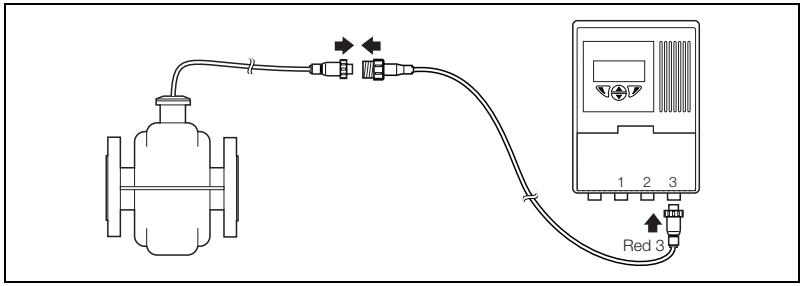


Fig. 3.21 Fitting Sensor Leads

To test an AquaMaster Explorer, see Section 4, page 20.

4 Testing

4.1 Testing a Flow Metering System

The CalMaster2 can hold the test results of up to 100 flow meters.

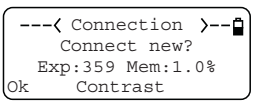
The contrast of the LCD screen can be adjusted by pressing the ▲ and ▼ buttons.

Note.

- If there is insufficient battery charge to completely a test, CalMaster2 does not start the test. Recharge the CalMaster2 – see Section 6, page 40.
- If the ambient temperature is greater than the specified operating temperature of 50°C (122°F), the tests are failed.
- Before using the CalMaster2 ensure that the flow metering system has been isolated from any integrated system – for example, current loops and telemetry.

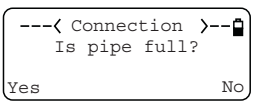
To perform a test:

1. Connect the CalMaster2 to the flow metering system – see Sections 3.2 to 3.4.
2. Disconnect communications lead 1.
3. Press the 'On' button. The initialization screen appears followed by a connection screen:



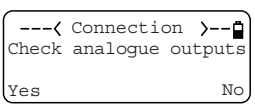
Note. 'Exp' is the number of days remaining before the licence expires.

4. The CalMaster2 attempts to connect to the flow measuring system. Select 'Ok'.
5. Reconnect communications lead 1.
6. Once the connection has been established a prompt appears to select whether the pipe is full:

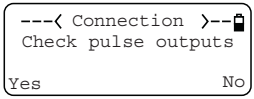


Note. When verifying an AquaMaster the pipe must always be full.

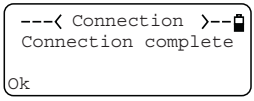
7. Select **Yes** or **No**. A prompt appears to test the analog outputs:



8. Select 'Yes' or 'No'. A prompt appears to test the pulse outputs:



9. Select 'Yes' or 'No'. A series of self-calibration screens appear. These ensure that the CalMaster2's reference calibration, battery and data integrity are acceptable. The Connection complete screen appears:



10. Select 'Ok'. CalMaster2 starts the AutoTest sequence:

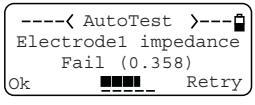
> **Note.** The first time CalMaster2 tests a flow meter that does not have an associated fingerprint file, it must find a valid test that can be used as a reference. A screen appears stating that CalMaster2 is searching for a reference test.

For each test there are three possible results:

- **Test Passed**:

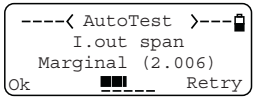
  No action is necessary.

- **Test Failed**:



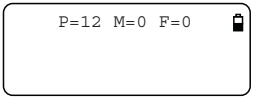
> **Note.** This screen appears for 10 seconds before proceeding automatically to the next test.
>
> 1. Select 'Retry'.
> 2. If the test fails again, either press 'Retry' to test again or 'Ok' to continue to the next test.

- **Test Marginal**:



> **Note.** This screen appears for 10 seconds before proceeding automatically to the next test.
>
> 1. Select 'Retry'.
> 2. If the test fails again, either press 'Retry' to test again or 'Ok' to continue to the next test.

11. After each test a status screen appears:



This displays a count of the number of tests that have passed, are marginal or have failed. It can also be used as a progress indicator as there are between 24 and 26 tests (depending on the selection made).

12. Once all the tests are complete, the initialization screen appears. Disconnect the flow metering system and either connect a new system (start the process again from step 3) and press 'Ok' or wait two minutes for the CalMaster2 to shut down automatically.

4.2 Connecting CalMaster2 to a Computer

Caution.

- If there is insufficient battery charge to completely a download there is a chance that the CalMaster2 will shutdown automatically before a download is complete. If this happens the test is corrupted and lost. Recharge the CalMaster2 – see Section 6, page 40 and reset the CalMaster2 – see Section 5.4.1, page 28.
- CalMaster2 switches off automatically after two minutes unless it is downloading verifications. To switch on, disconnect the mains adaptor, press the 'On' button and then reconnect the mains adaptor.

Connect the CalMaster2 to the computer using the RS232 cable provided – see Fig. 4.1. It is recommended that the CalMaster2 is connected to the power supply while downloading – see Section 6, page 40.

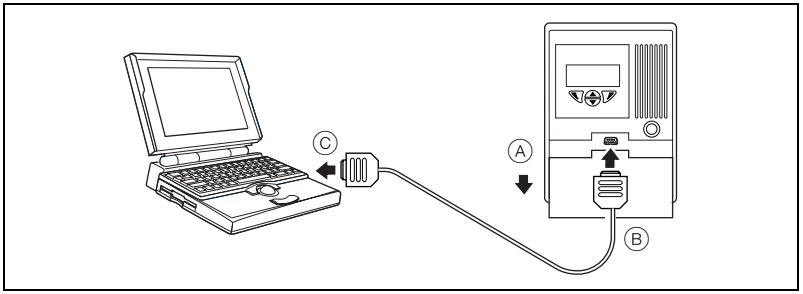


Fig. 4.1 Connecting the CalMaster2 to a Computer

To connect CalMaster2 to a computer:

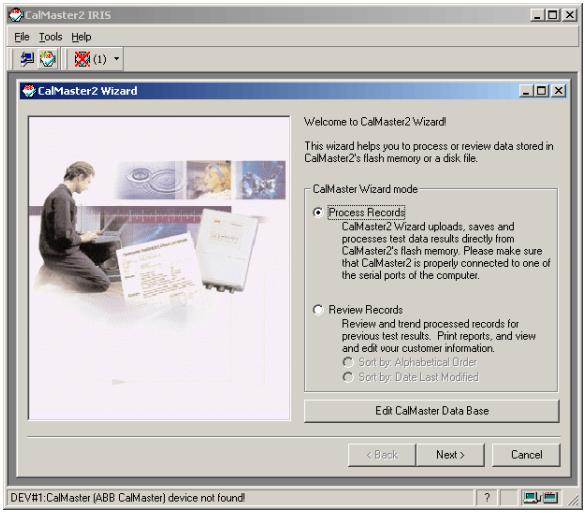
1. Slide the cover (A) down to reveal the serial port.
2. Connect the RS232 cable to the CalMaster2 (B).
3. Connect the RS232 cable to the computer (C)

4.3 Downloading Verifications

For full details of the CalMaster2 IRIS Software see Section 5, page 24.

To Download Verifications:

1. Start the CalMaster2 IRIS software. The CalMaster2 Wizard appears:



2. Select 'Process Records' and click 'Next'.
3. Follow the instructions for processing records – see Section 5.4.1, page 28.

Note. Once the verifications have been downloaded, the CalMaster2 does not need to be connected to be able to use it to view, organize and print reports of the verifications.

5 CalMaster2 IRIS Software

5.1 Introduction

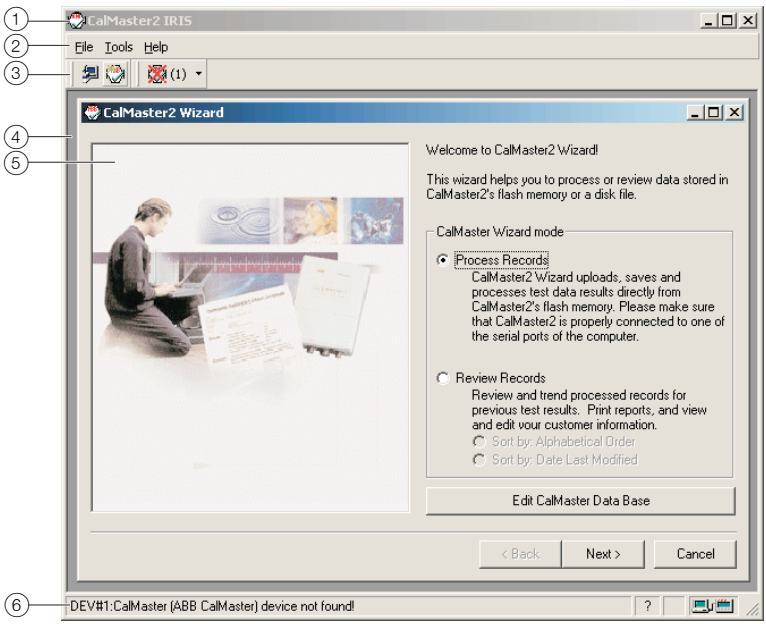
CalMaster2 IRIS for Windows is a Microsoft Windows-based communications and verification program for ABB Flow Meters. The program communicates with the CalMaster2 via an RS232C serial cable.

A CalMaster2 Certificate is produced when further analysis has been carried out on the test results. This includes Initial and/or FingerPrint comparison analysis using Fuzzy Logic routines. In order to generate a certificate, a software password is required.

Note. Fuzzy Logic is a problem-solving control system methodology that provides a simple way to arrive at a definite conclusion based upon vague, ambiguous, imprecise, noisy, or missing input information.

5.2 CalMaster2 IRIS Interface

To open CalMaster2, either select **Start | Programs | ABB | CalMaster2 | CalMaster2**, or double-click the CalMaster2 IRIS shortcut icon on the desktop. The application window appears:



CalMaster2 automatically detects whether a CalMaster2 is connected to the computer and displays the details in the status bar.

(1) **Header Bar**

Displays the title of the current view.

(2) **Menu Bar**

Provides access to all the menus for the CalMaster2 application – see Section 5.3, page 26.

(3) **Toolbar**

The toolbar buttons provide quick access to the CalMaster2 functions:

Icons

Install Factory Files.

CalMaster2 Wizard.

Connection present.

Connection not present.

(4) **Application Area**

The main application window.

(5) **CalMaster2 Wizard**

The CalMaster2 Wizard appears automatically when the software is launched – see Section 5.4, page 27.

(6) **Status Bar**

The status bar displays the connection details of the CalMaster2.

5.3 CalMaster2 IRIS Menus

Menu	Description
File	
Factory Files…	CalMaster2 verification can be made to within 1% of the original factory test results – see Section 5.6, page 34.
Exit	Closes CalMaster2.
Tools	
Device Wizard…	Used to configure the connection to the CalMaster2 – see Section 5.5, page 32.
CalMaster2 Wizard…	Opens the CalMaster2 wizard dialog box – see Section 5.4, page 27.
Languages	Changes the CalMaster2 language.
Help	
Contents…	Opens the contents page of the on-line help.
Index…	Opens the CalMaster2 on-line help index.
Search…	Opens the CalMaster2 on-line help search facility.
Support	Creates an e-mail addressed to ABB Technical Support.
ABB Home Page	Opens the ABB home web page.
Register CalMaster2…	Displays the registration details.
About CalMaster2…	Displays the CalMaster2 software version.

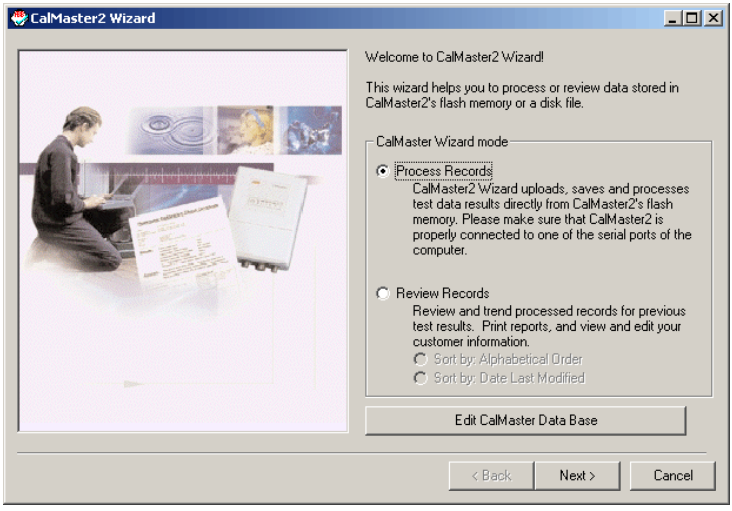
5.4 CalMaster2 Wizard

The CalMaster2 Wizard is used to:

- **Process Records** — download verifications from a CalMaster2.
- **Review Records** — examine verifications that have already been downloaded.
- **Edit CalMaster2 Database** — lists/edits the flow meters and CalMaster2s used.

To open the CalMaster2 Wizard:

1. Either select 'Tools | CalMaster2 Wizard…' or click the button. The CalMaster2 Wizard dialog box appears:



2. Select:

   Process Records – see Section 5.4.1, page 28.

   Review Records – see Section 5.4.2, page 29. Records can be sorted in either alphabetical or date order.

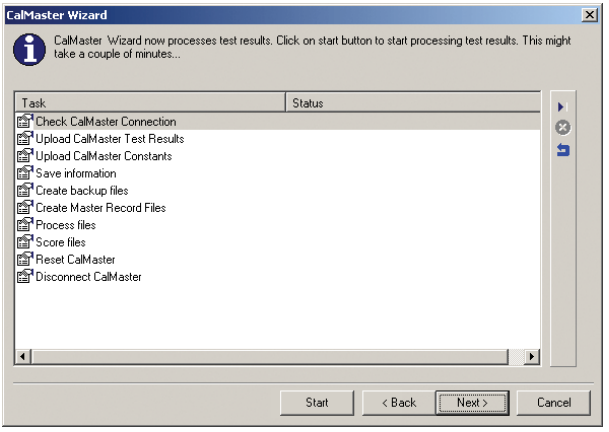
   Edit CalMaster2 Database – see Section 5.9, page 39.

5.4.1 Process Records

Process Records is used to extract the verifications from a connected CalMaster2. The Process Records dialog box appears when selected from the CalMaster2 Wizard – see Section 5.4, page 27.

To open the process records dialog box, click the button to start the CalMaster2 wizard, select 'Process Records' and click 'Next'.

This dialog box displays a list of the tasks required to download verifications from a CalMaster2:



Icons

- Start processing records.
- Cancel processing records.
- Reset the CalMaster2. **Note**. All Verifications are erased.

To process records:

1. Ensure the CalMaster2 is switched on.
2. On the right-hand side, click the button to start the download process.

   Note. This process could take a few minutes to complete. A progress bar appears at the bottom of the dialog box. As the download process proceeds, each task is highlighted in turn. To cancel the process, click the button.

3. At the Reset CalMaster2 task, a prompt appears asking whether the CalMaster2 is to be reset. Select either 'Yes' to delete all verifications held in the CalMaster2 or 'No' to leave the verifications in place.

   Note. The CalMaster2 can hold the test results of up to 100 flow meters.

4. Once the download process is complete click 'Next'. The Review Records dialog box appears – see Section 5.4.2, page 29.

5.4.2 Review Records

Review Records is used to review the results of the downloaded verifications as well as to print conformance reports and verifications. It is also used to view graphical representations of the verification results.

There are two ways of opening the Review Records dialog box:

- It appears automatically after processing records – see Section 5.4.1, page 28. The records are sorted in alphabetical order.
- Click the button to start the CalMaster2 wizard, select 'Review Records' and click 'Next'.

  Records can be sorted in either alphabetical or date order.

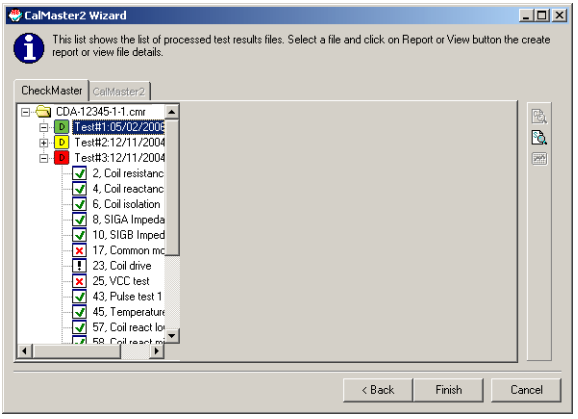
The Review Records dialog box has two tabs – CheckMaster and CalMaster2. Depending on your licence, one of these tabs may be disabled.

The right-hand toolbar has three buttons. Depending on your licence, one or more of these buttons may be disabled:

	Print a Conformance Report	see Section 5.7, page 35.
	Print a Verification Certificate	see Section 5.7, page 35.
	Trend Analysis	see Section 5.8, page 36.

CheckMaster

This tab is available only if you have a licence for CheckMaster.



Verifications are listed in the left-hand pane. To print a conformance report click the button – see Section 5.7, page 35.

Icons

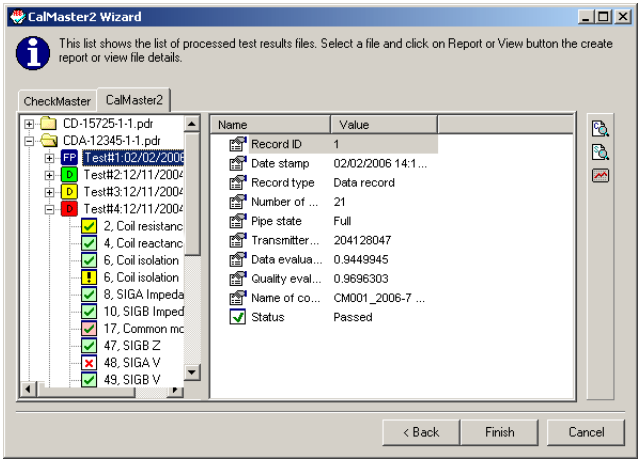
- The first verification that has passed. This is used as the benchmark for all other verifications.
- Verifications that have passed.
- Verifications that are marginal or have passed but near the limits of the Fuzzy Logic (see page 24).
- Verifications that have one or more failed tests

Each verification can be expanded to display the individual tests. The results of each test are displayed in the right-hand pane. Individual tests are marked as:

- Passed.
- Marginal.
- Failed.

CalMaster2

This tab is available only if you have a licence for CalMaster2.



Icons

FP If a flow meter's factory file has been installed (see Section 5.6, page 34), the first test in the list is the Factory file. This lists all the parameters at the time that the flow meter was manufactured.

D Verifications that have passed.

D Verifications that have one or more failed tests.

D Verifications that are marginal or have passed but near the limits of the fuzzy-logic.

Each verification can be expanded to display the individual tests. The results of each test are displayed in the right-hand pane. Individual tests are marked as:

Passed.

Passed, although the fuzzy logic is marginal.

Passed, although the fuzzy logic has failed.

Failed, although the fuzzy logic has passed.

Failed, although the fuzzy logic is marginal.

Failed, and the fuzzy logic has failed.

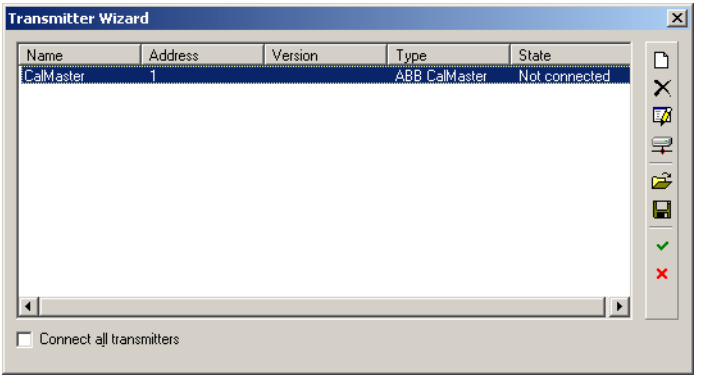
Marginal.

5.5 Transmitter Wizard

The transmitter wizard is used to configure the connection to the CalMaster2.

To open the Transmitter Wizard:

Either select 'Tools | Transmitter Wizard…' or click the down arrow next to the button on the toolbar and click the button. The transmitter wizard dialog box appears:



Each configured CalMaster2 is displayed in the list.

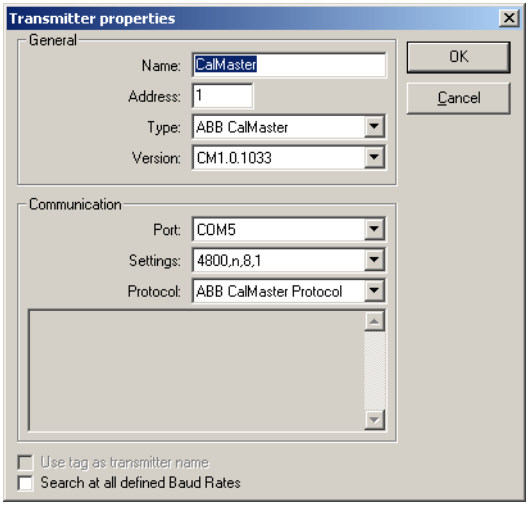
The right-hand toolbar has five buttons:

New	Opens the add New/Edit Configuration dialog box – see Section 5.5.1, page 33.
Delete	Deletes the selected configuration.
Edit	Opens the selected configuration
Connect	Connects to CalMaster2.
Open	Opens a saved device configuration file.
Save	Saves the selected device as a configuration file.
Ok	Closes the dialog box using the selected connection.
Cancel	Closes the dialog box without making any changes.

Note. If the 'Connect all transmitters' check-box is selected, when the button is clicked the computer attempts to connect to all the listed configurations.

5.5.1 New/Edit Configuration

This is used to configure the associated serial port connection for the CalMaster2.



5.6 Factory Fingerprint Files

Factory Fingerprint files are used only for CalMaster2.

When a flow meter is manufactured it is tested extensively and calibrated. The calibration verification results are stored as a fingerprint file that can be obtained from the ABB web site:

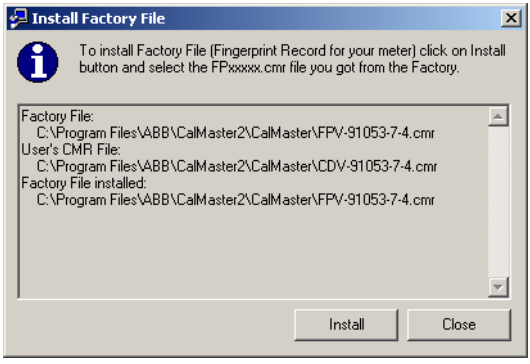
http://www.abbregister.com

The advantage of using fingerprint files is that, by comparing the original factory test results with the CalMaster2 verification, certification can be made to within 1% of the original factory test results. If fingerprint files are not available, verification is made to within 2%.

A flow meter's fingerprint file needs to be installed once only. It is stored within CalMaster2 IRIS software database so that it is available whenever a verification is processed for that flow meter.

To install a flow meter's fingerprint file:

1. Either select 'File | Install Factory File…' or click the button. The fingerprint files dialog box appears:



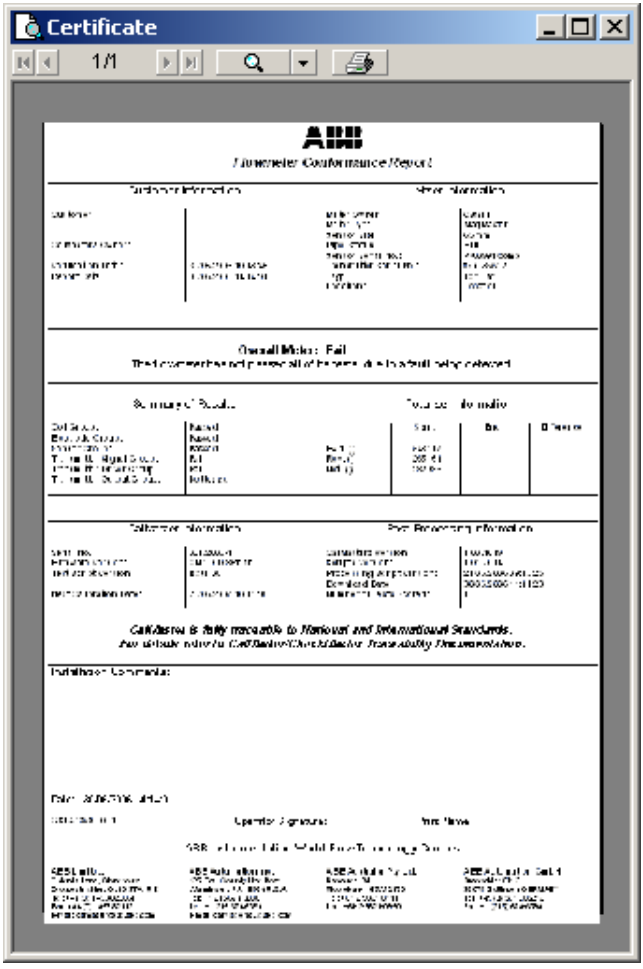
2. Click 'Install'. A file browser appears, locate the FPxxxxx-x-x.pdr and click 'Open'. The factory fingerprint file is installed and appears in the list and is now available for verifications for that flow meter.

> **Note.** Ensure that the fingerprint is installed before carrying out any field verifications. Failure to do this produces a 2% certificate.

5.7 Print a Conformance Report or Verification Certificate

To print a Conformance Report or Verification Certificate:

1. Click the button to start the CalMaster2 wizard, select 'Review Records' and click 'Next'.
2. On the right-hand side of the Review Records dialog box, click the report button or certificate button . A print preview is displayed:



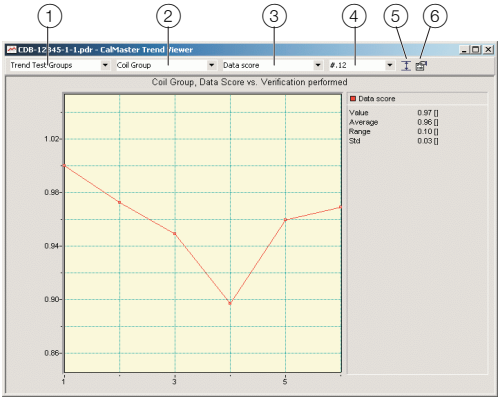
3. Click the button, a print dialog box appears. Select a printer and click 'Print'.

5.8 Trend Analysis

The trend analysis graph displays how the flow meter has performed over time. Each time a flow meter is verified the results are stored and compared to previous verifications. In this way a visual representation of the flow meter's performance is generated. At a glance, It can be seen whether the flow meter's performance is deteriorating and, if so, plan appropriate maintenance at a convenient time.

To start trend analysis:

1. Click the button to start the CalMaster2 wizard, select 'Review Records' and click 'Next'.
2. On the right-hand side of the Review Records dialog box, click the button. The trend analysis dialog box appears:



The graph functions are:

(1) **Group/Individual Tests**

Select whether to display an individual test or a group of tests.

(2) **Test**

Select the test to be displayed.

(3) **Graph Type**

Select the type of graph to be displayed. Options are: Data, Quality, Data Score and Quality Score.

(4) **Number of Decimal Places**

Select the number of decimal places to be displayed.

(5) **Show/Hide Trend Limits**

If selected, this displays horizontal lines delimiting the upper and lower trend limits.

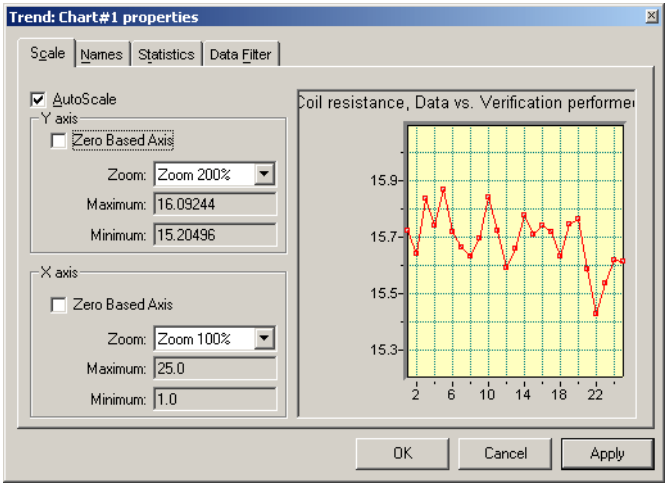
(6) **Graph Options**

This opens the graph options dialog box – see sections 5.8.1 to 5.8.4.

> **Note.** To zoom into any area of the graph click and drag a box in the graph area. Double-click to zoom out.

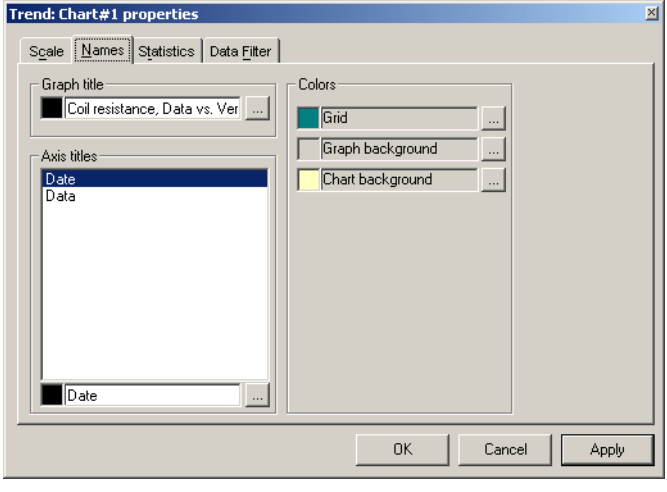
5.8.1 Scale Tab

Controls the default scale for the graph.



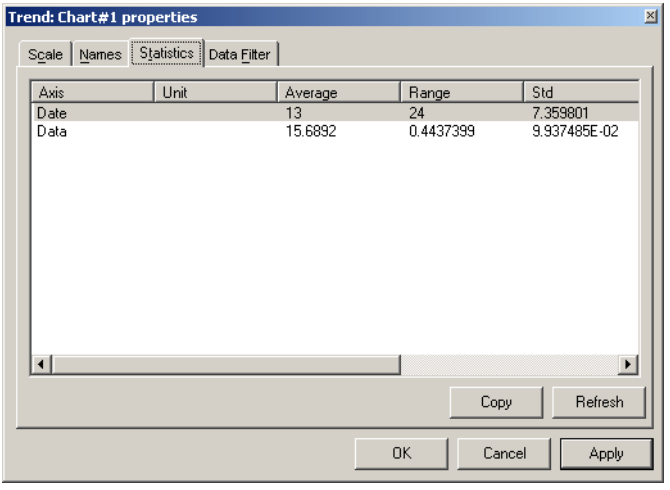
5.8.2 Names Tab

Controls the color and labelling for the graph.



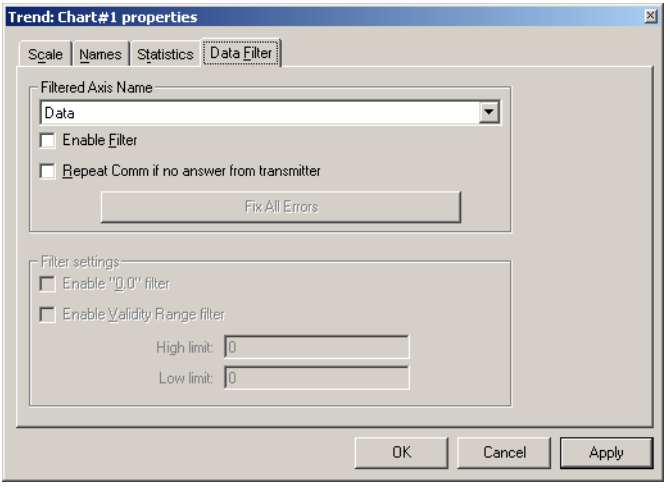
5.8.3 Statistics Tab

Displays basic statistics of the selected flowmeter.



5.8.4 Data Filter Tab

Forces the results to ignore any zero values.

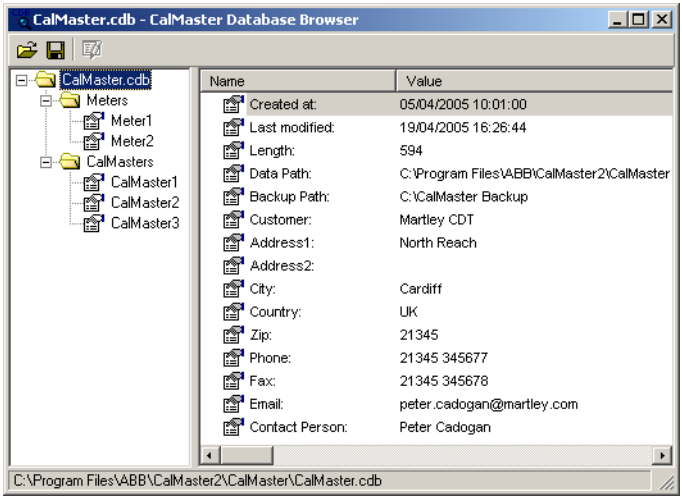


5.9 CalMaster2 Database

The CalMaster2 database enables data to be recorded about each CalMaster2 and flowmeter.

To open the CalMaster2 database:

1. Click the button to start the CalMaster2 wizard.
2. Click 'Edit CalMaster2 Database…' the CalMaster2 Database Browser appears:



The Database, Meters and CalMaster2s are listed in the left-hand pane. The details for the selected item are displayed in the right-hand pane.

To edit a detail, either double-click the detail selected or click the button. Type the new information and press Enter.

To open an alternate database click the button.

To save any changes, click the button.

6 Recharging CalMaster2

CalMaster 2 incorporates an intelligent charger that features fast, high and low current charge modes. The unit switches automatically from high current to low current charge mode when the required battery voltage is reached.

CalMaster2 must be recharged after use for at least four hours. With a full charge, CalMaster2 can verify a minimum of six flow meters before needing to be recharged.

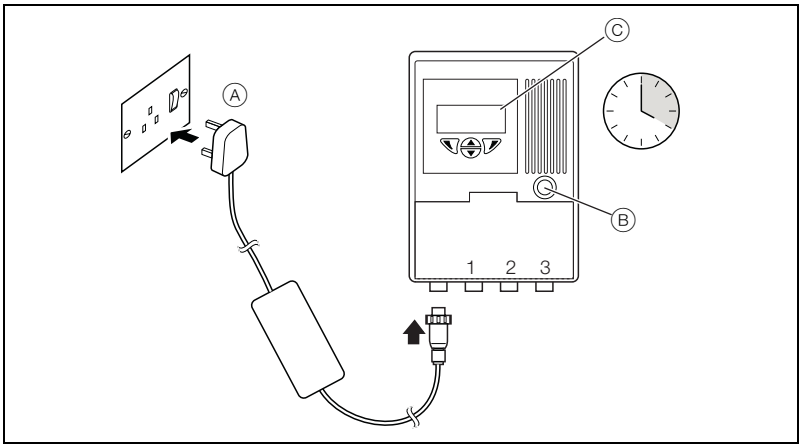


Fig. 6.1 Recharging the CalMaster2

To recharge CalMaster2:

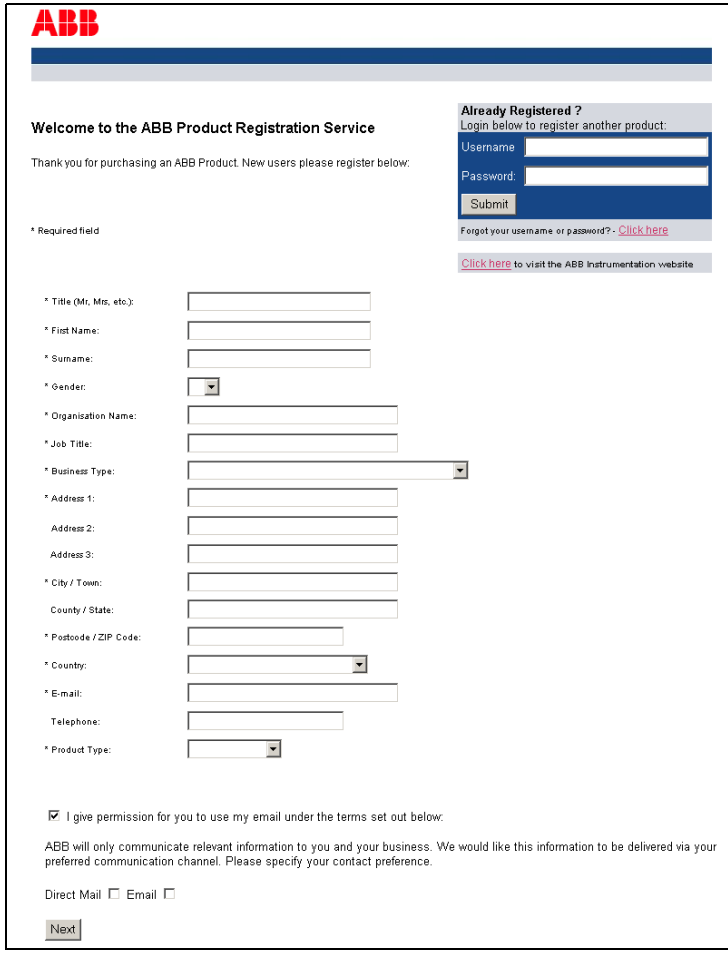
1. Plug in the universal mains adaptor (A) – see Fig. 6.1.
2. Press the 'On' button (B). Failure to do this results in slow and partial charging of the battery.
3. Correct connection is confirmed by the mains icon in the top right corner of the display (C).
4. The display shows the normal start-up screen ( ). After a short time period with no activity, this screen times out. If at this stage the CalMaster 2 determines that a fast-charge is necessary, the display shows the text 'Fast Charging x.xV', otherwise, the display switches off (enters sleep mode) immediately.
5. If fast-charging mode was engaged, once the required battery voltage is reached the unit switches fast-charge off automatically and the display switches off. Pressing the 'On' button (B) starts the CalMaster 2.
6. Typical charge periods are about 4 hours.
7. CalMaster 2 can be used during charging by pressing the button labelled 'Stop' on the display, followed by the 'On' button (B). Leave the charger connected. In this mode, charge times are extended.

7 Registration

In order to download fingerprint files to the CalMaster2, each flow meter must be registered.

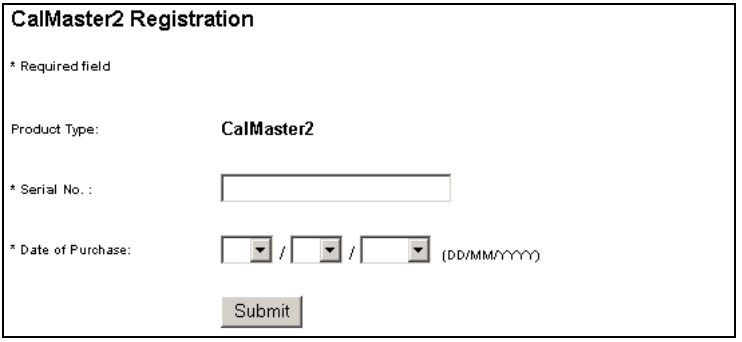
To register:

1. Open a web browser and type http://www.abbregister.com in the address bar. The ABB log-in page appears.



2. Complete the form and press 'Next'. An e-mail response is sent containing the Username and Password.

   The registration for the selected product appears:



3. Type the **Serial number** and **Date of Purchase**. A confirmation appears:

> **Note.** If the date of purchase is not known, use the date of installation.

4. Click the link to view registration details.

7.1 Registering Flowmeters

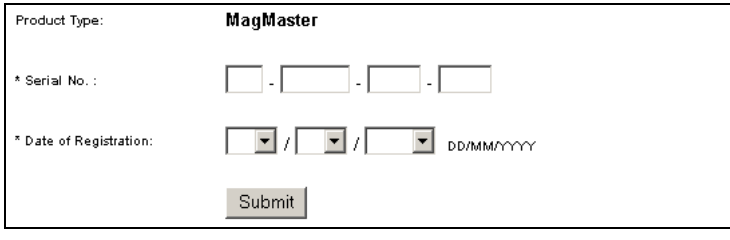
Each flow meter must be registered with ABB – see Section 7, page 41.

To register a flow meter:

1. Open the web browser and type http://www.abbregister.com in the address bar. The ABB log-in page appears:

2. Type the 'Username' and 'Password' and click 'Submit'. The registration details page appears:

3. Click the 'Register another product' link.
4. Select the 'Product type' from the drop-down list and click 'Next'. The details page appears:



5. Type the 'Serial Number' and 'Date of Purchase'. Click 'Submit'. A confirmation page appears. An e-mail response is sent with the product details provided.

7.2 Downloading Fingerprint Files

When a flow meter is manufactured it is tested extensively and calibrated. The calibration results are stored as a fingerprint file. Fingerprint files are available for all registered flow meters.

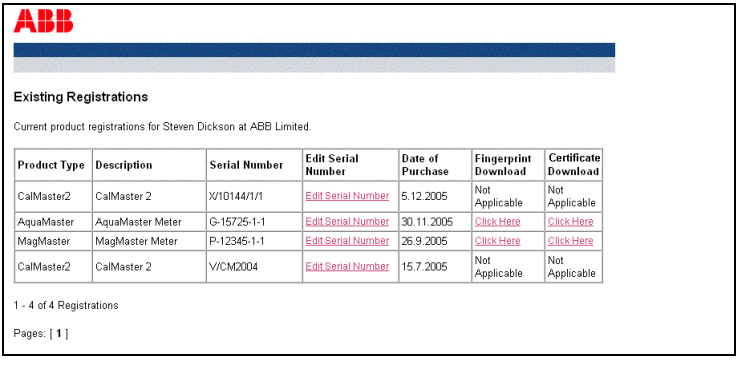
To download fingerprint files the flow meter(s) must be registered with ABB – see Section 7, page 41.

To download fingerprint files:

1. Open a web browser and type 'http://www.abbregister.com' in the address bar. The ABB log-in page appears:

2. Type the 'Username' and 'Password' and click 'Submit'. The options page appears:

3. Click View current registrations. A list of registered products appears:



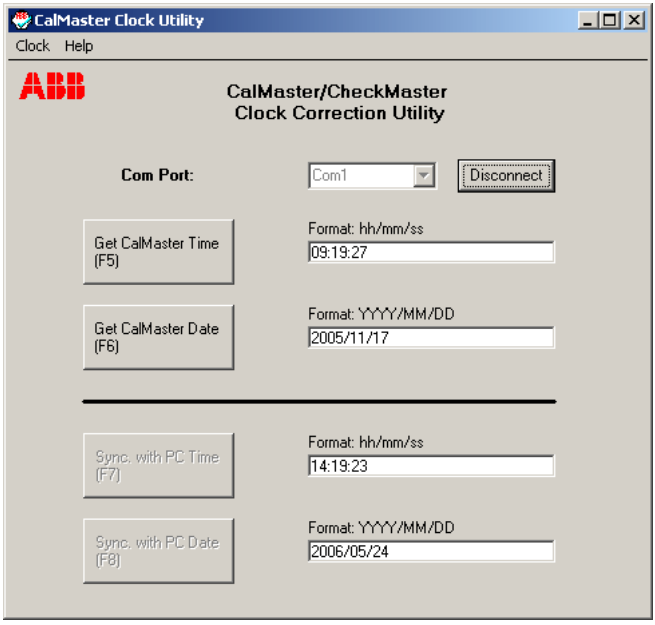
4. Click the link for the required flow meter. A File Download dialog box appears.
5. Click 'Save'. A file browser appears prompting for a location for the download. Browse to: 'C:\Program Files\CalMaster2\Factory Files\Fingerprints'.
6. Click 'Save'.
7. Install the fingerprint file – see Section 5.6, page 34.

Appendix A CalMaster2/CheckMaster Clock Utility

Included with the CalMaster2 IRIS software is a utility that enables the CalMaster2 or CheckMaster clock to be synchronized with a PC.

To run the utility:

1. Connect the CalMaster2 to the PC – see section 4.2, page 22.
2. From the Windows 'Start' menu select 'Run…'.
3. Type: 'C:\Program Files\ABB\CalMaster2\Clock.exe' or click 'Browse' to locate the file. The utility appears:



4. Select the COM port that the CalMaster2 is connected to.
5. Click the 'Get CalMaster Time' button or press F5.
6. Click the 'Get CalMaster Date' button or press F6.
7. Click the 'Sync with PC Time button' or press F7.
8. Click the 'Sync with PC Date' button or press F8. The CalMaster2/CheckMaster now uses the same date and time as the PC.

Notes

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- Zirconia Oxygen Analyzers, Katharometers, Hydrogen Purity and Purge-gas Monitors, Thermal Conductivity

Customer Support

We provide a comprehensive after sales service via a Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

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Fax: +44 (0)1453 829671

United States of America
ABB Inc.
Tel: +1 215 674 6000
Fax: +1 215 674 7183

Client Warranty

Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification.

Periodic checks must be made on the equipment's condition. In the event of a failure under warranty, the following documentation must be provided as substantiation:

1. A listing evidencing process operation and alarm logs at time of failure.
2. Copies of all storage, installation, operating and maintenance records relating to the alleged faulty unit.

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The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

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